



**Conflicting Framings in Global Conservation  
Governance:  
Consequences for African Megafauna**

Michael 't Sas-Rolfes

DPhil thesis

School of Geography and the Environment  
&  
St Antony's College

Supervisors:

Dr Laurence Wainwright  
Dr Dustin Garrick

Hilary Term 2024

## **Abstract**

Within the domain of biodiversity conservation, attrition of Africa's free-ranging populations of indigenous megafauna is a major concern for both governments and civil society. However, within the current global governance framework, there are conflicting approaches toward conserving African megafauna, aligned with broader discourses in environmental philosophy. For example, the governments of some African range states view these animals as harvestable natural resources and support utilization practices such as commercial hunting and the sale of live animals and body parts, whereas those practices are strongly opposed by influential international NGOs and, by association, governments of other countries. This results in contested global wildlife trade policies.

Pursuing a three-paper route, my DPhil thesis examines the nature, causes, and consequences of these conflicting approaches toward conserving African elephants, rhinos, and lions, by drawing on case study material obtained through practical engagements with wildlife trade policy processes. Grounded in a pragmatist approach, my research draws from a broad range of disciplines, strongly informed by institutional analyses and evaluations of the use of evidence. Linking a synthesis of existing institutional theories with a participatory research approach, it employs mixed methods and a multi-stage evaluation design, aimed at providing novel insights into the linkages between social constructs, formal institutions, wildlife trade policy, actor behaviour, and conservation outcomes.

I find that conflicting trade policies are partly determined by contrasting underlying ideological framings of the nature of the problem to be solved, including three somewhat incompatible overarching policy narratives, which I term Global Control, Decentralized Conservation, and Animal Protection. I further find that the international wildlife trade regime established by the CITES treaty shapes actor behaviour in a way that reinforces dominance of the Animal Protection paradigm over that of Decentralized Conservation. Finally, by analysing a long-term data set relating to rhino conservation outcomes I find that decentralization policies appear to outperform centralized policies such as trade restrictions. I conclude with a synthesis of the findings, discuss the implications thereof, and provide some suggestions for governance reform and further research.

## **Dedication**

I dedicate this work to:

**Dr Hans Jay Rolfes**

My grandfather, a remarkable man, whom I only knew during the first four years of my life,  
but who nevertheless remained a pillar of inspiration for me.

&

**Jean Eunice du Toit**

A beautiful soul, who loved nature as much as I do, and left this world too soon.

## **Acknowledgements**

This research has benefitted from the generous input and support of far too many people to mention individually, even though I would ideally like to thank each one of them by name. I thank all my colleagues in the conservation world, both academics and practitioners, for their camaraderie over the years. I similarly thank my family and friends for their understanding and support during these years of research, especially my long-suffering mother, Rita.

For their initial encouragement, and for facilitating a funding source for me, I would like to thank Frank and Deborah Vorhies of Earthmind. Over the long span of this work, I also benefitted from the input of four variously talented supervisors, and I would like to thank Paul Jepson for his inspiration, Bob Hahn for refreshing my economic skills, Dustin Garrick for getting me back on track with an institutional analytic approach, and finally, Laurence Wainwright for engaging deeply to get me over the line.

I also benefitted greatly from the kind support of E.J. Milner-Gulland and am most grateful for the opportunities afforded to me by joining the ICCS team and Oxford Martin Program on Wildlife Trade. A big shout out to all my colleagues there, and especially to Dan Challender, Amy Hinsley, and Diogo Veríssimo. Similarly, I thank David Macdonald, Amy Dickman, and the rest of the WildCRU team for their generous engagement. Rafael Ramírez at the Oxford Scenarios Programme took me under his wing to train me in participatory scenario planning methodology and I am deeply grateful to him and his supportive colleagues. I would also like to thank my DPhil colleagues in Paul Jepson's Conservation Governance Lab and Dustin Garrick's group, who provided a pillar of support during the height of the COVID era.

This participatory research would not have been possible without the kind cooperation and engagement of various colleagues in the IUCN African Rhino Specialist Group and IUCN SULi, as well as the broader CITES community, and several kind members of the South African Department of Forestry, Fisheries, and the Environment, and SANBI. I would also like to thank all of those who agreed to the long in-person key informant interviews that helped to align my inquiry: Tom Milliken, Holly Dublin, Thea Carroll, Malan Lindeque, Simon Stuart, John Hume, Mark Jones, Mary Rice, and Cathy Dean. Thanks also to Tina Hiller for her conscientious contribution to our joint systematic literature review, to Vivienne Williams for our fruitful research collaboration on what turned out to be a highly contentious issue (captive lions), and to Richard Emslie for helping me get to grips with the rhino data.

In the early stages of the research, I benefitted from exposure to the Environmental Ethics community, and I am grateful to David Schmitz for facilitating that. In the CITES and policy domain, Ron Orenstein provided very helpful early and subsequent input that shaped the direction of my inquiry, and I am also grateful to Liz Bennett, Susan Lieberman, Colman O’Criodain and the staff of the CITES Secretariat for being accessible to answer questions. Similarly, Erika Alberts, Peter Oberem, and John Hanks, all provided useful support and access during early consultations with the South African private wildlife sector. Terry Anderson, Brian Child, and Dean Lueck provided useful academic inputs and commented on early drafts of my work, as did Yadvinder Mahli and Constance McDermott in their capacity as interim internal examiners. I am grateful to them all and all those I have missed.

Finally, I would like to extend my heartfelt gratitude to Jennifer Gooden, who walked much of this road with me, cheering me on right until the end. I would never have done this without her and cherish the many fond memories of our shared journey.

# Table of Contents

<b>List of Tables</b> .....	<b>10</b>
<b>List of Figures</b> .....	<b>11</b>
<b>List of Abbreviations</b> .....	<b>12</b>
<b>1 Introduction</b> .....	<b>14</b>
1.1 Overview .....	15
1.2 Research background and objectives.....	18
1.3 Research questions.....	21
1.4 Scope and approach.....	22
1.5 Structure of thesis .....	23
1.6 Contribution .....	23
<b>2 Literature Review</b> .....	<b>24</b>
2.1 The evolution of wildlife trade policy.....	24
2.2 Institutional theory .....	37
2.3 Ideational influences on wildlife trade policy positions.....	39
2.4 CITES regime influences on actor behaviour .....	41
2.5 Conservation outcomes of varying institutional arrangements.....	43
<b>3 Methodological approach</b> .....	<b>45</b>
3.1 Research philosophy .....	46
3.2 Research design and methods.....	49
3.2.1 Overall research strategy .....	51
3.2.2 Analytical frames and relevant data types.....	52

3.2.3	<i>Data sampling approach</i> .....	52
3.2.4	<i>Data collection</i> .....	55
3.2.5	<i>Data analysis</i> .....	57
3.2.6	<i>Ethics approval</i> .....	59
3.3	<b>From research design to action</b> .....	<b>59</b>
<b>4</b>	<b>A conflict of visions: Ideas shaping wildlife trade policy toward African megafauna</b> .....	<b>60</b>
4.1	<b>Abstract</b> .....	<b>60</b>
4.2	<b>Introduction</b> .....	<b>61</b>
4.3	<b>Theoretical framework</b> .....	<b>66</b>
4.4	<b>Research approach, materials, and methods</b> .....	<b>69</b>
4.4.1	<i>Data collection</i> .....	71
4.4.2	<i>Data analysis</i> .....	71
4.5	<b>Results</b> .....	<b>73</b>
4.5.1	<i>Trade policy issues</i> .....	73
4.5.2	<i>Actors</i> .....	76
4.5.3	<i>Cognitive ideas</i> .....	77
4.5.4	<i>Normative ideas</i> .....	79
4.5.5	<i>Policy narratives</i> .....	82
4.6	<b>Discussion</b> .....	<b>86</b>
4.7	<b>Acknowledgements</b> .....	<b>93</b>
4.8	<b>References</b> .....	<b>94</b>
4.9	<b>Supplementary Material</b> .....	<b>107</b>
<b>5</b>	<b>Transition: From ideas to action for policy change</b> .....	<b>125</b>
<b>6</b>	<b>Playing the CITES game: Lessons on global conservation governance from African megafauna</b> .....	<b>126</b>

<b>6.1</b>	<b>Abstract .....</b>	<b>126</b>
<b>6.2</b>	<b>Introduction.....</b>	<b>127</b>
<b>6.3</b>	<b>Literature review .....</b>	<b>130</b>
<b>6.4</b>	<b>Approach and methods .....</b>	<b>134</b>
6.4.1	<i>Approach.....</i>	<i>134</i>
6.4.2	<i>Methods.....</i>	<i>137</i>
<b>6.5</b>	<b>Results.....</b>	<b>140</b>
6.5.1	<i>Rule framework.....</i>	<i>140</i>
6.5.2	<i>Case studies .....</i>	<i>142</i>
6.5.3	<i>Common features .....</i>	<i>146</i>
6.5.4	<i>Diagnostic overview.....</i>	<i>150</i>
<b>6.6</b>	<b>Discussion .....</b>	<b>152</b>
<b>6.7</b>	<b>Conclusion .....</b>	<b>157</b>
<b>6.8</b>	<b>Acknowledgements .....</b>	<b>159</b>
<b>6.9</b>	<b>References.....</b>	<b>160</b>
<b>6.10</b>	<b>Supplementary Material .....</b>	<b>172</b>
<b>7</b>	<b>Transition: From policy to consequences.....</b>	<b>190</b>
<b>8</b>	<b>African rhino conservation and the interacting influences of property, prices, and policy.....</b>	<b>191</b>
<b>8.1</b>	<b>Abstract .....</b>	<b>191</b>
<b>8.2</b>	<b>Introduction.....</b>	<b>192</b>
<b>8.3</b>	<b>Historical background.....</b>	<b>196</b>
<b>8.4</b>	<b>Theoretical Framework.....</b>	<b>201</b>
8.4.1	<i>Property .....</i>	<i>202</i>
8.4.2	<i>Prices .....</i>	<i>205</i>
8.4.3	<i>Policy .....</i>	<i>206</i>

<b>8.5</b>	<b>Methods and data .....</b>	<b>208</b>
8.5.1	<i>Data.....</i>	210
<b>8.6</b>	<b>Analysis and Results .....</b>	<b>211</b>
<b>8.7</b>	<b>Discussion .....</b>	<b>222</b>
<b>8.8</b>	<b>Acknowledgements .....</b>	<b>227</b>
<b>8.9</b>	<b>References.....</b>	<b>228</b>
<b>8.10</b>	<b>Supplementary information.....</b>	<b>245</b>
<b>9</b>	<b>Discussion .....</b>	<b>254</b>
9.1	Toward a theory of global wildlife trade policy evolution .....	257
9.2	Contribution, limitations, and future research avenues .....	258
<b>10</b>	<b>Conclusion.....</b>	<b>260</b>
	<b>Bibliography .....</b>	<b>263</b>
	<b>Appendices .....</b>	<b>323</b>

## List of Tables

Table 1. Five phases of CITES history .....	25
Table 2. Key thematic issues .....	76
Table 3. Cognitive arguments.....	78
Table 4. Normative arguments .....	80
Table 5. Relevant events and projects .....	109
Table 6. CITES agenda items .....	110
Table 7. Formal key informant interviews .....	112
Table 8. Campbell’s actor typology .....	116
Table 9. Extended thematic actor typology .....	116
Table 10. Trade policy stances of key non-state actors.....	120
Table 11. Governance needs: Checklist of factors .....	136
Table 12. CITES Rule framework.....	141
Table 13. Trade policy stances of key non-state actors.....	149
Table 14. Four types of goods .....	203
Table 15. Property regimes.....	204
Table 16. Significant regulatory interventions .....	213
Table 17. Rhino conservation success by country category .....	215
Table 18. Process tracing tests for causal inference .....	248
Table 19. Rhino poaching numbers .....	250
Table 20. Rhino price data.....	251

## List of Figures

Figure 1. Analytical framework.....	69
Figure 2. Rhino numbers and trade restrictions.....	212
Figure 3. Rhino poaching numbers by country .....	214
Figure 4. African rhino numbers by country .....	217
Figure 5. Black and white rhino numbers in South Africa.....	218
Figure 6. White rhino trophy and live prices (a); numbers and trophy premium (b).....	220

## List of Abbreviations

AfRSG	(IUCN SSC) African Rhino Specialist Group
BFF	Born Free Foundation
CBD	Convention on Biological Diversity
CIC	International Council for Game and Wildlife Conservation
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CITES AC	CITES Animals Committee
CITES SC	CITES Standing Committee
CMS	Convention on Migratory Species
CoP	Conference of Parties
DFFE	(South African) Department of Forestry, Fisheries, and the Environment
ECI	Environmental Conventions Index
EIA	Environmental Investigation Agency
EPI	Elephant Protection Initiative
EU	European Union
EWT	Endangered Wildlife Trust
HSI	Humane Society International
IDGEC	Institutional Dimensions of Global Environmental Change
IAD	Institutional Analysis and Design
ICCS	Interdisciplinary Centre for Conservation Science (at University of Oxford)
ITRG	Ivory Trade Review Group
IUCN	International Union for Conservation of Nature (also known as World Conservation Union)
MEA	Multilateral environmental agreement

NGO	Non-governmental organisation
OMP–IWT	Oxford Martin Programme on the Illegal Wildlife Trade
PROA	Private Rhino Owners Association
SADC	Southern African Development Community
SA-HLP	South African High-Level Panel
SANBI	South African National Biodiversity Institute
SAPA	South African Predators Association
SDGs	Sustainable Development Goals
SES	Social-ecological system
SSC	(IUCN) Species Survival Commission
SSN	Species Survival Network
SULi	(IUCN) Sustainable Use and Livelihoods Specialist Group
TEV	Total Economic Value
TRAFFIC	Trade Records Analysis of Fauna and Flora in Commerce (also known as the Wildlife Trade Monitoring Network)
UK	United Kingdom of Great Britain and Northern Ireland
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme (also known as UN Environment)
USA/US	United States of America
WAP	World Animal Protection
WCS	Wildlife Conservation Society
WildCRU	Wildlife Conservation Research Unit (at University of Oxford)
WRSA	Wildlife Ranching South Africa
WWF	World-Wide Fund for Nature (also known as World Wildlife Fund in the USA)

# 1 Introduction

Biodiversity loss persists as one of the world's most pressing environmental issues, calling for international cooperation to address it (Rockström et al., 2009; Diaz, 2019). The academic literature increasingly features work on global environmental governance and related international agreements, with disciplinary perspectives from political science (Kalfagianni & Young, 2022), economics (Pouw et al., 2022), and law (Sand & McGee, 2022), and increasing attention toward biodiversity conservation (Petersson & Stoett, 2022). Whereas scholars of environmental governance across disciplines have long emphasized the significance of analysing institutions—i.e., the rules that shape human behaviour (e.g., Young, 1986; Ostrom, 1990), application of this approach toward aspects of global biodiversity conservation governance, notably that of wildlife trade policy, has been limited. My research, oriented around three papers submitted for peer review, aims to address that gap by focusing on institutional aspects of conservation and contested trade policy toward threatened species of African megafauna, given the prominence of those species in international efforts aimed at protecting wildlife.

By engaging directly with policy processes that potentially lead to consequential institutional changes, I collected and analysed data using multiple mixed research methods to investigate the causes and consequences of varying and oft-conflicting views on wildlife trade. The results of this interdisciplinary research shed new light on the interacting institutional factors that shape wildlife trade policy and its outcomes. In this chapter I provide an overview of my research topic and central thesis, outline my approach and objectives, and elucidate my research questions and the scope of this work. I conclude by outlining the structure of the thesis and my contribution to the literature.

## 1.1 Overview

Conserving Africa's megafauna is a significant and unresolved contemporary policy issue, generating substantial social conflict within the global environmental governance regime. Charismatic mammals such as African elephants, rhinoceroses (hereafter rhinos), and lions, are potentially dangerous to humans, and threatened with potential extinction in the wild by a combination of factors related to human encroachment, including habitat loss and direct killing. They have also captured the human imagination over millennia, being revered by African people as spirit animals, offering prestige to hunters (comprising three of the 'Big Five' most challenging targets), and more recently as popular subjects of wildlife tourist viewing (and photo-videography) as part of the African 'safari' experience.

In recent decades, these animals have also acted as flagships to assist fund-raising efforts of non-governmental organisations concerned with environmental conservation. The plight of African rhinos was used to campaign for seed funding for the World Wildlife Fund (WWF), currently one of the world's largest conservation NGOs. Recent revelations of elephant sentience and iconic images of Elsa the lioness and the Lion King have helped raise the (often sentimental) popularity of these species among Western publics. However, in Africa, they are increasingly confined to state protected areas from which humans have been evicted and outside of these areas they continue to pose a threat to the lives and livelihoods of local people. All these factors combine to cause these animals to be the subject of various forms of human-wildlife conflict, which often translates to inter-human conflict between people with differing circumstances and consequent values.

The case to conserve genetically and functionally viable populations of these species in adequately sizable natural landscapes is strong. With their large body size, elephants and

rhinos act as important ecosystem engineers, playing a vital role in maintaining the integrity of habitats such as savannahs and forests. As a keystone predator, lions also play a vital functional ecological role. Conservation scientists routinely reaffirm the significance of these megafauna for biodiversity conservation in general (e.g., Ripple et al., 2016). However, to successfully conserve these species, humans must act collectively, ideally overcoming their differences and resolving conflicts over how this is best achieved.

My research focuses on a particularly controversial topic, namely conflict over policy toward international trade of these animals, in both live specimens and their body parts (which I term ‘physical commodification’). For this topic, I drew initial inspiration from a study by Hulme (2009), who investigated the underlying causes of policy conflict over climate change. As with climate change, international wildlife trade and conservation governance is an issue with global reach, interconnected with various other issues (including climate change) in the context of a complex adaptive social-ecological system (Ostrom, 2009). Since the early twentieth century, the world’s governments have approached it as an international issue, gradually developing the contemporary global governance system within which the current conflict takes place. Simultaneously, there has been growing and active public opposition to various forms of commodification, including the physical commodification of wildlife, (Abercrombie, 2020; ’t Sas-Rolfes, 2016).

A central player in the global conservation governance landscape is the International Union for Conservation of Nature (IUCN), which was formed during the mid-twentieth century as a coalition between governments and civil society organizations (Boardman, 1981). With a strong focus on conservation science, one of the IUCN’s divisions, the Species Survival Commission (SSC) hosts a wide variety of taxonomic specialist groups, consisting of

scientists with relevant species expertise. The IUCN also has other divisions, including the World Commission on Environmental Law, which has assisted with the drafting of international environmental treaties. Among these is the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which has played a central role in governing international wildlife trade since it entered into force in 1975 (Wijnstekers, 2018). A subsequent treaty, the Convention on Biological Diversity (CBD), became effective in 1993 but did not supersede CITES, even though its principles and approach are somewhat different. CITES continues to play a vital role in shaping global conservation governance by framing the international regime for wildlife trade.

Whereas the study of conservation conflict is a rapidly growing field (see Redpath et al., 2015) to date there has been relatively limited research on international policy conflict in relation to trade—most research has tended to focus on more localized issues. However, recent work by Duffy (2022) has highlighted the political aspects of wildlife trade and details how surges in illegal killing (hereafter ‘poaching’) of elephants and rhinos from the year 2007 have resulted in a reframing of conservation as a ‘security’ issue, potentially creating greater social conflict, including violence, and undermining collaborative long term conservation goals. An accompanying resurgent push towards protectionism and trade prohibition has also created conflict between those actively opposing physical commodification of wildlife and several African countries in the Southern African Development Community (SADC) region, which have typically favoured a ‘sustainable use’ approach that enables some harvesting and trade of wildlife products, including those from the charismatic species.

The concept of ‘framing’ (van Gorp, 2007) has gained salience in social science as an agenda-setting device and is relevant to understanding the genesis of conflict. Issues framed

differently will tend to suggest different approaches. Framing wildlife trade as a crime may lack social legitimacy among communities with long traditions of hunting animals and harvesting and consuming their meat and other products. Legality and social legitimacy are not necessarily aligned (see Beckert & Dewey, 2017) and such misalignment represents a conflict between formal (e.g., codified laws) and informal (e.g., cultural norms) institutions (Lauth, 2015). Engaging with and understanding the nature and role of interacting institutions is increasingly recognized as a crucial determinant of structuring and implementing effective governance (Ostrom, 1990; North, 1990; Scott, 1999; Young, 2002).

The central thesis of my work is that, due to the misalignment of institutions, the current international wildlife trade regime has locked policy conflict into the broader conservation governance system, to the detriment of African megafauna. I argue that to conserve elephants, rhinos, and lions more effectively, requires a deeper understanding and engagement with the institutional drivers of this conflict, including potentially discordant framings, ideally with a view toward ameliorating the conflict for the benefit of conservation.

## **1.2 Research background and objectives**

I engaged in this research with experience as a conservation practitioner, researcher, and specialist consultant, supported by training in commerce, environmental management, and resource economics. I have also had a personal interest in and passion for wildlife and conservation since my childhood years, engaging with African nature as a field researcher and photographer. I have never hunted animals nor been directly involved in physical wildlife trade, but through practical voluntary experience (co-managing an NGO-run wildlife reserve) during my undergraduate study years in South Africa, I learned how the domestic wildlife economy and conservation sector function and recognised the role that hunting and wildlife

trade played in promoting private conservation initiatives, which greatly expanded the country's wildlife estate, including biodiverse habitat and rapidly recovering numbers of previously depleted species.

Pursuing a degree in environmental resource economics, followed by consultancy work in the wildlife conservation and trade sector in the 1990s, enabled me to establish a wide network of international contacts. Returning to academia as a mature student, I was able to draw on this experience and network to gain access to explore the issues in more depth than the average younger graduate student. Starting with the observation of wildlife trade policy conflict, I formulated my initial research questions around why it is happening (the causes), what impact it is having on conservation outcomes (the consequences), and how these causes and consequences interact systemically across scales (from global to local).

Several aspects of my positionality enabled me to undertake this research. Immediately prior to commencing, I served on a South African Ministerial Committee of Inquiry appointed to investigate the feasibility of legalising rhino horn trade and was thus well placed to engage with relevant stakeholders. Serving on two IUCN Specialist Groups (the SSC African Rhino Specialist Group and the Sustainable Use and Livelihoods Specialist Group) I was able to attend CITES meetings and observe unfolding events in a neutral capacity (IUCN is mandated to act only in a technical advisory role and not to engage in advocacy). During the research period I also joined the Oxford Martin Programme on the Illegal Wildlife Trade (OMP-IWT)<sup>1</sup> as a research fellow and engaged in various collaborative research projects aimed at informing policy with scientific evidence. In that capacity, I was invited to engage in a

---

<sup>1</sup> In early 2021 the name was changed to the Oxford Martin Programme on Wildlife Trade.

collaborative research project to obtain data to inform the South African CITES Scientific Authority's decision on an appropriate quota for the export of lion bones obtained from domestic captive breeding facilities. Toward the end of the period, I was appointed to serve on a South African Ministerial advisory panel ('High Level Panel'; SA-HLP) to investigate and advise on all matters relating to the commodification of iconic species, including elephants, rhinos, and lions, and this provided me with unique access to full range of public representations on these issues.

My interest in this topic is pragmatic and solutions-focused. I view the problem as two-tiered, i.e., 1) the attrition of species/ecosystems and 2) intractable policy conflict. Given that the conflict includes different worldviews, including ontologies and epistemologies, I adopted an approach rooted in the philosophy of pragmatism, which I explain further in Chapter 3. This approach aligns with systems thinking but, recognizing the human element of conflict, places human agency at its centre. Hence, I focused on human actors and their motivations, as shaped by institutional incentives, grounded in the notion that institutional arrangements ultimately affect outcomes (North, 1990; Ostrom & Cox, 2010).

I started my research with the conviction that to develop a deeper understanding of a system, one must engage with it directly. In this case, that entailed involvement with the broader global conservation governance system and the drivers and role of market institutions and trade policy within it. My personal goal for this research was therefore to develop a deeper understanding of how the system works by engaging with both the operational and epistemological aspects of it. This motivated a participatory approach, inspired by 'participatory action research' (Reason & Bradbury, 2013), which is highly collaborative and motivated toward a certain goal, in this instance being my shared interest (with other

colleagues in conservation) in informing wildlife trade policy with evidence, consistent with pursuing the objective of evidence-based policy (Cartwright & Hardie, 2012). However, I realised that there are important questions concerning what constitutes ‘evidence’ and I needed to address these too, understanding how it is used in policy formation. This called for grappling with concepts as well as observing ‘evidence’ in action.

At the outset, my intended contribution aimed ambitiously at three levels:

- 1) academic: to advance the academic literature by moving the frontiers of (inter)disciplinary knowledge (but starting out with no clear idea of where exactly these might be),
- 2) practical: to improve conservation outcomes as per the stated objectives in global public policy documents such as the United Nations Sustainable Development Goals (with visible results on the ground), and
- 3) policy: to bridge the gap between the academic and practical, to deepen understanding, thereby opening avenues for i) useful new research and ii) policy reform.

### **1.3 Research questions**

Given an overarching objective of conserving African megafauna, and further recognizing the prevalence of conflicting views on how this is best achieved, my research investigated the evolution of international trade policy toward these species through an institutional analytic lens. My central research question can be stated formally as follows:

*How do interacting institutions shape wildlife trade policy and conservation outcomes for African megafauna?*

Delving deeper into the question necessitated identifying relevant institutional elements and appropriate analytic methods. I identified three distinct sub-categories of investigation. The first comprised the ideational influences driving conflicting approaches toward wildlife trade policy. The second concerned how the formal rules established by the CITES regime shape and constrain actor behaviour. The third concerned the relationship between various types of institutional arrangements (linked to wildlife trade) and conservation outcomes. These can be stated formally as three more specific research questions:

- 1) *What are the ideational elements that shape differing views and actor stances toward wildlife trade policy?*
- 2) *How does the CITES regime shape actor behaviour?*
- 3) *What are the conservation outcomes of varying institutional arrangements?*

These three questions inform the scope of my overall literature review and methodological approach, as detailed in Chapters 2 and 3 of this thesis document.

## **1.4 Scope and approach**

The case study subject species (described in detail in Section 4.9: S1) were pre-selected. At first, I chose African elephants and rhinos. However, as my research developed, I added African lions, believing that their inclusion would provide further useful perspective. The species were selected for their prominence in trade policy debates and in conservation governance discourse in general, and for data availability. The geographic scope of my investigation extended from continental African concerns within the global context to a focus on southern Africa, and South Africa in particular, partly for practical reasons of proximity, but also because South Africa has enabled wildlife commodification to greater degrees than other countries, thus providing an interesting setting to analyse policy boundary conflict.

Although the selected species have been widely studied, the approach adopted in this thesis is unique in several respects. It is grounded in a pragmatist research philosophy (see Section 3.1) and adopts novel combinations of analytical frameworks associated with varying applications of institutional theory to investigate the research questions. The synthesis of the three studies has enabled me to propose an incipient theory of the evolution of global wildlife trade policy and governance, as outlined in Chapter 9, and provides new insights into institutional interplay across institutional forms and scales.

## **1.5 Structure of thesis**

The thesis is structured as follows: Chapter 2 provides a review of relevant literature. Chapter 3 describes my methodological approach. Chapters 4, 6, and 8 constitute my three studies, with Chapters 5 and 7 providing short text to describe the links between the studies. Chapter 9 synthesizes the findings of the three studies and discusses novel the implications and Chapter 10 concludes with some brief reflections.

## **1.6 Contribution**

My contribution consists of three articles submitted for peer review, aligned with Chapters 4, 6, and 8. All three articles comprise essentially my own work, with light collaboration in each case. During my participatory research process, I engaged with numerous related side projects, mostly in the pursuit of additional relevant evidence, and published accordingly. A list of those publications is included as Appendix 2 (on page 324) of this thesis document. Appendix 3 contains details of my co-author contributions and copies of the receipts of the three initial submissions. All three papers were published during 2024—details appear as footnotes to each relevant chapter heading.

## **2 Literature Review**

In this chapter, I review literature relevant to my overarching and three subsidiary research questions. For context, I start with an overview of the evolution of wildlife trade policy in relation to the selected African megafauna (case study) species, linking this to the academic literatures on the effectiveness of CITES (more specifically) and environmental governance (more generally). Next, I review and interpret literature on institutional theory that informed my analytical approach. Finally, I turn to the more specific questions of ideational influences, shaping of actor behaviour, and conservation outcomes, to i) identify the knowledge gaps that inspired my three studies and ii) identify relevant strands of institutional literature to provide appropriate analytical frameworks to employ.

### **2.1 The evolution of wildlife trade policy**

Growing 19<sup>th</sup> century concerns that commercial overexploitation threatened the survival of wild species prompted transatlantic attempts to regulate interjurisdictional trade in certain listed species during the early 20<sup>th</sup> century (Epstein, 2006; Sand, 1997). These attempts were only partly successful, being disrupted by the World Wars. The firmer establishment of a global treaty was facilitated by the creation of the IUCN in the mid-20<sup>th</sup> century (Boardman, 1981). As the world's first international federation of conservation bodies, the IUCN initiated discussions in the 1950s that led to the eventual drafting of CITES.

I identify five relevant phases in the history of CITES, punctuated by four pivotal occasions that impacted the case study species. Phase 1 commenced during the 1960s (when the treaty was first proposed) and entailed the original conception and negotiations that led up to the

ratification of the treaty in mid-1975. Ratification can be considered as a significant event, resulting in the initial implementation of trade restrictions that had a distinct impact on, for example, prices for rhino horn, which increased dramatically in the subsequent two years, further incentivising poaching and illegal trade (’t Sas-Rolfes, 2000). Phase 2 ran until the seventh CITES Conference of the Parties (CoP7) in late 1989, being the second pivotal occasion, at which African elephants were listed on CITES Appendix I, the so-called ‘ivory ban’—an event of great significance in the history of wildlife trade policy (Princen, 1994). Phase 3 lasted until CoP9 in late 1994, a relatively short period in the build-up to the next pivotal development at that meeting, being the acceptance of new CITES listing criteria, which were regarded by many as constituting a more scientific and objective approach to trade policy (Carey, 1999) and which opened the way for some subsequent nuanced relaxation of trade restrictions. Phase 4 lasted until CoP14 in mid-2007, being around the time at which poaching start to resurge, and the relaxation of restrictions essentially halted. I treat the subsequent period as Phase 5, which includes the duration of my research. Key characteristics of the five phases, including relevant broader contextual characteristics are summarized in Table 1, below, and then discussed in further detail.

**Table 1. Five phases of CITES history**

Phase	Start date	End date	Event	# of CITES Parties	Poaching trends*	Dominant trade policy direction*	Global Environmental Governance context	Global political context	South African political context
1	Sep-63	Jun-75	CITES Ratification	14	Poaching picking up	Trending toward regulation	Stockholm Conference era	Emerging stagflation	Apartheid era – stability
2	Jul-75	Oct-89	CITES CoP 7	101	Rampant poaching	Listings and trade restrictions	Build up to Brundtland; early MEAs	Gradual recovery	Apartheid era – instability
3	Nov-89	Nov-94	CITES CoP 9	126	Poaching slows	Realignment	UNCED (Rio) era	Post-Berlin wall era	Transformation era
4	Dec-94	Jun-07	CITES CoP 14	171	Poaching bottoms out	Nuance and compromise	Millenium Ecosytem Assessment era	Globalisation surge	Post-democratic era
5	Jul-07			(now 184)	Poaching resurges	Return to restriction	SDG era	Post Global Financial Crisis	Zuma and post-Zuma era

\*Note: This applies principally to elephants and rhinos

**Phase 1** (1963-1975) took place during a time of peaking post-war United States (US) hegemony, culminating with the emergence of economic stagflation (Keohane, 1984). It was initiated at an IUCN conference in Arusha, Tanzania, in 1961 when a US delegation proposed an international convention to control the trade in endangered species (Boardman, 1981). This led to a formal resolution at the eighth IUCN general assembly held in Nairobi, Kenya, in September 1963 (Wijnstekers, 2018), following which the IUCN Environmental Law Centre (in Bonn) prepared and circulated several successive drafts for comment to both governments and NGOs (Sand, 1997). Following some alignment with the logic of the newly drafted US Endangered Species Act, a plenipotentiary conference of eighty parties settled upon a final version of the convention text in 1973 in Washington DC. In January 1974, the USA became the first country to ratify CITES, which entered into force on 1 July 1975.

Phase 1 determined several essential characteristics of the treaty. The dominant roles of the IUCN and associated NGOs, of legal architects, and the USA as the contemporary hegemon are noteworthy, as is an influential role of East African conservation interests and, following the 1972 United Nations (UN) Conference on the Human Environment in Stockholm, the nascent UN Environment Programme (Epstein, 2006). Whereas earlier iterations of the CITES text considered including references to habitat conservation (Bowman, 2013), the final version focuses exclusively on addressing international trade as a threat to wild species and follows a specific logic. Species are listed on one of three appendices based on the assessed extent of the threat of extinction and associated assumed need to control trade to mitigate this threat; trade is thus regulated in a prescribed way for each Appendix, essentially through permit issuance systems.

This listing and permit issuance approach has fundamentally shaped the subsequent evolution of CITES and persisted throughout its history. Species assessed as threatened with extinction that are or may be affected by international trade are listed on CITES Appendix I; for such species, commercial trade in wild specimens is prohibited, albeit with certain exemptions. Appendix II lists species that are not necessarily threatened with extinction but for which it is considered that trade must be controlled to avoid potentially unsustainable levels of utilization; for such species, trade is contingent on the issuance of an export permit from the country of origin. Appendix III lists species protected within at least one country, for which cooperation is requested from other CITES Parties to control trade. From the outset, the convention allowed Parties to take ‘stricter domestic measures’ than those prescribed by the listing system.

**Phase 2** (1975-1989) comprised the early operational stages of the treaty until the watershed event of the 1989 Appendix I listing of African elephants (ivory trade ban), by which time over 100 Parties had acceded to CITES. It took place in the context of gradual global economic recovery overseen by the relatively weaker but still dominant USA, and a growing interest in the concept of sustainable development through multilateral cooperation, as per the 1987 Brundtland report. This Phase also saw the creation, in 1976, of TRAFFIC, the Wildlife Trade Monitoring Network, which evolved into a separate NGO grounded in a strategic alliance between the IUCN and the WorldWide Fund for Nature (WWF).

Of the charismatic species of interest to my research, by early 1977 all had been listed on either Appendix I (Asian elephants and lions, and all rhino species) or Appendix II (African elephants and lions). Despite this and other subsequent CITES-related measures during this time both rhino and elephant poaching persisted, driven in large part by soaring prices for

rhino horn and elephant ivory (’t Sas-Rolfes, 2000). African populations of these species declined rapidly, with rhinos becoming extinct or near extinct in most range states (with the notable exception of South Africa) and continental elephant populations declining by some 50% between 1979 and 1989.

The apparent failure of the CITES Appendix II listing to mitigate a decline in African elephant populations prompted a proposal to up-list African elephants to Appendix I at CoP7 in 1989 (Glennon, 1990). The proposal was preceded by unilateral action from some of its supporters—for example, the USA banned ivory imports and Kenya staged a dramatic ivory stockpile burn to signal its intent to end the trade. Despite strong support from various Parties, including East and West African elephant range states, the proposal was vigorously opposed by a group of Southern African range states that relied on legal sales of ivory and elephant hides to offset the costs of elephant management, which included the controversial practice of culling to control numbers. However, with rising awareness of elephant sentience and shifting public sentiment toward the welfare of individual animals, the proposal also attracted strong support from a growing faction of NGOs that opposed culling and the harvest of body parts and sought a stricter legalistic approach to animal protection. After much negotiation and attempts at compromise, the proposal was eventually put to a vote with the required two-thirds majority of the Parties approving of the up-listing.

In the lead up to the 1989 deliberations on the African elephant up-listing proposal, a CITES African Elephant Working Group had commissioned an independent body, the Ivory Trade Review Group (ITRG), to investigate the impact of regulated ivory trade on African elephant populations and prepare a report as input to CoP7. The ITRG included biologists and economists, who had varying perspectives on whether a trade ban should be imposed or not

and subsequently shared these views in various publications during the following (Phase 3) period (see 't Sas-Rolfes et al., 2019, and below).

During Phase 2, nascent scholarship on global environmental governance adopted an institutional perspective to analyse the emergence of international cooperation to establish resource regimes, with a focus on marine fisheries (e.g., Young, 1986; 1989). Evaluations of CITES were limited with a predominant view in the legal literature that it was the most successful of all international wildlife conservation treaties (Lyster, 1985), given the rapid initial accession and engagement by most relevant Parties. However, this view was challenged by a more detailed technical analysis of the treaty, which cited both theoretical and empirical concerns (Kosloff & Trexler, 1987). These included the treaty's failure to consider habitat loss as a key driver of species extinction, its inherent inability to deal adequately with the complexity and specificity of most wildlife trade issues, and poor species recovery performance after listings.

**Phase 3** (1989-1994) covers a relatively shorter period between CoP7 and CoP9 characterised by much debate over the appropriateness of the ivory trade ban and of CITES in general, culminating with some significant changes to the convention. This period featured momentous geopolitical change, including the fall of the Iron Curtain and democratic reform in South Africa. It is also notable for the 1992 UN Conference on Environment and Development (in Rio de Janeiro), which spawned the CBD. The uptake of the CBD was rapid, and membership had already surpassed CITES by 1994 (Escobar-Pemberthy & Ivanova, 2020).

A survey of nine African countries prior to CoP9 indicated that elephants had received a temporary reprieve from the CITES up-listing, but that poaching was increasing again (Dublin et al., 1995). The authors argued that the effect of the ban itself was indeterminate because of the confounding factor of field protection funding that first rose and then waned. In contrast, the decline of rhino populations slowed down markedly, apparently assisted by the strong international efforts to persuade key consumer countries (i.e., those with the most end users) to close legal domestic rhino horn markets. The USA applied diplomatic pressure through legislation known as the Pelly amendment (Charnovitz, 1994), threatening trade sanctions against China and Taiwan unless they moved to end domestic trade in rhino horn and tiger bone.

While consumer countries capitulated to pressure to outlaw markets, southern African countries that favoured a 'sustainable use' approach to wildlife conservation sought to re-open legal markets for elephant and rhino products by down-listing their national populations of these species. At CoP 9, South African achieved the first incremental step in this direction: an annotated down-listing for one rhino species (white rhino, which excluded legal horn exports). However, attempts to restore legal trade in elephant products failed, in part because of a lack of US support (Kriebs, 1996). To address concerns that there were too many barriers to down-listing species, at CoP9 the CITES Parties also agreed to new listing processes and criteria, intended to be more scientific and objective (Young, 2003) but also explicitly invoking the precautionary principle in a potentially ambiguous way (Dickson, 2000).

This period yielded seminal academic literature on governance (e.g., Roseneau & Czempiel, 1992; Haas et al, 1993; Young, 1994), emphasizing the 'new institutionalism' (see Section 2.2, below), non-state actors, and effectiveness. The effectiveness of CITES itself was further

evaluated (Sand, 2001) and the deliberations over the ivory trade attracted the attention of scholars of economics, law, and political science. Economists highlighted two key disadvantages of the trade ban, one being that it precluded the sale of legal ivory stocks to depress the price of illegal ivory and therefore incentives for poaching (see Bergstrom, 1990) and the other that it removed a longer-term economic incentive for range states to invest in elephant management and habitat (Barbier et al., 1990). These arguments were further developed by Swanson (1994) to propose a revised theory of the economics of extinction of terrestrial megafauna. Scholars of law (Glennon, 1990; Favre 1993) and political science (Princen 1994) presented different perspectives, emphasizing that a ban would i) address existing problems of legal trade providing cover for illegal trade (i.e., 'laundering'), ii) signal a necessary change in international social norms among potential ivory consumers, and therefore iii) better align with the precautionary principle under the circumstances of the time.

**Phase 4** (1994-2007) was characterised by the incremental easing of CITES trade restrictions and relative respite from poaching for the case study species, especially rhinos, in a context of burgeoning globalization and rapid economic growth, especially in key Asian economies such as China and Vietnam, and in the newly democratic South Africa. It was also characterized by growing environmental awareness and concern, with the rapid growth of international environmental treaties and a focus on global ecosystem integrity through the Millennium Ecosystem Assessment. This period commenced with a formal independent effectiveness review of CITES (commissioned at CoP9), which concluded that, despite various expressed concerns, most Parties believed that the treaty was working and was worth supporting (Hepworth, 1998).

At CoP10 (in 1997) four southern African countries succeeded in down-listing their African elephant populations to Appendix II, which enabled two eventual one-off ivory sales, in 1999 and 2008, respectively. However, a South African proposal to reopen international trade in rhino horn was narrowly defeated in a vote. At CoP13 (in 2004) the CITES Parties approved proposals by South Africa and Namibia to enable legal hunting trophy exports of Appendix I-listed black rhinos, subject to a quota. At CoP14, the end of the easing phase was signalled by i) Parties imposing a nine-year moratorium on legal ivory sales to follow the approved second one-off sale, and ii) further resisting proposals by China to reopen a domestic trade in tiger bone products supplied from captive breeding operations (Nowell & Ling, 2007).

This period saw substantial developments in the literature on environmental governance, with a growing focus on causality, effectiveness, and institutional design, highlighting aspects of institutional fit, interplay, and scale (see Bernauer, 1995; Young, 1999; 2002; Oberthur and Gehring, 2006), concepts which underpin the institutional diagnostics approach (discussed below in Section 2.4). The emergence of new journals specifically focused on international environmental agreements and international wildlife law provided further platforms for burgeoning research on CITES-related issues, and discussions on sustainable use, ivory trade policy, and related policy matters continued across several epistemic communities.

Amidst a growing number of official CITES effectiveness surveys during the Phase 4 period (Sand, 2001), scholars of various disciplines deliberated over this question in addition to questions on sustainable use, ivory trade policy, and related policy matters. The results of a comprehensive WWF-commissioned four-year survey of commercial wild species harvesting (Freese, 1997;1998) provided a nuanced view of the conservation benefits of sustainable wildlife use, suggesting guidelines for its management and advocating an adaptive approach,

including attempts to influence consumer demand for wildlife products. This was followed by three publications that focused on trade regulation and CITES more specifically. Two of these provided alternative critical perspectives on its effectiveness, one raising more fundamental questions about whether its design was suited to achieving conservation goals in certain contexts (Hutton & Dickson, 2000) and the other viewing its shortcomings as related to poor implementation and compliance (Reeve, 2002). The third provided a more neutral and nuanced overall perspective of wildlife trade regulation more generally, emphasizing the significance of context (Oldfield et al., 2003).

Economists engaged in numerous (largely theoretical) discussions on environmental agreements in general (e.g., (Barrett, 1994; 2003; Swanson 2001) and wildlife trade policy more specifically, with a continued strong focus on elephants and the ivory trade. Opinions on the effectiveness of the ivory ban were mixed, with several contributions suggesting that its effects were ambiguous, affecting different range states in different ways (e.g., Bulte & van Kooten, 1996; Heltberg, 2001) but that ivory stockpiles should be retained by governments as a deterrent for illegal speculation (Kremer & Morcom, 2000). Opinions on rhino horn trade differed, with some economists advocating legalisation (e.g., Brown & Layton, 2001), but a theoretical analysis of the potential legalisation of a previously banned wildlife product suggested that the conservation effects of such action were also ambiguous (Fischer, 2004). Similarly, a study on the potential effects of wildlife farming on wild populations of a species were argued to be ambiguous under certain circumstances (Bulte & Damania, 2005).

The legal literature focused on different aspects. Matthews (1996) criticized CITES for being too weak, with vague language and too many exemptions or possible loopholes, whereas Baker (1999) noted that its effectiveness was challenged by the high costs of compliance,

especially in developing countries. McOmber (2002) highlighted enforcement problems in the USA, despite its considerable investment in compliance, and Sand (1997) reviewed the evolution of CITES, providing a nuanced and mixed assessment. Scholars in the governance literature were more critical, with Curlier & Andresen (2002) arguing that CITES effectiveness was difficult to evaluate but that there were few decisive examples of attributable species conservation success. Lanchberry (2006) examined cooperation between CITES and other related treaties, arguing that while this appeared to be constructive, conservation success appeared to be more dependent on local enforcement. Epstein (2006) provided a critical evaluation of CITES as a potential tool to impose US and other developed country norms (and therefore externalities) on developing countries.

**Phase 5** (2007-2020+) which includes my detailed case study research period, was characterised largely by tightening of trade restrictions and an emphasis on law enforcement and supporting measures in the face of rapidly escalating poaching pressure linked to apparently increased East Asian consumer demand for body parts of the case study species. The Global Financial Crisis in the early stages of this phase disrupted and realigned the world order, causing a shift of economic power toward Asia (Grant & Wilson, 2014). Simultaneously, the USA indicated a strong interest in addressing perceived issues of national and international security linked to organised wildlife crime and started realigning its foreign conservation assistance policies accordingly (McMurray, 2008; Massé & Margulies, 2020). In 2014, the profile of illegal wildlife trade was further raised by a UK initiative backed by its royal family. In 2015, the UN General Assembly formulated a set of Sustainable Development Goals to guide the development agenda until 2030; these included Target 15.7, aimed at eliminating poaching and trafficking of endangered species. In 2020, the COVID-19

pandemic raised the profile of wildlife commoditization and consumption as a potential disease vector, further fuelling anti-trade sentiments (Roe et al., 2020).

From 2008, both elephant and rhino poaching escalated significantly in Africa, the latter notably in South Africa, which faced domestic governance challenges under the Zuma regime. Tiger farming operations emerged in Vietnam, Laos, and Thailand, and citizens from those countries started sourcing lion bones from South Africa (as potential substitutes for tiger bones), eliciting concerns about the potential impact of that new trade, accompanied by a campaign ('Blood Lions') to expose practices linked to commercial captive lion breeding. In 2015, the well-publicised death of Cecil the lion in Zimbabwe raised the profile of recreational hunting and trophy trade, igniting international campaigns to ban it ('t Sas-Rolfes, 2017). Botswana, previously a strong supporter of sustainable use, broke ranks with the SADC region during the tenure of President Khama (2008-2018), banning recreational hunting on public land and no longer advocating legal ivory trade (LaRocco & Mogende, 2022). However, this position was reversed from 2018. South Africa hosted CITES CoP17 in 2016 and contemplated submitting a legal trading proposal for rhino horn but then decided against it, with growing domestic conflict over sustainable use policy and concerns that increased levels of crime and corruption had undermined the ability to govern trade.

The environmental governance literature reflected a growing interest in concepts of earth systems governance (e.g., Biermann et al, 2010), and institutional diagnostics and dynamics within the context of complex social-ecological systems (e.g., Young, 2008; 2010; 2017). Linked to this, scholars increasingly scrutinized the effectiveness of and interlinkages between international environmental agreements (e.g., Chambers, 2008). Similarly, the literature on CITES-related issues continued to proliferate with especially substantial

commentary from legal scholars but also increasingly critical evaluations by conservation social scientists.

Economists, however, contributed relatively less to the discussion. A more nuanced analysis of the ivory trade ban (van Kooten, 2008) highlighted ongoing problems and argued that the ban alone would fail as a conservation measure in the long term if elephant habitat was rendered less valuable than agricultural land. The role of stockpiles of wildlife products was further examined, with discussions about how to mitigate the risks of potential speculative hoarding and ‘banking on extinction’ (Mason et al., 2012; ‘t Sas-Rolfes et al., 2014).

Economists also urged a cautious approach to a new appeal by scientists to legalise rhino horn trade (see Biggs et al., 2013; Collins et al., 2016).

In the legal literature, Ayling (2013) and Elliot (2017) both highlighted the challenges of enforcing the rhino horn trade ban and other restrictions in the face of resilient international criminal networks, but Wiersema (2013; 2015; 2016) argued for increased regulation and enforcement from a precautionary perspective. Bowman (2013) reflected on the effectiveness of CITES after forty years, with a generally optimistic assessment, but a similar reflection by Couzens (2013a; 2013b) was more pessimistic and argued for a ‘reverse listing’ approach, whereby trade in all wild species would be automatically prohibited with the burden of proof being placed on those who wanted to trade. Trouwborst et al. (2017) and Wandesforde-Smith (2015; 2016) provided more critical evaluations of CITES, again highlighting the limitations of treaty enforcement in the face of varying and conflicting local social norms. Adam (2014) also criticized the colonial legacy of wildlife treaties and, focusing on the USA, Liljebad (2014) noted that CITES receives less support at local levels than other treaties.

In the political, conservation, and social science literature, Duffy (2013) criticised CITES as a vehicle for enabling non-state actors to reinforce global inequalities, Challender et al., (2015) noted that ‘poaching is more than an enforcement problem’ and Hübschle (2017) invoked the notion of contested illegality, again noting that the CITES rhino horn trade ban conflicted with local social norms and lacked legitimacy along the entire trade chain. Finally, in the recent governance literature, Escobar-Pemberthy & Ivanova (2020) proposed an *Environmental Conventions Index* (ECI) to assess treaty compliance, implementation, and effectiveness, applying it to CITES and other treaties. They found that the ECI is very unevenly geographically distributed for CITES, with only the USA and a small number of other countries rating highly and suitable evaluation data absent for much of Africa.

## **2.2 Institutional theory**

In recent decades institutional theory has played a resurgent role in social sciences under the banner of the ‘new institutionalism’ (March & Olsen, 1983). Viewed as an alternative to individualism, scholars across social science disciplines have embraced ‘explanatory approaches that variously emphasize the consequences of strategic interaction, the role of such corporate actors as companies or crowds, or the constraining and enabling effects of formal and informal rules’ (DiMaggio, 1998:696). Institutions are now widely recognized as key elements in the analysis of social-ecological systems (Anderies et al., 2004; Ostrom, 2007; Epstein et al., 2015).

The term ‘institutions’ has been defined in various ways across the social science literature. Ostrom (2005:3) provides a broad definition of institutions as ‘the prescriptions that humans use to organize all forms of repetitive and structured interaction.’ She goes on to state that ‘(T)he opportunities and constraints individuals face in any particular situation, the

information they obtain, the benefits they obtain or are excluded from, and how they reason about the situation are all affected by the rules or absence of rules that structure the situation.’ Another definition suggests that ‘an institution is a widely understood rule, norm, or strategy that creates incentives for behaviour in repetitive situations’ (Crawford and Ostrom 1995). A well-known and oft-cited definition by North (1990) suggests that institutions act as a social constraint on human behaviour, but many scholars argue that institutions not only constrain certain human behaviours but also enable others (Hodgson, 2006; Bromley, 2009). Hodgson (2006:18) therefore defines institutions as ‘systems of established and embedded social rules that structure social interactions.’

More than rules alone, institutions are specifically rules that people are motivated to (and actually do) follow (Guala, 2016). According to North (1991) institutions may be informal, such as sanctions, taboos, customs, and traditions, or formal, such as constitutions, laws, and property rights. However, the distinction between informal and formal institutions is somewhat ambiguous and the relationship between them may vary from reinforcement to competition (Hodgson, 2006; Lauth, 2015). Significantly, institutions build upon other institutions, with language forming a base institution upon which all others are built (Searle, 2005). Institutions exist within and across prototypical domains of exchange, i.e., social, political, organizational, and economic (Aoki, 2007), and vary in strength, which may be assessed with reference to two dimensions: i) extent of compliance, and ii) durability (Levitsky & Murillo, 2009).

Although several different approaches and positions have developed within institutionalist scholarship (Peters, 2019; Vatn, 2006), Ostrom (1990), views such variants as largely complementary and Aligica & Boettke (2009:110) similarly endorse ‘a social theory that

attempts to steer between under- and oversocialized views of the individual,’ and ‘between individualism and holism’ and opposing models of rationality. Individual humans both influence and are influenced by institutions Vatn (2006) and institutions may be viewed as both static (rules in place) and dynamic, given that they can change in response to evolving social norms (Platteau, 2000; Aoki, 2007).

Different schools of new institutionalist thought have emphasized different aspects of influence on socio-political outcomes (DiMaggio, 1998). Hall & Taylor (1996) identify at least three schools: the rational choice school, which emphasizes the strategic interactions of purposive actors; the sociological school, which emphasizes the role of cultural factors; and the historical school, which recognizes both, further emphasizing power relations and the contribution of other factors, notably ideas, toward outcomes. For the purposes of my thesis, I embrace the more inclusive approach of the historical school to explore my overall research question and I engage with more specific developments in branches of institutional theory to address the subsidiary questions, as detailed below.

### **2.3 Ideational influences on wildlife trade policy positions**

My first subsidiary research question is addressed in a limited or tangential way in the existing literature. Discussing the emergent elephant ivory and related CITES trade debates from a legal perspective, Favre (1993) noted a wide range of practical and ethical stances concerning use of wildlife. In relation to elephants, he claimed a critical distinction between ‘conservationist’ and ‘animal protectionist’ views, being that the former was only concerned with the sustainability of wild harvest (frequently termed ‘sustainable use’), whereas the latter would regard elephants as ‘intelligent mammals with a complex social structure and interests of their own, independent of the existence of humans’ (Favre, 1993: 880). He suggested that

non-state actors tended to represent more extreme animal protectionist views and favour banning trade activities associated with harm to individual elephants. Princen (1994) similarly observed such varying views but neither scholar applied more rigorous analysis to these observations.

A review of literature investigating the ethics of wildlife commodification suggests that conflicting views are shaped by different schools of moral reasoning (’t Sas-Rolfes, 2016). In a similar vein, a review of critical perspectives on private land conservation also points to normative concerns over market influences on conservation, as well as ones grounded in science (Gooden & ’t Sas-Rolfes, 2020). Elsewhere in the literature there are extensive discussions on value conflict in conservation (e.g., Sandbrook et al., 2011) and the influence of narratives (Hutton et al., 2005; Jepson, 2018). Two more specific articles investigate ideational influences on wildlife trade policy through lenses of eco-political thought (Stoett, 2002) and discursive political ecology (Massé et al., 2020). None of these articles provides a rigorous empirical analysis of ideas in action.

In the broader work on new institutionalism, seminal work on the role of ideas in the policy process employed comparative institutional analysis to examine the spread of Keynesian economic thought across advanced capitalist democracies (Hall, 1989). Inspired by this work, a subsequent study analysed the development of the transnational temperance movement that drove the global alcohol prohibition wave in the early twentieth century (Schrad, 2010), drawing on a widely cited framework developed by Campbell (1998; 2004). These studies form part of a growing body of research on the ways in which ideational processes can influence international public policy, emphasizing the central role of the ideas themselves (Béland, 2009). Building on the notion that the interactive process of conveying ideas – i.e.,

discourse – can drive institutional change, Schmidt (2008) proposes an additional category of new institutionalism, which she terms ‘discursive’ institutionalism.

More recent academic developments in this vein include a theory of ideational power, identifying three different types: power through ideas, power over ideas, and power in ideas (Carstensen & Schmidt, 2016), and a theory of ideational evolution (Carstensen, 2015). The latter holds that new ideas emerge when political actors conjoin a set of ideational elements. A past tendency in institutional analysis to treat ideas as explanatory variables (as part of a broader conception of causality) is considered overly rigid as it requires an absolute beginning and end to a discrete idea (Carstensen, 2015). In contrast, this theory holds that ideas are best viewed as relational entities in a state of coevolution. As a final parallel contribution to the discursive turn in institutional thought, a group of scholars have highlighted and investigated the power of stories to influence policy and developed a narrative policy framework for analysis (Jones et al., 2014).

## **2.4 CITES regime influences on actor behaviour**

Within the voluminous literature on the effectiveness of the CITES regime there is limited direct analysis of how it shapes actor behaviour in relation to African megafauna. Following some early observations by Favre (1993) and Princen (1994), the influential role of NGOs in policy processes has become more salient and a recent study specifically analyses this (Challender & MacMillan, 2019). Less directly, related literature looks at the behaviour of actors outside the CITES system, such as poachers and consumers of illegal products, and examines how they are affected by the regime (Challender & MacMillan, 2014). A systematic review of the impact of CITES trade restrictions in southern Africa reveals that most research investigates incentives for wildlife crime at local levels (Hiller & ’t Sas-Rolfes, 2024).

Finally, regarding state actors, reviews of CITES implementation and compliance reveal that this is poor in many developing countries (Reeve, 2002; Wyatt, 2021), suggesting shortfalls in capacity, incentives, or both.

Turning to applications of institutional theory to such a question, within a proliferating literature on applying it to global environmental governance in a systems context, increasing attention is devoted to institutional design and its effect on actor behaviour. This work builds on concepts such as the Institutional Analysis and Design (IAD) framework developed by Ostrom (1990; 2005) and the work of the Institutional Dimensions of Global Environmental Change (IDGEC) project (Young, 2002; 2008) and its successor, the Earth System Governance project (Burch et al., 2019). These frameworks all recognise and list the relevance of actors in the broader system and analyse institutions in multiple ways, exploring concepts such as institutional interplay, fit, scale, and dynamics, through techniques such as institutional diagnostics.

Institutional interplay refers to the interactions between various institutional forms (for example, the horizontal relationship between two international environmental treaties or the vertical relationship between a treaty and national laws). Institutional fit refers to the way institutions are matched to the physical characteristics of the environmental problems they are intended to address, other institutions (for example matching formal rules with local customs) or a combination of both (Epstein et al., 2015). Both concepts of interplay and fit are relevant across scales, with scale mismatches identified as a problem for conservation (Maciejewski et al., 2015). Dynamic institutional analysis (Woldendorp & Kemen, 2010) relates to actor behaviour, which can be assessed in relation to institutional change and linked outcomes over time, providing insights into policy processes, and has been applied to investigate the

evolution of the international whaling regime (Young, 2010), which offers potentially important lessons for CITES (Couzens, 2013a).

## **2.5 Conservation outcomes of varying institutional arrangements**

Apart from the literature discussed above in Section 2.1, what other evidence exists concerning the conservation effectiveness of wildlife trade policy measures within the current CITES-shaped global regime, especially in relation to the case study species, and compared with other institutional arrangements? I undertook two collaborative review studies to investigate the extent to which trade policy effectiveness had been causally determined through recognised impact evaluation methods (*sensu* Baylis et al., 2016). The first (’t Sas-Rolfes et al., 2019a; 2019b) found limited evidence on the impact of international trade regulation and somewhat more on the effectiveness of local interventions, especially on the supply side (e.g., protected areas and anti-poaching measures). The second (’t Sas-Rolfes & Hiller, 2021), which comprised a systematic review on the evidence of the effectiveness of wildlife trade restrictions in the SADC region on elephants, rhinos, lions, and pangolins, similarly found that the evidence of conservation success that could be directly attributed to trade restrictions was ambiguous or weak, with the only positive evidence relating to short-term benefits.

The literature provides numerous broader analyses of the effectiveness of varying institutional arrangements for conservation. For example, Geldmann et al. (2013) assessed the effectiveness of state protected areas on biodiversity conservation more broadly (as opposed to conservation of single species) and Lindsey et al. (2017) conducted a broad global assessment of megafauna conservation success by country but did not explore institutional variation between the countries. Miteva et al. (2012) conducted a broader evaluation of

biodiversity policy instruments, laying foundations for an institutional analytical approach to such evaluation, influenced by institutional economics (Sills & Jones, 2018).

Institutional economics is a rich and growing field (North, 1990; Williamson, 2000; Hodgson, 2007), providing tools to analyse the outcomes of varying institutional arrangements, but its application to species conservation has been limited to a relatively small literature from the USA (e.g., Lueck, 2018) and southern Africa (e.g., Child, 2012). Defining institutions as distinct variables is challenging as is defining species conservation success. For example, questions arise as to whether intensive forms of wildlife management on private land violate conservation principles such that the animals concerned lose an acceptable level of ‘wildness’ (Redford et al., 2011; Child et al., 2019). However, these notions are challenged by new ontologies of wildlife emerging from the geography literature (see Lorimer, 2012). As indicated above, my review of the ethics of wildlife commodification (’t Sas-Rolfes, 2016) reveals that framings relate not only back to ontologies and epistemologies, but also different and sometimes competing modes of moral reasoning. This calls for a more open research approach to the question of what drives wildlife trade policy conflict and what constitutes legitimate evidence, and has informed my overall methodological approach, as detailed in the following chapter.

### **3 Methodological approach**

In this chapter, I describe the approach that I followed to address my research questions. To achieve the broadest possible understanding of the issues I adopted a pragmatist research philosophy. The flexibility that this philosophical approach allowed for—compared to conventional positivist or interpretive approaches—enabled congruency between the methodological approach of the research and its overall objectives. I undertook three complementary studies, employing varied approaches to tackling specific questions, drawing on nested comparative case studies of the selected species of African megafauna. The results of these three studies were synthesized to develop an incipient theory of global wildlife trade governance and policy evolution, which is presented in Chapter 9. My overall approach to reasoning was essentially abductive and I used mixed methods, at times also using deductive reasoning supported by both qualitative and quantitative methods (to assess evidence of causal relationships), and at others guided by inductive reasoning, using qualitative methods to develop theory.

My initial literature review was followed by a five-year period of participatory research. This comprised practical immersion in relevant policy processes and consultations, including targeted, frequently collaborative research on specific emerging questions (some of which was published after being subjected to peer-review, to ensure veracity), and ongoing reviews of relevant theoretical and empirical literature to gain further background knowledge. This holistic and iterative process allowed for the development of an appropriate theoretical and analytical framework (Patton, 2015). Having started with i) a general sense of wildlife trade policy conflict, ii) some initial theoretical propositions from the literature, and iii) my broad research questions, as I acquired new information, I employed multiple disciplinary and

interdisciplinary lenses to gain both a broader and deeper understanding of the issue. I engaged with the policy processes and academic discourse both concomitantly and iteratively, regularly returning to the theoretical literature to test for best fit of my observations. This approach aligns with that promoted by Ostrom (1990: 45), who describes it as ‘moving back and forth from the world of theory to the world of action,’ and has been termed as a ‘systematic combining’ approach to case study research (Dubios & Gadde, 2002).

I proceed here by elucidating my interpretation of pragmatism as a philosophical approach to research and how it aligns with systematic combining, following which I provide some detail on my research design and methods.

### **3.1 Research philosophy**

My research began with the recognition from the literature (see Chapter 2) that conflicting framings of wildlife trade and its impact on conservation may not only be grounded in conflicting environmental and social values but may also be informed by varying ontologies (conceptions of reality) and epistemologies (theories of what constitutes valid knowledge). Within the mission-driven discipline of conservation biology, there is clear evidence of plural and diverging values (Sandbrook et al., 2011; Miller et al., 2011) and these may influence the ways in which conservation issues are framed and studied by scientists (Redpath et al., 2013). There is furthermore evidence of diverging ontologies, such as conceptions about the separation (or not) between people and nature (Adams & Hutton, 2007), and of diverging epistemologies within interdisciplinary conservation research (Brister, 2016) being employed as framing devices and therefore acting as partial drivers of conflict.

Since the ultimate aim of my research was to mitigate conflict for the sake of conservation, I chose the most inclusive approach possible to overcome the framing problem inherent in different disciplinary approaches and their associated research philosophies by adopting a pragmatist approach, inspired by the tenets of American pragmatism (Bacon, 2013; Spencer, 2019) as elucidated by the work of environmental pragmatist philosophers (e.g., Norton, 2005; Minter, 2011). These principles are also evident in the work of the Ostrom Bloomington School of political economy (see Aligica & Boettke, 2009; Aligica 2014), from which I drew further inspiration on links between pragmatism and institutional analysis, which in turn informed the theoretical approaches applied in all three studies.

The tradition of American pragmatist thought draws on the work of Charles Sanders Peirce, William James, and John Dewey, and builds on the core assumption that ‘beliefs are inseparable from actions; therefore, the truth of beliefs should be evaluated according to their consequences’ (Bacon, 2013: 4). Pragmatists seek answers to questions through direct experience and experimentation and are fallibilists, believing all knowledge to be tentative and conditional. They therefore hold that we must be content with solutions that ameliorate problems and that we are more likely to succeed if we share the plurality of our experiences and verify them through community interaction. Pragmatists also reject subject-object dualism and see humans as both natural and cultural beings (Spencer, 2019).

Drawing on the work of Dewey, who argues for a contextualist, experimental, and adaptive approach to moral enquiry, Minter (2011) proposes a pragmatist environmental ethic that is less ideological and more democratic, and which accounts for pluralism, particularism, and contextualism in environmental value theory. In a similar vein, Norton (2006; 2015) proposes a ‘sustainability’ philosophy of adaptive ecosystem management. These approaches embrace

principles that I have applied to my methodological approach. They specifically imply a role for systems thinking, an evolutionary ontology, interdisciplinarity (and/or transdisciplinarity) and a fallibilistic approach to empirical knowledge that embraces all forms of reasoning, i.e., abductive, deductive, and inductive.

Systems thinking (Capra & Luisi, 2016) provides a way to understand the world's complexity by examining wholes and relationships in addition to constituent parts. It underpins the social-ecological systems (SES) framework (Ostrom, 2009; Partelow, 2018; Colding & Bartel, 2019), which provides an analytical structure for studying natural resource management systems (at various scales) in which social and ecological dynamics are inextricably linked. Such systems are viewed as both complex and adaptive and can be analysed in terms of concepts that transcend conventional disciplinary boundaries (Miller & Page, 2007), supporting an adaptive approach to science-based management to support social-ecological resilience (Holling, 1978; Folke, 2007; Folke et al., 2016). Systems thinking also aligns with an evolutionary ontology, which recognizes that certain broad principles of generalized Darwinism may be applied to SES processes across disciplines (but also recognizes limits to this—see Bryant, 2004; Hodgson & Knudson, 2011).

Complex SES problems also call for the application of not only multiple disciplinary lenses, but also the application of interdisciplinarity (Aldrich, 2014), which attempts to transcend disciplinary boundaries by finding common elements, or even transdisciplinarity (as called for in mammal conservation by Macdonald, 2019), which attempts to fuse disciplines. However, such fusing of disciplinary elements remains challenging and must be cautiously applied (see Lélé & Norgaard, 2005; Barry et al., 2008). Grounded theory (Charmaz, 2013) constitutes an inductive methodological approach (rooted in principles of pragmatism) that attempts to

develop new theory from collected data from the bottom up and could be considered as supportive of transcending disciplines, and its principles partly influenced my overall approach.

For the purposes of my research, engaging with many of the background ideas and concepts required understanding arguments and underlying concepts from diverse and multiple disciplines including biology, ecology, conservation science, environmental ethics, economics, law, and social psychology. However, identifying the overall problem of wildlife trade policy conflict (if not all of biodiversity conservation) as an essentially social and political problem (see Jepson & Ladle, 2010), I found the concept of institutions and associated institutional theories to provide the most relevant interdisciplinary tools and frameworks to analyse the data at finer resolution.

### **3.2 Research design and methods**

Focusing on trade policy toward African elephants, rhinos, and lions—and, where possible, associated conservation outcomes—within specified temporal and spatial parameters provided a suite of nested case studies to form the backbone of my research. Case studies are intensive studies of a single or small number of cases that draw on observational data to shed light on a larger population of cases (Gerring, 2016: 28). For this research, the cases related to particular species within specified time frames and geographies, and nesting comprised examining cases within cases, notably national-level trade policies within those at the international level.

Nested comparisons enable the observation of differences between policies and their effects at different scales (Flyvbjerg, 2006). Furthermore, comparisons between the different selected species cases helps produce more robust generalisations across policies and species.

Across all three studies, the case studies were evaluated using multiple mixed, but mostly qualitative, methods, employing triangulation techniques to strengthen the results (Patton, 2015). In most instances, a paucity of verifiably accurate or complete and appropriately standardized quantitative data sets, combined with multiple potential cause and effect variables, precluded the credible use of quantitative methods such as statistical analysis (Creswell, 2013). This problem of combined quantitative data deficiency and system complexity is ubiquitous in the domain of wildlife trade regulation and causality in conservation science, prompting scientists to propose an integrated framework to conduct impact evaluations (see Booth et al., 2020). The principles of this approach align with methods such as process tracing and general elimination methodology (see Thomas-Walters et al., 2022), which employ counterfactual thinking (Baylis et al., 2015) to infer causal mechanisms from qualitative data.

My research design was therefore driven by three interrelated principles. The first was triangulation in data collection, with the aim of achieving saturation, a point beyond which further sampling would become redundant (Busetto et al., 2020). The second was collaboration, inspired by the principles of participatory action research (Reason & Bradbury, 2013), which prioritizes the value of collective experiential knowledge to tackle problems and suggests building blocks for project design that include building relationships and establishing common understandings of an issue (Cornish et al., 2023), and has also recently been applied to conservation (Jepson et al., 2018). For my research, collaboration provided both a means for triangulating approaches to a controversial and subjectively-influenced topic and a means to pursue the third principle, namely the pursuit of robust evidence, supported by counterfactual analytical techniques. My research methods were underpinned by these three principles, as further detailed below.

### ***3.2.1 Overall research strategy***

For the first two studies, I undertook an extended triangulated data collection exercise and concurrent analyses guided by principles of ‘controversy mapping’ (Venturini, 2010), which is an approach that has been applied to analysing elephant management conflict in Kenya (Venturini & Munk, 2021), and which outlines a process of identifying statements and linking them to literatures that help to identify actors, their networks, and epistemic communities. However, in the case of my research, the sequence would sometimes differ, it being easier to identify issues or actors first, as detailed below. Consistent with an abductive iterative approach (Timmermans & Tavory, 2012), I collected and analysed data in repeated rounds over the duration of my research, triangulating multiple and different methods, data sources, and theories to obtain corroborating evidence (Patton, 2015; Onwuegbuzie & Leech, 2007).

To ensure adequate triangulation, I collected data from diverse and complementary sources, employing an iterative reflexive approach to analysis (Srivastava & Hopwood, 2009). In essence, this analytic approach involves 1) interrogating the data to answer preliminary questions, 2) refining points of interest and focus, and 3) returning to investigate those points further to articulate and address any discrepancies between expected and actual observations. The second step of refining points of interest and focus was partly informed by identifying theories that best fit the initial observations. In so doing I aimed to see the issues and meanings from as many angles as possible, aiming for saturation.

For the third (desk-based) study, I first engaged in collaborative research to assess the impact of legal hunting on African rhino populations, drawing on an analysis of relevant assembled data, and walked it through a scientific peer review process leading to publication, to ensure

external validity of the data (’t Sas-Rolfes et al., 2022). The results of that study were then combined with further assembled data from triangulated sources to form the basis for the subsequent institutional analysis.

### ***3.2.2 Analytical frames and relevant data types***

The three studies employed diverse analytical frames, which influenced the types of data sought and the methods to collect and analyse it. The first study built on the framework developed by Campbell (2004) and Schrad (2010), fused with the Narrative Policy Framework (Shanahan et al., 2017), thus calling for the identification and classification of actors and ideational elements within the policy process, as well as specific issues to analyse. Building on the first study, the second adopted and combined three analytical frameworks: the IAD framework (Ostrom, 2001), dynamic institutional analysis (Woldendorp & Kemen, 2010), and institutional diagnostics (Young, 2002; 2008), which called for further collection of data on the rules that define the CITES regime, specific characteristics of actor behaviour, and more general contextual information about the issues of concern. The third study drew on institutional economic frameworks, specifically relating to attribute-based property typologies (Ostrom, 2010), property regimes (Bromley, 1989), total economic value (Swanson & Barbier, 1992), and a typology of biodiversity policy instruments (Miteva et al., 2012). This called for data on institutional arrangements in relation to policy instruments, economic values (e.g., prices), and appropriate proxy data to measure species conservation success.

### ***3.2.3 Data sampling approach***

Data were collected within three distinct sample frames, two of which applied to both the first and second study and have been termed as ‘Stage 1’ (engagement with international CITES processes) and ‘Stage 2’ (domestic processes within South Africa). Both Stage 1 and 2

covered most of the duration of the five-year research period but Stage 1 data was mostly collected during the first four years and Stage 2 data during the final fifth year, i.e., 2020. The third sample frame refers to data collection for the third study (on rhino conservation outcomes), which took place concurrently with Stage 1 and 2, and mostly involved accessing data collected by the IUCN SSC African Rhino Specialist Group. The Stage 1 sample frame comprised attendance of CITES meetings and tracking agenda items relevant to the selected case study species. The Stage 2 frame involved broader engagement with relevant actors in South Africa, culminating with participation in the High-Level Panel and involved tracking Stage 1 CITES agenda items that affected the country, as well as tracking the domestic discourse on all trade-related issues relevant to the case study species.

As indicated above in Section 1.2, my positionality facilitated access to various data collection opportunities within the two stages, through attendance and participation in multiple relevant events and projects, details of which appear in Table 5 of this thesis document (in 4.9: S2). Actor and network identification was supplemented by monitoring participation and collaboration in relevant forums (e.g., CITES meetings, working groups, workshops, etc.). I combined two purposive sampling techniques, namely criterion and snowball sampling (Bryman, 2016), to identify and select specific actors and policy issues for further investigation. Purposive sampling is non-probabilistic: criterion sampling in this case entailed sampling all policy issues and actors that met certain criteria (detailed below), and snowball sampling involved engaging with the selected prominent policy issues and actors to find others that were less obvious during my initial contacts and content analysis, thereby identifying broader networks and epistemic communities.

The agenda items at the formal CITES meetings provided a sample of all issues relevant to the case study species, which could then be tracked. To identify relevant policy issues in Stage 1 of the research, my criteria were to discern policies that both i) were currently under discussion at CITES meetings (and typically contested), and ii) somehow affected international trade in the case study species, either directly or indirectly. Whereas direct effects could be easily identified (policies such as international trade bans or quotas), to ascertain potential indirect effects, I applied the following test questions:

1. Does the item in question refer to an aspect of production (including captive breeding), consumption, or domestic trade specifically in relation to one or more of the case study species?
2. Does the item in question refer to an imitative substitute product in relation to trade in one or more of the case study species?
3. Does the item in question refer to a potential substitute species in relation to trade in one or more of the case study species?
4. Does the item in question refer to an aspect of the Convention that, if affected, might influence trade regulation of one or more of the case study species?

The numbered agenda items are listed in Table 6 (in 4.9: S2) along with issue descriptions and indications of whether they were of direct (no shading) or indirect (grey shading) relevance to affected species. The same issues were followed in Stage 2 of the research, and most were explicitly assigned for consideration by the SA-HLP.

To identify relevant actors in Stage 1 of the research, I first noted all those individuals present at the CITES and related meetings and the organisations that they represented (as per published attendance records). I then further noted which of those actors commented on the selected issues by way of written submissions and/or by oral interventions at relevant

meetings (which I attended), following which I adopted a snowball sampling approach to find other less easily identifiable actors, including journalists and academics. The flexibility, spontaneity, and adaptability of the snowball approach is well suited to a study with somewhat broad research questions that may be subject to change as the research progresses (Noy, 2008). It enables the ongoing inclusion of different actors that were not identified early in the study (Heckathorn, 1997).

For Stage 2 of the research, I drew upon my existing knowledge of the South African spectrum of actors either affected by or attempting to influence trade policy in the case study species, first identifying key organisations known to have vested interests, such as wildlife producer and hunting associations, conservation NGOs, animal rights and welfare NGOs, and relevant government agencies. I then again used snowball sampling to identify further supporting actors. Finally, I recorded all actors that made submissions to the SA-HLP. Cross-referencing the two research stages, I identified a subset of actors that engaged at both the international and national South African level.

The actors thus identified provided the subsequent material to analyse, i.e., policy positions and stances, ideational elements of arguments, underlying interests, and strategies used to pursue actor objectives.

#### **3.2.4 Data collection**

Over the five-year period, my principal method of data collection for the first two studies was through participant observation (Kawulich, 2005; DeWalt & DeWalt, 2010) in various forms and by targeted access of relevant literature sources, including extensive use of the CITES website, [cites.org](http://cites.org). I also conducted nine long-form semi-structured interviews with key

informants, who were purposively selected for their spectrum of insights into the issues (especially relating to elephants and rhinos) and I engaged in targeted collaborative research to collect data relevant to the lion skeleton export quota issue, consisting of both a survey and focus groups, including a participatory scenario planning exercise (Ramírez & Wilkinson, 2016) with a cross-section of stakeholders. Specific details of the key informant interviews (including sample questions) appear as anonymised in the supplementary material to Chapter 4 (4.9: S2 and Table 7), with the identities and affiliations of the key informants provided in Appendix 1 (on page 323) of this thesis document.

I collected the data in the form of official source documents, interview recordings, and handwritten notes from in-person observations at all relevant events and meetings. This was supplemented throughout the research process by regular informal and semi-formal targeted communication and consultation with various stakeholders and informants, and by monitoring of group communication and media channels, including both conventional and social media. For the first two studies, the combination of complementary data collection methods and multi-scalar analysis, with triangulation between multiple actors and data source types, enabled research to reach a point of saturation (Fusch & Ness, 2015; Busetto et al., 2020), beyond which no more significantly different ideas or actor behaviour could be observed—i.e., actors were repeatedly saying and doing the same predictable things.

For the third study (Chapter 8), I collected qualitative and quantitative time series data from literature and publicly available databases, with some assistance from the Chief Scientific Officer of the IUCN SSC African Rhino Specialist Group. Further specific information on data collection methods is provided in the Methods sections and Supplementary Material of each of the research chapters.

### **3.2.5 Data analysis**

Data analysis was guided by the respective analytical frames relevant to each study, as per Section 3.2.2, above. The first study called for reflexive thematic analysis (Braun & Clark, 2019) to classify issue themes and understand the nature of influential ideas relating to them, as further detailed below and in Chapter 4. The first and second studies called for categorisation of various actor attributes, also discussed below. For the first two studies, data analysis therefore consisted mostly of employing coding and sorting techniques, in multiple rounds. Codes were either handwritten or entered onto MS Excel spreadsheets, depending on the data source and the need for sorting or counting. Various techniques were used to code actors and their attributes (including behaviour), issues, and ideational elements. The second and third studies applied different forms of institutional analysis, also discussed further below.

Issue themes were classified by drawing on a trade chain logic, adapted from 't Sas-Rolfes et al. (2019:206). Concerns could be categorized as relating to the supply side (extraction from the wild), demand side (consumption), or intermediary issues (i.e., actual trade). Additional observed concerns included alternative sources of supply (wildlife farming, stockpiles), exemptions for hunting trophies, and imitative substitute products. Numbers were assigned to each of these themes and coded accordingly (see Chapter 4, Table 2). Ideational themes, i.e., cognitive, normative, conflated, and narrative elements were coded as described in Chapter 4.

Variability among actors, i.e., actor heterogeneity, is a significant factor in institutional analysis (Snidal, 1994). In each study, to add precision to the analyses, I categorised actors according to certain distinct attributes. All three studies distinguish between state actors (i.e., governments and their official subsidiary organisations) and non-state actors (all other

organizations and individual members of civil society). Beyond this basic distinction, actors may be classified in many varied ways and the broader literature contains many examples of actor typologies based on selected attributes (e.g., Golding, 2017; Juerges et al., 2020). For my first study, as a starting point I drew upon the actor typology developed by Campbell (2004) in relation to the ideational realms that influence policy. However, finding that inadequate, I identified further relevant attributes (including behaviour in relation to specific issues), which I coded for both the first and second studies, as detailed in the Supplementary Material to Chapters 4 and 6.

For the second and third studies, I employed different forms of comparative institutional analysis (Cole, 2013; Lueck, 2018) to determine the effect of institutional variation over time and space. For the second study, Woldendorp and Kemen's (2010) approach to dynamic institutional analysis provides useful categorisations of the strategic behaviour of both state and non-state actors, which could be assessed through coding their observed actions and consequent developments. For the third study, which provided various data sample frames over space and time, two comparative techniques offered utility to analyse those as nested case studies. The first, for comparisons between discrete jurisdictions with varying institutions, is the use of natural experiments (Dunning, 2012). The second, for comparisons over time, is process tracing (Collier, 2011; Bennet & Checkel, 2014; Beach & Pederson, 2019). Both methods employ counterfactual logic to assess alternative plausible explanations for cause-and-effect relationships. Their application to the third study data is further detailed and discussed in the Supplementary Material to Chapter 8 (8.10: S2).

### **3.2.6 *Ethics approval***

The research methods applied to this project received ethics approval under the Oxford University CUREC system, reference # SOGE 1A-170.

## **3.3 From research design to action**

The methodological approach described above evolved through an iterative process, embedded in pragmatist philosophy, and adopting a pragmatic, adaptive approach. Initially intended as a shorter and more focused research project, I needed to adapt with changing circumstances, including challenges (changing supervisors and the effects of the COVID-19 lockdowns and travel restrictions) and opportunities (new engagements that provided further meaningful data access). The result is presented in the following research chapters (4, 6, and 8) with short guidance on transitions provided in between. Each research chapter comprises the final submitted versions of the relevant papers (with some minor formatting amendments), including (for convenience) the specific reference lists and supplementary material, added as final sections. All references also appear in the Bibliography section at the end of the thesis document.

## 4 A conflict of visions: Ideas shaping wildlife trade policy toward African megafauna<sup>2</sup>

### 4.1 Abstract

Among factors that threaten wild populations of African megafauna, wildlife trade has gained prominence as a global policy issue, with concerted international campaigns aiming to influence the trade of species such as elephants, rhinos, and lions. Trade policy is strongly contested, confounding attempts to develop coherent approaches across jurisdictions and through international mechanisms such as CITES. This undermines conservation efforts. Understanding the drivers of such conflict may help to address this problem. Scholars of political science increasingly recognize the power of ideas as drivers within policy processes. Guided by this literature, we developed an analytical framework and conducted a thematic analysis to examine the ideas driving wildlife trade policy conflict. Our nested case study approach examined debates over trade policy toward African elephants, rhinos, and lions at two levels: the international policy arena of CITES and within a single country, South Africa. Informed by earlier literature, we tracked the evolution of international trade policy debates over a four-year period (2016–2019) and analysed submissions to a national policy review process in South Africa that took place during 2020. During the study period, state and non-state actors contributed to vigorous trade policy debates within seven key thematic issues across the case study species. Arguments were driven by both cognitive ideas, which specify cause-and-effect relationships, and normative ideas, which are values-based and especially

---

<sup>2</sup> This chapter/paper is co-authored with Jennifer Gooden. It was published in *People and Nature* on the 4<sup>th</sup> of August 2024; doi: 10.1002/pan3.10705

salient elements of anti-trade stances. Fusing these cognitive and normative ideational elements, we identified three distinct overarching narratives relating to wildlife trade policy. These three narratives align with broader environmental policy and political narratives and elucidate inherent tensions within the CITES arena. They also reveal differing ethical interpretations and perceptions of risk and precaution. Wildlife trade policy conflict is driven at least in part by competing ideological visions, which may be entrenched by the CITES Appendix listing system. The structural role of CITES in perpetuating this polarization—and the consequences thereof—warrants further research.

## **4.2 Introduction**

Wildlife trade policy toward charismatic megafauna is a strongly contested issue, with opposing positions influenced by underlying ideas and ideologies. We undertook a five-year research project to identify key ideational elements that underpin the conflict over trade policy decisions relating to selected African species. After contextualising this issue, we elucidate our analytical approach, share our results, and discuss their implications for addressing policy conflict for the benefit of conservation.

With biodiversity loss a pressing global concern (IPBES, 2019), conservationists have highlighted persistent threats to the world's populations of wild terrestrial mammalian megafauna (Ripple et al., 2016). Whereas overexploitation and habitat loss have long been recognized as principal drivers of wild species depletion, the role of wildlife trade has gained prominence over recent decades, with sustainability and legitimacy as two core issues (’t Sas-Rolfes et al., 2019). Although originally focussed on species conservation impacts, concerns over trade in wild animals and their body parts have more recently extended to include animal welfare aspects (Bowman, 1998; Baker et al., 2013) and zoonotic disease risk (Karesh et al.,

2005; Smith et al., 2009). In the wake of COVID-19, these concerns have intensified, accompanied by calls for increased global regulation and even complete bans on wildlife trade (D’Cruze et al., 2020; Roe & Lee 2021).

The concept of regulating wildlife trade to reduce the risk of species extinctions was firmly established by transatlantic initiatives at the start of the 20<sup>th</sup> century (Sand, 1997). An approach centred around listing threatened species and attempting to restrict or regulate their trade developed gradually during that century, with the US Endangered Species Act of 1973 co-evolving with and strongly influencing the simultaneous founding of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (Epstein, 2006). Since 2014, the political profile of wildlife trade has been raised further through a series of international conferences initiated by the UK royal family and government (Milner-Gulland, 2018) and a simultaneous drive by the US government to link wildlife trafficking to national and global security concerns (Massé & Margulies, 2020).

With a mandate to protect wild species from overexploitation for international commerce, CITES currently shapes the global governance of wildlife trade: 183 nations have signed the treaty and various non-state actors play prominent roles. Throughout the evolution of this governance mechanism, African and Asian megafauna have provided a central focus for policymakers and civil society. However, both the appropriate role and conservation impact of trade regulation relating to these species is contested, with some actors consistently advocating total bans on commercial trade (aligned with CITES Appendix I listings) and others preferring regulation aimed at ensuring that trade is linked to sustainable rates of extraction from the wild (aligned with CITES Appendix II listings). This trade policy conflict has been especially salient since the 7<sup>th</sup> CITES Conference of the Parties (CoP7) in 1989, at

which a worldwide ban on elephant ivory trade was proposed but fiercely contested. Although a majority of Parties to the Convention voted to up-list the African elephant to Appendix I at that meeting, a complete and permanent worldwide ban was never implemented and conflict over ivory trade policy has persisted ever since (Somerville, 2017; Gaffney & Evanson, 2019), prompting scholarship to analyse this and related emerging debates (Favre, 1993).

The subsequent co-evolution of CITES and the wildlife trade policy debate is frequently discussed in the legal literature (e.g., Kriepps, 1996; Sand, 1997; Harvard Law Review, 2001; Bowman, 2013) and to a lesser extent in other literatures relating to economics (Swanson et al., 1993; Swanson, 1996), environmental politics and governance (Gehring & Ruffing, 2008; Velázquez Gomar & Stringer, 2011; Duffy, 2013), and conservation science (Rivalan et al., 2007; Abensperg-Traun, 2009; Challender & MacMillan, 2014). Broader associated debates concerning philosophical and ethical aspects of markets in relation to nature and wild animals also appear in the environmental ethics (Callicot, 1990), political ecology (Brockington & Duffy, 2011), and conservation biology (Doak et al., 2014) literatures. Most of these analyses suggest distinct motivational differences and highlight polarization between views that are more protectionist, being fundamentally opposed to the extraction, consumptive use, and trade of wildlife products, and those that view sustainable use and trade as legitimate tools for conservation. However, among conservationists it remains unclear to what extent such divisions arise from established underlying differences in ethics and values (Sandbrook et al., 2011) compared to evidence-based assessments of how trade impacts particular wild species and ecosystems (Natusch et al., 2021).

A group of scientists raised this issue in the context of ongoing disputes over elephant ivory trade policy, suggesting that the continued polarization stems from conflicts over values and

associated ‘mental models’ of how elephant conservation can be achieved (Biggs et al., 2017). In response, other scientists rejected the suggestion that opposition to ivory trade is grounded in differing core values or objectives, claiming that it is rather based on differing interpretations of evidence (Sekar et al., 2018). CITES listings and associated trade policy directions rely on scientific evidence (Heim & Böcher, 2016; Friedman et al., 2019), with specialist groups of the International Union for Conservation of Nature (IUCN) playing a key informative (and officially neutral) role. However, consistent with the disagreement over the scientists’ interpretations on ivory trade, there is growing evidence that decisions are often determined by political and other factors and influenced significantly by partisan non-state actors (Bauer et al., 2018; Challender & MacMillan, 2019). This has prompted scholars to examine such political factors more closely through lenses of international relations theory (Stoett, 2002) and discursive political ecology (Massé et al., 2020).

Against this background, our research aimed to gain a deeper understanding of the drivers of trade policy conflict in relation to African megafauna, using elephants (*Loxodonta* spp.), black and white rhinos (*Diceros bicornis*, *Ceratotherium simum*), and lions (*Panthera leo*) as case studies. (See Supplementary Material S1 for further details on the species concerned). These species have recently been the subject of heated trade-related policy debates at both international and national levels, encompassing not only the activity of trade itself, but also a range of linked concerns over the nature of supply sources such as captive, managed, and legally hunted animals, and the potential use of accumulated product stockpiles or synthetic substitutes. While most of these debates have taken place internationally through CITES and related forums, South Africa has also provided a significant national focal point, hosting CITES CoP17 in 2016 and being involved in recent controversy over domestic rhino trade and its unique practice of commercial captive lion breeding for trophy hunting and trade

(’t Sas-Rolfes, 2017). The latter prompted the South African Environment Ministry to appoint an advisory committee (‘High-Level Panel’) to investigate all the associated issues and conduct a policy review (DFFE, 2020a). This process provided an opportunity to conduct a nested case study for comparative cross-scalar analysis of policy processes.

Redpath et al. (2013) noted that conservation conflicts in general are increasing and argued that it is important to understand and manage them. In the case of wildlife trade, embedded conflict may result in poor policy choices and compromised governance (including ongoing violence; see Duffy et al., 2019), leading to perverse conservation outcomes and possibly even species extinctions. We believe that better understanding the underlying drivers of such conflict may provide a critical step toward reducing it. Accordingly, we analyse the past and recent evolution of the trade policy debate, exploring the actors, arguments, and relevant themes, and identify key unifying ideas that generate dominant policy narratives. Our results shed light on the ideational factors contributing to conflict by indicating that wildlife trade policy decisions are not simply determined by scientific evidence. They are also determined by normative considerations under the influence of three significant narratives that interact within the existing global policy framework to generate policy outcomes.

Our research contributes to the literature by integrating two separate strands of theory on the ideas driving policy conflict and applying the ideational analysis specifically to the wildlife trade policy process, which has not previously been considered in this way. We proceed as follows: Section 4.3 outlines our theoretical framework, grounded in political science, to guide analysis of this issue. Section 4.4 describes the methods we used to collect and analyse data. Section 4.5 presents our results, and Section 4.6 concludes with a discussion of their relevance, considering policy implications and recommending avenues for further research.

### 4.3 Theoretical framework

The question of what drives trade policy conflict over African megafauna lends itself to a multi-disciplinary approach, as adopted by others examining conservation conflicts (Redpath et al., 2015). Whereas the natural sciences have a role to play in identifying how biophysical parameters determine the limits of sustainable wildlife extraction to supply trade, the factors driving policy conflict fall largely within the realm of the socio-political and hence call for the application of conservation social science (Bennett et al., 2017). Given the substantial role of non-state actors in both the formation of CITES and subsequent shaping of trade policy and regulation (Kosloff & Trexler, 1987; Princen & Finger 1994), the topic also fits within the scope of research on environmental governance (Armitage et al., 2012; Lemos & Agrawal 2006).

Research on policy development in general has proliferated and with it the evolution of several different theories of ‘the policy process’ (Weible & Sabatier, 2017). Theoretical frameworks relating to the policy process typically draw on new institutionalist thought (March & Olsen, 1983), aligned with the proposition that institutions create incentives that shape human behaviour (North, 1990; Ostrom, 1990). In this context, institutions can be defined as “systems of established and embedded social rules that structure social interactions” (Hodgson, 2006: 18). We have drawn from the school of ‘historical institutionalism’ (Hall & Taylor, 1996), which considers both the strategic interactions of purposive actors and role of cultural factors in influencing their behaviour, and which further emphasizes power relations and the contribution of other factors, notably ideas, toward outcomes. Within this school, we drew inspiration from a framework developed by Campbell (1998; 2004) and its specific application to research on the transnational temperance

movement that drove the global alcohol prohibition wave in the early twentieth century (Schrad, 2010).

More recent academic work has emphasized the central role of ideas themselves (Béland, 2009) and generated concepts of ‘discursive institutionalism’ (Schmidt, 2008), ideational power (Carstensen & Schmidt, 2016), and a theory of ideational evolution (Carstensen, 2015). The role and power of discourse in framing environmental problems and solutions to mobilize policy is a focus of recent work in political ecology. This notably includes research on framings of illegal wildlife trade as a problem of serious transnational organized crime and a global security threat—and the consequent implications for conservation policy and practice (Massé et al., 2020; Duffy, 2022). The theory of ideational evolution, which provides further inspiration for our research, holds that new ideas emerge when political actors conjoin a set of existing ideational elements.

To investigate the evolution of ideas in the wildlife trade policy process, we drew on two strands of policy process research to develop a conceptual framework for analysis. The first is grounded in Campbell’s framework, which provides a typology of actors and ideas that influence policy processes, in both the foreground and background of policy debates. Ideas that influence policy debates may be categorized as either cognitive or normative (Campbell, 1998; Schmidt, 2008). According to Schrad (2010:20) cognitive ideas are “outcome-oriented descriptions and theoretical analyses that specify cause-and-effect relationships,” whereas normative ideas are “based on shared values, norms, identities, and attitudes.” Since both cognitive and normative ideas are apparent in both the foreground and background of policy debates, the Campbell model yields four quadrants with specific types of ideas (ideational realms), which he terms programs, paradigms, frames, and public sentiments, each of which is

associated with certain types of actors, namely decision-makers, theorists, framers, and constituents, respectively (see Campbell, 1998:385). Campbell (2004) also identifies a fifth type of actor, ideational brokers (e.g., expert advisors, media, and epistemic communities), who operate at the intersection of the other four realms.

A separate strand of policy process research has developed the Narrative Policy Framework (NPF), which focuses on the strategic use of narratives—compelling stories with a setting, characters (e.g., victims, villains, and heroes), a plot, and a moral—to influence public opinion and policy decisions (Jones et al., 2014; Shanahan et al., 2011). The notion that ideas conveyed through stories are especially powerful at motivating collective human action is increasingly recognised across various disciplines within the social sciences (Czarniawska, 2004). Narrative policy analysis evolved from the recognition that many policy issues involve interrelated elements of complexity, uncertainty, and polarization, and that making sense of these may be best achieved by examining the stories of policymakers and their critics (Roe, 1994). Noting preliminary evidence of narrative elements in the wildlife trade debate, we chose to enrich our analytical framework with conceptual insights from the NPF (Shanahan et al., 2017).

Figure 1, overleaf, illustrates the framework we used to guide our approach toward analysing the ideational drivers of wildlife trade policy change. We drew from and adapted the framework developed by Campbell (1998; 2004) and Schrad (2010). For our analysis we identified key actors and their roles in the policy process and examined the ideational elements constituting their positions, guided by the various classifications. However, Campbell's framework makes no provision for overarching ideas that integrate all four categories of ideational elements; it only identifies ideational brokers as overarching actors.

We therefore included policy narratives in our framework to fill this lacuna. Applying this framework to recent debates has enabled us to consider the evolving wildlife trade policy discourse in the light of more recent theoretical developments in policy analysis and the contemporary international wildlife trade policy landscape.

**Figure 1. Analytical framework**

	Foreground of policy debate		Background of policy debate	
	Ideas	Actors	Ideas	Actors
<b>Cognitive</b>	<i>Programs</i> (policy prescriptions)	<i>Decision-makers</i> (e.g., politicians, bureaucrats)	<i>Paradigms</i> (elite assumptions to constrain cognitive range of potential solutions)	<i>Theorists</i> (e.g., academics, intellectuals)
<b>Ideas: Policy narratives    Actors: Brokers (e.g., NGOs, expert advisors, media, epistemic communities)</b>				
<b>Normative</b>	<i>Frames</i> (symbols and concepts for public legitimacy)	<i>Framers</i> (e.g. campaign managers)	<i>Public sentiments</i> (public assumptions to constrain normative range of legitimate available solutions)	<i>Constituents</i> (e.g., the public, elites, investors, courts)

Adapted from Campbell (1998: 385) and Schrad (2010: 21)

#### 4.4 Research approach, materials, and methods

Research took place principally through participation in relevant policy processes. The first author engaged directly with these processes through three main channels:

- 1) membership of two IUCN specialist groups, whose role is to inform policy with scientific evidence;
- 2) an association with the Oxford Martin Programme on the Illegal Wildlife Trade (OMP-IWT), which fostered collective research to promote evidence-based wildlife trade policy; and
- 3) as an appointed member of the South African High-Level Panel (hereafter SA-HLP), which was presented with submissions from a range of non-state actors.

The research consisted of an extended triangulated data collection exercise and concurrent reflexive thematic analysis (Braun et al., 2019; Braun & Clark, 2019). The data collection strategy was guided by principles of controversy mapping (Venturini, 2010), which outlines a process of identifying statements and linking them to literatures that help to identify actors, their networks, and epistemic communities. The first author collected data in the form of official source documents, recorded interviews with nine key actor representatives ('key informants'), and notes from in-person observations, supplemented by regular informal and semi-formal communications and monitoring of social and conventional media channels, over a five-year period (2016-2020), as detailed below and in S2.

Following an exploratory literature review (academic, grey, and popular) to gain an understanding of the landscape of ideas influencing the policy debates, data acquisition and assembly was undertaken in two overlapping stages. Stage 1 consisted of a participatory engagement with international policy processes within the IUCN and CITES community, tracking the evolution of policy debates and outcomes associated with the case study species. This stage began at a meeting of the CITES Standing Committee in January 2016 and ended with the 18<sup>th</sup> CITES CoP in August 2019. Stage 2, focused on South Africa, commenced with a wildlife economy stakeholder workshop in March 2016 and culminated with participation in the South African High-Level Panel (hereafter SA-HLP) from November 2019 to December 2020. A list of events attended as part of these processes is provided in S2 Table A. For both stages of the research, specific policy issues and actors were purposively sampled using a combination of criterion and snowball sampling methods (Bryman, 2016).

Gaining an adequate perspective of ideas ranging from clearly specified cognitive arguments in the foreground of trade policy debates to less obvious normative public sentiments in the

background required the use of diverse and complementary sources of data and an iterative, reflexive approach to analysis (Srivastava & Hopwood, 2009). Unveiling aspects of the background ideas required understanding arguments and underlying concepts from diverse disciplines including conservation science, environmental ethics, economics, law, and social psychology. Throughout the research process, the first author investigated evidence of associations between actors (including both observable interactions and references in their statements and publications) to identify likely background influences on ideas in the foreground of policy debates. The combination of complementary data collection methods and multi-scalar analysis, with triangulation between multiple actors and data source types, enabled research to reach a point of saturation (Fusch & Ness, 2015; Busetto *et al.*, 2020), beyond which no more significantly different ideas could be observed.

#### **4.4.1 Data collection**

The principal method of data collection for both stages was through participant observation (Kawulich, 2005; DeWalt & DeWalt, 2010) in various forms. This was supplemented throughout the process by monitoring of various media and group communication channels, as well as targeted communication and consultation with various stakeholders and key informants. All key informant input has been anonymised and the research methods applied to this project received ethics approval under the Oxford University CUREC system, reference # SOGE 1A-170. Further details on data collection methods and sources are provided in S2.

#### **4.4.2 Data analysis**

The data were analysed following Braun and Clarke's (2019) reflexive thematic approach to identify themes across policy issues, actor categories, and ideas. This entailed following the six phases of i) initial familiarization, ii) generating initial codes, iii) searching for themes, iv)

reviewing themes, v) defining and naming themes, and vi) writing up as originally described by Braun and Clarke (2006), and doing so reflexively, i.e., iteratively while revising assumptions and categories where appropriate if new themes became apparent. Preliminary themes identified during the exploratory literature review were thus evaluated and refined throughout the data collection period. The exploratory review provided an indication of the identity of actors associated with promoting specific ideas and formed a basis for understanding the underlying assumptions of the policy debate, i.e., the ‘background’ (see Fig. 1), which could then be followed by closer analysis of the ‘foreground’ through the participatory process.

Policy issues raised through CITES meeting agenda items were classified thematically across the case study species, and these themes were refined following stakeholder inputs in South Africa during Stage 2 of the research. Actors were categorised through use of an extended actor typology, as detailed in S3, and their positions and arguments (‘stances’) on the relevant CITES agenda items and related thematic issues were recorded and coded to generate the ideational themes.

Initial ideational themes were classified as either cognitive ideas (characterized by assumed causal relationships) or normative ideas (characterized by social values and attitudes).

However, some conflation of categories was observed (for example, value-driven but unproven assumptions of causality, such as blaming another actor’s position for an outcome), and this was noted in relation to the identification of policy narrative elements. For relevant CITES agenda items, the emergent ideational themes were cross-referenced by policy issue and actor category using coded spreadsheets, to identify patterns and relationships revealed

through sorting and clustering. After refinement of the ideational themes, the SA-HLP stakeholder submissions were analysed following the same protocol.

Wherever possible, cognitive ideas expressed as programs within the CITES framework were traced back to theoretical concepts (representing ‘paradigms’) in the peer-reviewed literature—this was typically done by consulting referenced sources. Normative ideas, both in the form of frames and public sentiments, were more challenging to classify and source-trace. However, the identified normative themes that served to frame and justify trade policy prescriptions provided a strong indication of narrative elements, as did overt challenges to the legitimacy of other actors. The final analysis traced themes across issues, actors, cognitive and normative ideas, and different scales of governance, to identify distinct policy narratives on trade in African megafauna.

## **4.5 Results**

We present the results in five sections. The first describes the specific trade policy issues that were identified and followed through both stages of research, starting with an account of policy changes. The second outlines our findings on actors. The third and fourth discuss, respectively, the cognitive and normative ideas that emerged through the observed discourse and that were further illuminated through key informant interviews. The final section outlines key features of three identified policy narratives.

### ***4.5.1 Trade policy issues***

During the five-year study period, a range of specific trade-related issues were vigorously debated across the case study species, both internationally and within South Africa (see S2 Table B and DFFE, 2020a). However, these deliberations resulted in relatively few actual

policy changes during this time. In relation to elephants, two significant international trade policy developments took place. The first was the further entrenchment of ivory trade restrictions, through various incremental policy shifts within the CITES framework; these included the defeat of an attempt by southern African countries to establish a decision-making mechanism for future legal trade and the imposition of new restrictions in various domestic ivory markets, including the USA, EU, UK, China, and Japan. The second was the placement of additional restrictions on the trade of live elephants, by way of a CITES resolution (CITES, 2019b). Discussions on elephant-related trade issues occupied a substantial proportion of the allocated time in CITES Standing Committee meetings and Conferences of the Parties and included an unsuccessful attempt to list the extinct woolly mammoth in CITES, aimed at monitoring the mammoth ivory trade.

Limited international policy change took place in relation to rhino trade during the study period, although rhinos remained as a prominent CITES agenda item. South Africa was granted an effective increase in its trophy export quota for the black rhino species (CITES, 2019a) and, within the country, the courts overturned a moratorium on domestic rhino horn trade (Stoddard, 2017), but this was of limited relevance due to continued tight restrictions (Clements et al., 2020).

Despite occupying less time and space on CITES meeting agendas, there were two substantial changes in relation to lion trade in 2016: the United States suspended all trophy imports from lions bred in captivity, and at CITES CoP17 (in late 2016) the Parties imposed a zero quota on all body part trade with an exemption for South Africa, which was mandated to establish an annual export quota of lion carcasses from captive bred sources only. However, this decision became highly contentious, and the quota and quota-setting process were domestically

challenged, through both the South African Parliament and the courts, causing the curtailment of exports and providing the catalyst for the creation of the SA-HLP. In the final SA-HLP report, a majority view recommended terminating South Africa's commercial captive lion breeding industry (DFFE, 2020b).

Several thematic policy issues appeared across the case study species. A starting point of debate related to varying opinions concerning the threats to these species and the associated impact and social legitimacy of i) extraction from the wild, ii) consumptive uses, and iii) 'physical' commercial trade (in which 'physical' specifically denotes corporeal trade in live animals and their body parts as distinct from trade in, for example, animal viewing and filming rights). These varying opinions led to disagreements over which CITES Appendix listing was most appropriate and whether certain annotations were justified to create exceptional conditions, such as quotas or differentiated treatment for certain products.

Directly related to this were questions of the extent to which trade in live animals or their body parts should be legally permitted and for what purposes. Those questions were linked to three further issues. The first concerned keeping and breeding these species in captivity and the potential for 'farming' them, which provides a frequently used avenue for legal trade in Appendix I listed species under CITES. The second concerned the retention, management, and potential future use or trade of accumulated legal stockpiles of body parts. Such stockpiles may accumulate from various non-farming sources, through collections from natural mortalities of wild animals, and through management practices such as culling lions and elephants for population control and dehorning rhinos for security purposes. A third issue concerned exemptions made for trade in hunting trophies, given growing public opposition to the practice of legal recreational hunting of iconic species.

The above issues were vigorously debated and contested throughout the study period, both internationally and within South Africa. A final issue, largely ignored within South Africa, but salient internationally, concerned the desirability of allowing or enabling trade in imitative substitute products, either from similar extinct species (termed here as ‘simulants’) or produced through new technologies such as synthetic biology. Table 2, below, provides a list of these key thematic issues and the key questions relating to them.

**Table 2. Key thematic issues**

Issue theme & Sub-theme		Question: Under what circumstances are the following acceptable?
1	Extraction	Removing animals from the wild
	1a Lethal	– Killing wild animals
	1b Non-lethal, full	– Removing live animals from the wild for translocation
	1c Non-lethal, part	– Removing body parts from live or naturally deceased wild animals
2	Consumption	Utilising wild animal body parts as food, medicine, ornaments, etc.
3	Physical commercial trade	Commercial trade in live animals or body parts
	3a Live animal trade	– Commercial trade in live animals
	3b Trade in animal parts	– Commercial trade in body parts and derivatives
4	Commercial captive breeding	Breeding wild animals in captivity for commercial purposes
5	Stocks of body parts (and derivatives)	Retention of body part stocks for potential future use or trade
6	Trophy trade	Movement of hunting trophies across jurisdictional boundaries
7	Imitative substitute products	Allowing trade in simulant and synthetic products

#### 4.5.2 Actors

Our research revealed a range of intergovernmental, state, and non-state actors that engage in elements of wildlife trade policy discourse, as detailed in S4. We identified 14 non-state actors that were engaged both at the international (CITES) level and in the SA-HLP process, with varying orientations. Significantly, we found that most key actors played multiple roles according to Campbell’s typology; most larger scale non-state actors also played the role of broker and were likely to have varying and nuanced stances (see S4, Table F). Within the most extensive organizational actor, the IUCN, there were critical disagreements over issues such as hunting trophy trade (IUCN, 2019), domestic ivory trade (Stuart et al., 2019), and captive lion breeding (DFFE, 2016). These revelations about actor role complexity reaffirm

the need to engage more specifically with ideational elements to gain deeper insight into wildlife trade policy conflict.

#### **4.5.3 Cognitive ideas**

Trade policy decisions, taken by state actors either through CITES or at domestic levels, are expected to be informed by cognitive ideas: i.e., paradigms and programs (Fig. 1), grounded in scientific evidence of causal relationships that link different trading regimes to conservation outcomes. The default logic of the CITES system is that if a species is deemed to be threatened by trade, monitoring and regulation of international trade through an Appendix II listing will help to mitigate this threat; furthermore, for species deemed to be threatened with extinction and affected by trade, a ban on international commercial trade (as per an Appendix I listing) will provide further mitigation. Evaluation of the threat is informed by the global IUCN Red List species assessments, but ultimately determined through the state-driven process of undertaking ‘non-detriment findings’ (NDFs). The criteria and methods used for NDFs vary across countries, with some focusing only on biological aspects and others including socio-economic factors. We found that not all state actors share the same views or understanding of the causal links between trade and conservation outcomes, with some inferring that trade always constitutes a threat to species and others viewing appropriately regulated trade as potentially enhancing species conservation, citing evidence from southern African countries.

This difference in perception of causal links was more marked among non-state actors and evidently linked to broader and longer-term debates over the effectiveness of extractive forms of sustainable use as an approach to conservation (Ludwig et al., 1993; Hoyt, 1994; Hutton & Leader-Williams, 2003). Cognitive arguments against trade tended to express scepticism over

whether extraction and trading regimes are sustainable in practice, whereas those in favour of trade tended to link it to postulated incentive mechanisms that benefit conservation of species and ecosystems by way of socio-economic benefits, i.e., financial, livelihood, and other returns to conservation management agencies, private landowners, and local communities. These broadly opposing views tended to be linked to other arguments relating to the identified issue themes. Sustainable use sceptics were also more likely to raise animal welfare concerns in relation to the case study species, highlighting various causal links between trade-related activities and harms to individual animals. S4 provides detailed descriptions of observed contrasting cognitive arguments, which are summarized in Table 3, below.

**Table 3. Cognitive arguments**

Issue	Supportive	Opposing
Extraction	Sustainable offtake can yield biodiversity and socio-economic benefits	Sustainable and harmless offtake not possible if commercial
	Lethal	Can be supportive or even necessary for conservation
	Non-lethal, full	Can be supportive or even necessary for conservation
	Non-lethal, part	Can be supportive or even necessary for conservation
Consumption	Provides opportunities to benefit conservation through trade	There is insufficient supply to meet insatiable demand
Physical comm. trade	Yields socio-economic benefits for conservation	Over-stimulates consumer demand and enables laundering
Comm. captive breeding	Delivers socio-economic benefits; provides supply source to reduce pressure on wild populations; some potential for reintroduction to wild (maintenance of genetic buffer)	Negative impacts on animal welfare; potential adverse genetic effects from selective breeding; increased zoonotic disease risk; may cause further wild harvesting
Stockpiling body parts	Future source of income that can pay for conservation; insurance against speculation-driven poaching (buffer effect)	High storage costs; risk of demand stimulation through leakage or signalling that future trade is acceptable
Trophy trade	Regulated recreational hunting can provide ecological and socio-economic benefits that enhance conservation outcomes	Recreational hunting harms individual animals and disrupts their social structures; trophy export exemptions can enable product laundering
Imitative substitutes	Can displace and suppress demand for genuine wild products	Can perpetuate or stimulate demand for the genuine wild-harvested products and enable laundering

A notable feature of most cognitive arguments around trade policy toward the case study species was the extent of disagreement, uncertainty, and general lack of substantive empirical evidence regarding causal relationships between trade policy, trade-related activities, and conservation outcomes, especially at international levels. This issue was acknowledged by some state actors and reflected in background peer-reviewed literature but denied by many non-state actors and some scientists, who either claimed that sufficient evidence existed or argued that certain policy decisions (typically restrictions) were justified on grounds of

applying a precautionary approach. Persistent disagreement on these issues was reflected in the final report of the SA-HLP, in which Panel members were unable to reach consensus on the causal links between captive lion breeding, hunting, and legal skeleton export trade and threats to wild lions, as well as the appropriate conservation role of private rhino breeding and trade (DFFE, 2020b).

To date, most research on causal links between international wildlife trade and conservation outcomes has been conceptual rather than empirical, with a focus on the elephant ivory trade and some discussion around potential effects of wildlife farming (Fischer, 2010; 't Sas-Rolfes et al., 2019). Such research identifies complex market interactions along supply chains and postulates ambiguous or uneven outcomes for conservation, contingent on numerous factors that vary significantly between species, jurisdictions, and site-specific contexts (e.g., proximity to international borders or disaffected local communities). Cognitive arguments about the effects of trade policy are therefore subject to scale effects and uncertainty. This adds a political dimension and raises questions over how best to deal with uncertainty and risk, thereby introducing a normative element to policy discussions.

#### ***4.5.4 Normative ideas***

Our research revealed that normative ideas (comprising values and attitudes) played a strong, often dominant, role in the trade policy discourse during the study period. In most instances in which actors opposed trade or a trade-related activity, cognitive arguments were bolstered by normative arguments, with the distinction between the two categories sometimes unclear, notably regarding animal welfare concerns and perceptions of species endangerment and risk. Within the realm of normative ideas, three thematic focal areas of concern were evident, and could be categorised as anthropocentric, ecocentric, and sentiocentric. Anthropocentrism

places humans at the centre of moral concern, ecocentrism holds that natural ecosystems have intrinsic value independent of humans, and sentiocentrism places sentient beings at the centre of moral concern and therefore extends consideration of the conventional norms that structure and govern relationships among humans to non-human animals. Few actors self-identified as subscribing to only one of these three value systems; however, there were clear differences in emphasis, the most noticeable being in relation to sentiocentric arguments (e.g., killing wild animals is unethical – see Ramp & Bekoff, 2015), which tended to be juxtaposed with anthropocentric positions. The observed key normative arguments are detailed in S4 and summarized in Table 4, below.

**Table 4. Normative arguments**

Issue	Supportive	Opposing
Extraction	Sustainable harvest can meet socio-economic needs of the poor, support cultures, and help to maintain natural ecosystems	Extraction constitutes interference in natural ecosystems and harms sentient animals
	Lethal	Killing some animals is justified for the greater good, subsistence, and ecosystem management
	Non-lethal, full	Killing sentient animals is fundamentally unethical
	Non-lethal, part	Harvesting live animals for translocation and trade can help with managing populations and providing conservation finance for their welfare and well-being
		Harvesting body parts of rare and sentient wild animals is not socially legitimate
Consumption	Consuming wild animal products is natural for humans, part of many cultural heritages, and justified if sustainable and ethical supply sources are used	Consuming wild animal products is unacceptable in contemporary society due to associated risks and harms to people and wildlife
Physical comm. trade	Trade is justified if sustainably sourced and can generate net positive benefits for people and biodiversity	Physical trade is exploitative, driven by human greed, fuels illegal activity, and poses security risks to society
	Live	Commercial trade in live sentient animals is unethical and harms their welfare and well-being
	Parts	Managed legal trade from sustainable sources can generate benefits for people and wildlife
		Illegal trade in body parts fuels poaching and other crime, and is a security threat; legal commercial trade enables wildlife crime and should be banned
Comm. captive breeding	Provided appropriate welfare and genetic standards are set, commercial captive breeding can generate numerous positive benefits for people: e.g., livelihoods, aesthetic appreciation, education, recreational, and scientific research advances	Commercial breeding and associated practices such as live trade, animal interactions, and put-and-take hunting are inherently exploitative, abusive, and incompatible with traditional conservation values
Stockpiling body parts	Stockpiles are valuable assets with potential future use; destroying them undermines future conservation incentives	Destroying stockpiles is necessary to signal that trade and consumption will no longer be tolerated
Trophy trade	Hunting and the taking of trophies is supported by many cultural traditions; preventing trophy trade harms people by affecting their livelihoods, undermines conservation incentives, and can therefore also harm both species and their habitats	Killing individual animals for pleasure and profit is unethical, especially from threatened species
Imitative substitutes	Suppressing cultural traditions is wrong and providing substitutes that do not harm animals is morally justified	Approving such substitutes inappropriately legitimises use of the genuine products; alternatively, it might undermine genuine sustainable use initiatives

Normative arguments relating to the three case study species appeared to be grounded in background sentiments that formed the basis for framings in the foreground of policy debates. Anti-trade positions drew on public sentiments against killing and physical harm of wild animals, especially those perceived to be rare and iconic, as well as notions that actors involved in trade-related activities were motivated by greed and selfish pleasure and therefore lacked virtue. Linked to these sentiments were notions of an undesirable loss of wildness and an apparent distaste for excessive commodification and commercial development, which were seen as associated driving factors. Public sentiments supporting trade activity were less obvious but seemed generally grounded in notions of sustainably managing wildlife as resources for the benefit of society and especially local communities, thereby ensuring a better (balanced) future for humans, wildlife, and the environment alike.

Anti-trade sentiments readily translated into framings that emphasized peril and crimes against nature, fuelled by greed and ignorance, invoking a need for compassion, protection, and education to overcome the threats to the welfare and security of both wild animals and humans. The theme of security was applied to protecting individual animals from harm, protecting wild nature, and mitigating zoonotic disease risk through precautionary measures. Hence, the overriding policy framing of anti-trade sentiment was one of protection and precaution. Trade-supportive framings were grounded in the essentially anthropocentric concept of sustainable development, emphasizing the achievement of efficiency, equity, and sustainability through good governance and judicious use of natural capital, supported by appropriate recognition of national sovereignty, human rights, and the imperative for just socio-economic development.

#### **4.5.5 Policy narratives**

Actor statements and stances on policy issues frequently conflated cognitive and normative ideas to produce over-arching narratives relating to wildlife trade. Within the defined setting of the global marketplace for physical wildlife products, which wildlife trade policy seeks to regulate, we identified three distinct policy narratives in relation to African megafauna. We term these three narratives ‘Global Control’, ‘Decentralized Conservation’, and ‘Animal Protection’. The first two are closely linked to previously identified environmental conservation narratives, but the third has not been explicitly recognized in this domain, despite being readily identifiable by consistent narrative elements.

The **Global Control** narrative aligns with a previously identified broader narrative termed ‘Finite Earth’ (Jepson, 2018) and provides a plot of worrying excessive exploitation of threatened species for trade, which is best addressed through a global controlling mechanism established and governed by morally enlightened decision-makers. In this narrative, the victims are endangered species and global society, the villains are those exploiting those species (poachers, illegal traders, and those who enable their activities, including non-compliant state actors), and the heroes are the creators and implementors of the global governance system. In the more detailed plot, various heroes play specific roles: scientists identify trade threats to species, lawyers draft the necessary regulations, and bureaucrats and law enforcement officials implement them. Non-state actors facilitate the system by assisting with monitoring, raising public awareness and funding, and changing public perception and behaviour. The moral of the story is that through cooperation and law abidance, the forces of good exercised through a top-down international regulatory regime can gain effective control of wildlife trade, to the benefit of the threatened species.

The Global Control narrative framed 20<sup>th</sup> century wildlife trade policy and the design of CITES, which it would thus present as both a legitimate and functional regime. Adhering to this narrative need imply no normative preference between Appendix I and II listings and would simply assume that these are scientifically determined and work essentially as intended across all scales of government. This policy narrative appears to receive continued support from most state actors, intergovernmental agencies, and some mainstream environmental conservation NGOs.

The **Decentralized Conservation** narrative includes elements of other previously identified narratives termed ‘Resource Earth’ (Jepson, 2018) and ‘Community Conservation’ (Hutton et al., 2005). These elements emphasize the role of providing socio-economic incentives to relevant local people to achieve species conservation by way of appropriately regulated market institutions that support sustainable use outside of state protected areas. Decentralized Conservation differs from the Global Control narrative in that it is sceptical of top-down approaches and excessive trade restrictions, asserting that these may in fact be counterproductive. In this narrative the victims include not only the threatened species and their habitats, but also previously disadvantaged local communities who were historically deprived of traditional access, use, and benefit-sharing rights, and may still bear the costs of living with dangerous animals. The role of local poachers as villains is downplayed relative to external facilitators of larger scale criminal activities and exploitation, including both extraction and habitat conversion. The heroes of this narrative include actors who develop institutional arrangements that enhance local incentives for long-term species and habitat conservation whilst providing livelihoods for local people; they would thus include certain politicians, economists, and other social scientists, as well as fair-minded, law-abiding participants in the wildlife economy, including landholders, managers, entrepreneurs, and

consumers. The plot thus entails the devolution of meaningful wildlife ownership and use rights to local levels, following which sustainable trade can be enabled through appropriate regulation if local actors wish to benefit from it.

The moral of the Decentralized Conservation narrative is that by empowering local people with rights to participate in the management of—and receive benefits from—endangered megafauna, they will feel a strong sense of stewardship over these populations and ensure their conservation, to the collective benefit of all. This narrative calls the full effectiveness of regulatory regimes such as CITES and the Endangered Species Act into question, noting that they can create perverse incentives through the excessive imposition of restrictions and punitive measures that victimise local people, and may ultimately fuel criminal activity as a form of rebellion. Hence, it would tend to favour CITES Appendix II listings and domestic regulatory frameworks that enable trade that is legal, sustainable, and fair, as opposed to long-term bans. Supporters of this narrative include some state actors and various non-state actors, including community organisations, private landowners, and various wildlife industry participants. These actors also often view opponents of physical wildlife trade, whom they typically (and inaccurately) label as ‘animal rightists’, as villains.

The **Animal Protection** narrative, while somewhat aligned with a well-recognized ‘Animal Rights Metanarrative’ (Roe, 1994), is uniquely positioned in relation to wildlife conservation, having evolved as a counter-narrative to the notion of sustainable use (see Hoyt, 1994, who provides an effective manifesto for this narrative). In contrast to the two earlier narratives, Animal Protection adopts a more overtly sentiocentric position and the principal victims are clearly identified as individual wild animals, with collectives such as species and ecosystems playing a lesser (but still salient) role, along with humans affected by animal harm. This

narrative considers physical commodification of wildlife as fundamentally unacceptable and therefore regards all its enablers as villains. Villains would thus include all actors directly involved in physical trade, whether legal or illegal, including poachers, legal hunters, commercial breeders, traders, smugglers, product processors, and wilful consumers, all of whom are regarded as exploiters. Other villains include state and non-state actors that enable such exploitation to continue, including academics and other advocates for sustainable use, and even those who fail to act once made aware of the injustices. Heroes include all actors involved in bringing an end to animal exploitation, from those physically rescuing harmed or threatened individuals to those working to permanently outlaw all forms of consumptive use and enforce such laws once in place. Such heroes could be state or non-state actors, playing various supporting roles along supply chains and within society in general (e.g., by raising awareness and funds).

The basic plot of this narrative involves rare and iconic wild animals, threatened by human exploitation, that must be protected from individual harm and collective extinction. A more detailed sub-plot, specific to trade policy, depicts misguided actors who promote and practice the sustainable use approach to conservation through the provision of legal supply alternatives. Their initiatives are portrayed as either unethical or too risky (or both), being likely to stimulate demand and provide cover for illegal activity and abuse, thereby leading to further exploitation and possible extinction. The moral of the story is that complete protection through abolition of use—leading to permanent human behaviour change—is the only long-term solution that is safe, ethical, and ultimately effective. Animal Protection is sceptical of the role of CITES Appendix II, holding that adequate control of extractive use for commercial and consumptive ends is not practically possible. It therefore sees Appendix I listings or their

equivalent as imperative for all sentient animals and especially the case study species, starting with elephants as the most obviously sentient.

Support for the Animal Protection narrative in relation to wildlife trade policy appears to have originated with a relatively small number of animal welfare NGOs in the early days of CITES (based on historical records) but has grown substantially in the wake of the ivory trade ban and the debates that it spawned. Current supporters include a growing number of state actors and a dedicated and growing coalition of non-state actors, spearheaded by a core group of international NGOs. This coalition receives increasing support from academics (notably in the fields of animal ethics, environmental and animal law, and conservation biology), the wildlife tourism industry, celebrities, and the media, including activist writers and filmmakers. Of the three policy narratives relating to wildlife trade, Animal Protection currently appears to be providing the most effective platform for a coherent and cohesive social movement, as indicated by its surging presence in the South African trade policy debate during the case study period.

## **4.6 Discussion**

Applying our analytical framework to international and South African wildlife trade policy debates relating to the case study species provides insights into the ideational influences that inform and shape actor positions. Whereas specific actors in policy processes play clearly influential roles, our analysis contributes and lends weight to the growing literature on the critical significance of ideas, especially in relation to ideational evolution and ideational and discursive power. Our results provide added insight into the discursive mechanisms through which, for example, public opinion can be influenced to support changing approaches to foreign conservation assistance (Massé & Margulies, 2020), including through media

misinformation (Hart et al., 2020). They highlight that cognitive ideas and scientific evidence may carry less relative weight than normative arguments, especially when both are subsumed within broader policy narratives.

The three identified policy narratives, which also align somewhat with previously identified branches of eco-political thought—namely authoritarian, utilitarian, and radical ecology (Stoett, 2002)—also highlight the broader disparate social tensions within the wildlife trade policy community. To illustrate this point further, we contextualise this result within the longer-term evolution of CITES and ideas about wildlife trade policy, notably attitudes toward bans, before drawing some conclusions.

The formation of CITES appears to have been dominated by a cluster of cognitive and normative ideas most closely aligned with the Global Control narrative. In the opening speeches of the first Conference of the Parties (CITES, 1976), potential tensions between different worldviews were concealed by the interchangeable use of the words ‘conservation,’ ‘preservation,’ and ‘protection,’ terms that already signified somewhat divergent ethical stances at the time (Norton, 1986). CITES attempted to accommodate fundamentally different wildlife management philosophies—for example, the North American model, which rejects private wildlife ownership and markets (Geist, 1994) and various African models that had successfully enabled both (Child et al., 2012). This divergence in philosophies had surfaced markedly by CoP7, by which time the three distinct policy narratives had emerged in relation to the ivory trade debate, as indicated by various accounts in the popular literature (e.g., Barbier et al., 1990; Douglas-Hamilton & Douglas-Hamilton, 1992; Bonner, 1993). The Animal Protection narrative evidently gained further support following new scientific revelations of elephant sentience through the work of ethologists and provided additional

impetus for the 1989 ivory ban (Poole and Thomsen, 1989). However, the ban stimulated a reaction that led to a firming of the Decentralized Conservation narrative (Sugg & Kreuter, 1994), which led to large mainstream conservation NGOs aligned with the Global Control narrative being criticised from both sides (Princen, 1994).

After strong lobbying from Southern African countries during the 1990s, the CITES Parties agreed to the differential treatment of certain range states with large and relatively secure elephant and rhino populations (Thompson, 2004). Such concessions included specific national down-listings to Appendix II (so-called ‘split-listing’ of species) with restrictive annotations, and agreement to allow strictly controlled sporadic ivory sales, subject to various conditions being met. Two such sales were approved and eventually took place, prompting fierce debate over their impacts on elephant conservation, especially since the second final approval coincided with resurgent poaching driven by rapidly growing East Asian consumer demand (Somerville, 2017). This surge in demand and associated poaching, which also affected species such as rhinos and pangolins (*Manidae*), prompted strong responses from actors associated with both the Global Control and Animal Protection narratives, fuelling the vigorous campaigns against the illegal wildlife trade, and increasingly legal trade, during the last decade. These campaigns have relied most heavily on normative arguments, given the persisting uncertainties and disputes over empirical evidence.

Supported by the recent work of others, our research has revealed that many claims of universal causal links between controversial trade-related activities and adverse conservation outcomes are grounded in both tenuous theoretical assumptions and limited empirical evidence. This applies not only to wildlife trade in general (’t Sas-Rolfes et al., 2019; ’t Sas-Rolfes & Hiller, 2021), but also to activities such as wildlife farming (Williams & ’t Sas-

Rolfes, 2019; Hinsley & 't Sas-Rolfes, 2020), stockpile management ('t Sas-Rolfes et al., 2014), trophy hunting (Di Minin et al., 2021), and supply of simulant and synthetic products (Farah & Boyce, 2019; Chen & 't Sas-Rolfes, 2021). Wildlife trade, associated activities, and the regulation thereof, take place in the context of complex-adaptive social-ecological systems, in which many diverse variables may influence conservation outcomes, which therefore tend to be highly situational and defy oversimplification (Cooney et al., 2015).

Concerted efforts over the last two decades to establish various databases to assist CITES decision-making are starting to support global enforcement relating to elephant ivory trade but the data remain open to variable interpretation and to date have been insufficient to help resolve trade policy debates. A recent analysis of ivory prices suggests that elephant poaching is relatively inelastic, i.e., somewhat insensitive to changes in trade policy (Do et al., 2020), a conclusion supported by recent evidence of continued elephant poaching despite intensification of ivory trade ban measures (Schlossberg, 2020). A more recent detailed analysis of elephant poaching drivers draws on CITES databases to affirm that factors such as governance quality, human development, and site-level enforcement play significant roles along with ivory prices (Kuiper et al., 2023); however, the relationship between these factors and current elephant trade policy is unclear and possibly tenuous.

In the absence of clear and decisive empirical evidence on causal relationships, environmental treaties, including CITES, have officially adopted the 'precautionary principle' (Kriebel et al., 2001). However, in the context of wildlife trade, the precautionary principle can be applied in different, sometimes conflicting, ways, and there is evidence of inconsistent application within the Convention text itself (Dickson, 1999). Similar evidence exists within the various arguments used to support the distinct wildlife trade policy narratives. In essence, one

interpretation of the precautionary principle would hold that commercial wildlife trade is inherently risky and therefore must be actively restrained by default. An alternative interpretation would hold that any proposed change in trade policy, including the imposition of restrictions, should be subject to a cautious prior assessment, to avoid any potentially detrimental unintended consequences.

Our research revealed that proponents of the former interpretation (some of whom also used the term ‘highly precautionary approach’) applied it not only at the species level, but at the level of individual animals. One key informant interviewee stated that they “would put the intrinsic value of a live elephant above the entire stock of world ivory.” This quote stands in sharp contrast with a state actor who stated that recreational hunting and trophy trade was considered as a “means of converting surplus wild animals into social benefits.” The latter view was aligned with research suggesting that a ban on trophy trade would have significant negative socio-economic and conservation impacts (Naidoo et al., 2016), thereby implying that such a ban would not be precautionary in terms of the alternative interpretation (and implicitly accepting the notions of ‘surplus’ animals and ecological sustainability of the practice).

Public perceptions of risk are widely recognized as being potentially biased and linked to social group cohesion (Slovic, 1987), which in turn is strongly influenced by shared moral values (Haidt, 2008). Moral judgements are furthermore grounded in emotionally driven social intuitions and subject to post-hoc reasoning (Haidt, 2001; Greene, 2014). Research on divergent opinions in climate change science reveals that they are closely linked to cultural polarization, which is greatest among those with the highest levels of science literacy; this highlights a potential influence of moral tribalism on scientific neutrality and suggests that

research on ethically contested topics may be prone to directionally motivated reasoning (Kahan et al., 2012; Lord et al., 1979). These insights reemphasize the binding power of normative ideas and policy narratives and provide a plausible explanation as to why ostensibly scientific decisions on wildlife trade policy may become overwhelmed by ethical considerations and politics.

An early 1990's review of CITES and the ivory ban (Princen, 1994) noted that trade bans might be increasingly employed within CITES, causing it to evolve from a limited trade regulation regime to a 'global prohibition regime' (Nadelmann, 1990). Our analysis suggests that the fusion of elements of the Global Control and Animal Protection narratives provides fertile ground for the entrenchment of CITES as a global prohibition regime and there is evidence of this happening in the wake of the most recent surge of African megafauna poaching and trade. Recent scientific literature on wildlife trade in general reflects growing criticism of its negative impacts and scepticism that these can be mitigated through mere regulation of legal trade (e.g., Frank & Wilcove, 2019; Macdonald et al., 2021), further reinforcing the prohibition drive and calls to overhaul CITES accordingly (Couzens, 2013a). This raises important questions about the future of the Southern African model of wildlife conservation, which is heavily reliant on sustainable extractive wildlife uses to create both direct and indirect incentives for conservation, against a background of severe funding constraints, exacerbated by COVID-19 (Abensperg-Traun, 2009; Lindsey et al., 2020).

Our analysis confirms that wildlife trade policy satisfies the definition of a 'wicked problem' (Rittel & Webber, 1973), providing a platform for actors to pursue multiple objectives that overlap and conflict to varying degrees, against a background of complexity and uncertainty. This is illustrated by the varying (and inconsistent) tensions between anthropocentric,

ecocentric, and sentiocentric sentiments that underlie normative arguments, framings, and narratives that shape the policy debate. The three distinct policy narratives, which are not mutually exclusive, appear to pursue disparate goals, namely control of wildlife trade, sustainable development, and physical decommodification of wild animals. The more detailed narratives expose critical ideological tensions. The tensions between Global Control and Decentralized Conservation align to a broader long-standing tension between political traditions that are grounded, respectively, in the sociological and rational choice models of human behaviour (Masters, 1982). The Animal Protection narrative introduces a new level of complexity to such political debates by adding another dimension—i.e., the inclusion of sentient animals into the political calculus.

The Decentralized Conservation narrative does not preclude the partial implementation of Animal Protection values—for example, within designated strictly protected areas. However, these two narratives conflict in relation to the acceptable human treatment of wild animals outside of such areas. Hence, the Animal Protection narrative appeals to Global Control to implement its vision of worldwide physical decommodification, thereby also rejecting appeals for conservation and environmental policy to embrace ethical pluralism and pragmatism (Robinson 2011, Minter, 2011, Pascual et al., 2021). Animal Protection through Global Control produces a vision of the future of conservation that is in clear ideological conflict with the latter, and this represents a widespread phenomenon identified and labelled by social scientists as a ‘conflict of visions’ (Sowell, 1987; Pinker, 2002). In this conflict, a ‘Utopian Vision’ of liberating all sentient wild animals through fundamental social change and ‘decommodification’ confronts the ‘Tragic Vision’ of a world in which human nature is less malleable and behaviour is best guided by incremental changes to existing institutions, with due consideration of long-standing traditions and individual incentives.

What are the future implications for wildlife trade policy and conservation of African megafauna? Béland (2019) argues that whereas narratives moralize and shape problem definition, institutional legacies ultimately influence policy adoption. This implies that policy changes called for by the South African High-Level Panel will still face significant implementation constraints as they confront the constraints of existing institutional arrangements, including informal institutional responses. It also implies that international wildlife trade policy will remain substantially guided by the basic structure and logic of CITES. Given that the Appendix listing system of CITES entrenches a polarizing tension between proponents of commercial prohibition (Appendix I) and sustainable use (Appendix II), the future implications of this are certainly worth considering further in the light of the above analysis. Will the current prevailing trend toward prohibition prevail and, if so, what are the likely consequences for the conservation of African megafauna and even the future viability of CITES itself? These questions warrant further research.

#### **4.7 Acknowledgements**

We thank Paul Jepson, Dan Challender, Amy Dickman, Constance McDermott, and two anonymous reviewers for comments on earlier drafts of this paper. Michael 't Sas-Rolfes gratefully acknowledges funding from Earthmind.

## 4.8 References

- Abensperg-Traun, M. (2009). CITES, sustainable use of wild species and incentive-driven conservation in developing countries, with an emphasis on southern Africa. *Biological Conservation*, 142(5), 948–963. <https://doi.org/10.1016/j.biocon.2008.12.034>
- Armitage, D., Loë, R. de, & Plummer, R. (2012). Environmental governance and its implications for conservation practice. *Conservation Letters*, 5(4), 245–255. <https://doi.org/10.1111/j.1755-263X.2012.00238.x>
- Baker, S. E., Cain, R., Kesteren, F. van, Zommers, Z. A., D’Cruze, N., & Macdonald, D. W. (2013). Rough Trade: Animal Welfare in the Global Wildlife Trade. *BioScience*, 63(12), 928–938. <https://doi.org/10.1525/bio.2013.63.12.6>
- Barbier, E. B., Burgess, J. C., Swanson, T. M., & Pearce, D. W. (1990). *Elephants, Economics and Ivory*. Earthscan.
- Bauer, H., Nowell, K., Sillero-Zubiri, C., & Macdonald, D. W. (2018). Lions in the modern arena of CITES. *Conservation Letters*, 11(5), e12444. <https://doi.org/10.1111/conl.12444>
- Bauer, H., Packer, C., Funston, P. F., Henschel, P., & Nowell, K. (2016). *Panthera leo*. *The IUCN Red List of Threatened Species*. <https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T15951A107265605.en>
- Béland, D. (2009). Ideas, institutions, and policy change. *Journal of European Public Policy*, 16(5), 701–718. <https://doi.org/10.1080/13501760902983382>
- Béland, D. (2019). Narrative stories, institutional rules, and the politics of pension policy in Canada and the United States. *Policy and Society*, 38(3), 356–372. <https://doi.org/10.1080/14494035.2019.1644071>
- Bennett, N. J., Roth, R., Klain, S. C., Chan, K., Christie, P., Clark, D. A., Cullman, G., Curran, D., Durbin, T. J., Epstein, G., Greenberg, A., Nelson, M. P., Sandlos, J., Stedman, R., Teel, T. L., Thomas, R., Veríssimo, D., & Wyborn, C. (2017). Conservation social science: Understanding and integrating human dimensions to improve conservation. *Biological Conservation*, 205, 93–108. <https://doi.org/10.1016/j.biocon.2016.10.006>
- Biggs, D. (2016). Track the impact of Kenya’s ivory burn. *Nature*, 534(7606), 179–179. <https://doi.org/10.1038/534179a>
- Biggs, D., Holden, M. H., Braczkowski, A., Cook, C. N., Milner-Gulland, E. J., Phelps, J., Scholes, R. J., Smith, R. J., Underwood, F. M., Adams, V. M., Allan, J., Brink, H., Cooney, R., Gao, Y., Hutton, J., Macdonald-Madden, E., Maron, M., Redford, K. H.,

- Sutherland, W. J., & Possingham, H. P. (2017). Breaking the deadlock on ivory. *Science*, 358(6369), 1378–1381. <https://doi.org/10.1126/science.aan5215>
- Bonner, R. (1993). *At The Hand Of Man: Peril and Hope for Africa's Wildlife*. Alfred A. Knopf.
- Bowman, M. (1998). Conflict or compatibility? The trade, conservation and animal welfare dimensions of cites. *Journal of International Wildlife Law & Policy*, 1(1), 9–63. <https://doi.org/10.1080/13880299809353883>
- Bowman, M. (2013). A Tale of Two CITES: Divergent Perspectives upon the Effectiveness of the Wildlife Trade Convention. *Review of European, Comparative & International Environmental Law*, 22(3), 228–238. <https://doi.org/10.1111/reel.12049>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*, 11(4), 589–597. <https://doi.org/10.1080/2159676X.2019.1628806>
- Braun, V., Clarke, V., Hayfield, N., & Terry, G. (2019). Thematic Analysis. In P. Liamputtong (Ed.), *Handbook of Research Methods in Health Social Sciences* (pp. 843–860). Springer. [https://doi.org/10.1007/978-981-10-5251-4\\_103](https://doi.org/10.1007/978-981-10-5251-4_103)
- Brockington, D., & Duffy, R. (2011). *Capitalism and Conservation*. John Wiley & Sons.
- Bryman, A. (2016). *Social Research Methods* (5th edition). OUP Oxford.
- Busetto, L., Wick, W., & Gumbinger, C. (2020). How to use and assess qualitative research methods. *Neurological Research and Practice*, 2(1), 14. <https://doi.org/10.1186/s42466-020-00059-z>
- Callicott, J. B. (1990). Whither Conservation Ethics? *Conservation Biology*, 4(1), 15–20. <https://doi.org/10.1111/j.1523-1739.1990.tb00261.x>
- Campbell, J. L. (1998). Institutional analysis and the role of ideas in political economy. *Theory and Society*, 27(3), 377–409. <https://doi.org/10.1023/A:1006871114987>
- Campbell, J. L. (2004). *Institutional Change and Globalization*. Princeton University Press.
- Carstensen, M. B. (2015). Conceptualising Ideational Novelty: A Relational Approach: Conceptualising Ideational Novelty. *The British Journal of Politics & International Relations*, 17(2), 284–297. <https://doi.org/10.1111/1467-856X.12030>
- Carstensen, M. B., & Schmidt, V. A. (2016). Power through, over and in ideas: Conceptualizing ideational power in discursive institutionalism. *Journal of European Public Policy*, 23(3), 318–337. <https://doi.org/10.1080/13501763.2015.1115534>

- Challender, D. W. S., & MacMillan, D. C. (2014). Poaching is more than an Enforcement Problem. *Conservation Letters*, 7(5), 484–494. <https://doi.org/10.1111/conl.12082>
- Challender, D. W. S., & MacMillan, D. C. (2019). Investigating the Influence of Non-state Actors on Amendments to the CITES Appendices. *Journal of International Wildlife Law & Policy*, 22(2), 90–114. <https://doi.org/10.1080/13880292.2019.1638549>
- Chen, F., & 't Sas-Rolfes, M. (2021). Theoretical analysis of a simple permit system for selling synthetic wildlife goods. *Ecological Economics*, 180, 106873. <https://doi.org/10.1016/j.ecolecon.2020.106873>
- Child, B., Musengezi, J., Parent, G. D., & Child, G. F. T. (2012). The economics and institutional economics of wildlife on private land in Africa. *Pastoralism: Research, Policy and Practice*, 2(1), 18. <https://doi.org/10.1186/2041-7136-2-18>
- CITES. (1973). *CITES CoP1 E01 – Opening speeches*. <https://cites.org/sites/default/files/eng/cop/01/E01-Opening-speeches.pdf>
- CITES. (2019a). *Eighteenth meeting of the Conference of the Parties: Summary record of the fourth session for Committee I, 19 August 2019: 14h05–16h50*. [https://cites.org/sites/default/files/eng/cop/18/Com\\_I/SR/E-CoP18-Com-I-Rec-04-R1.pdf](https://cites.org/sites/default/files/eng/cop/18/Com_I/SR/E-CoP18-Com-I-Rec-04-R1.pdf)
- CITES. (2019b). *Eighteenth meeting of the Conference of the Parties: Summary record of the second plenary session, 27 August 2019: 09h15–11h30*. <https://cites.org/sites/default/files/eng/cop/18/Plen/SR/E-CoP18-Plen-Rec-02-R2.pdf>
- Clements, H. S., Knight, M., Jones, P., & Balfour, D. (2020). Private rhino conservation: Diverse strategies adopted in response to the poaching crisis. *Conservation Letters*, 13(6), e12741. <https://doi.org/10.1111/conl.12741>
- Cooney, R., Kasterine, A., MacMillan, D., Milledge, S., Nossal, K., Roe, D., & 't Sas-Rolfes, M. (2015). *The trade in wildlife: A framework to improve biodiversity and livelihood outcomes*. International Trade Centre. [http://www.intracen.org/uploadedFiles/intracenorg/Content/Publications/2014-2015-76\\_Low%20Res%20PDF\\_Trade%20in%20Wildlife\(4\).pdf](http://www.intracen.org/uploadedFiles/intracenorg/Content/Publications/2014-2015-76_Low%20Res%20PDF_Trade%20in%20Wildlife(4).pdf)
- Couzens, E. (2013). CITES at Forty: Never Too Late to Make Lifestyle Changes. *RECIEL*, 22(3), 311–323.
- Czarniawska, B. (2004). *Narratives in Social Science Research* (First edition). SAGE Publications Ltd.

- D’Cruze, N., Green, J., Elwin, A., & Schmidt-Burbach, J. (2020). Trading Tactics: Time to Rethink the Global Trade in Wildlife. *Animals*, *10*(12), Article 12.  
<https://doi.org/10.3390/ani10122456>
- DeWalt, K. M., & DeWalt, B. R. (2010). *Participant Observation: A Guide for Fieldworkers* (2nd edition). AltaMira Press.
- DFFE / South African Department of Forestry, Fisheries, and the Environment. (2016). *South Africa’s position on a motion to terminate the hunting of captive-bred lions and other predators*.  
[https://www.environment.gov.za/mediarelease/SA%25E2%2580%2599sposition\\_toterminate\\_huntingcaptivebredlions](https://www.environment.gov.za/mediarelease/SA%25E2%2580%2599sposition_toterminate_huntingcaptivebredlions)
- DFFE / South African Department of Forestry, Fisheries, and the Environment. (2020a). *High-Level Panel Report – For Submission to the Minister of Environment, Forestry and Fisheries*. [https://www.environment.gov.za/sites/default/files/reports/2020-12-22\\_high-levelpanel\\_report.pdf](https://www.environment.gov.za/sites/default/files/reports/2020-12-22_high-levelpanel_report.pdf)
- DFFE / South African Department of Forestry, Fisheries, and the Environment. (2020b, March 27). Department of Environmental Affairs: Notice 221 of 2020. *Government Gazette: Republic of South Africa*, *657*(43173), 3.
- Di Minin, E., Clements, H. S., Correia, R. A., Cortés-Capano, G., Fink, C., Haukka, A., Hausmann, A., Kulkarni, R., & Bradshaw, C. J. A. (2021). Consequences of recreational hunting for biodiversity conservation and livelihoods. *One Earth*, *4*(2), 238–253.  
<https://doi.org/10.1016/j.oneear.2021.01.014>
- Dickson, B. (1999). The Precautionary Principle in CITES: A Critical Assessment. *Natural Resources Journal*, *39*(2), 211–228. JSTOR.
- Do, Q.-T., Levchenko, A. A., Ma, L., Blanc, J., Dublin, H., & Milliken, T. (2020). The Price Elasticity of African Elephant Poaching. *The World Bank Economic Review*, *35*(3), 545–562. <https://doi.org/10.1093/wber/lhaa008>
- Doak, D. F., Bakker, V. J., Goldstein, B. E., & Hale, B. (2014). What is the future of conservation? *Trends in Ecology & Evolution*, *29*(2), 77–81.
- Douglas-Hamilton, I., & Douglas-Hamilton, O. (1993). *Battle for the Elephants* by Iain Douglas-Hamilton. Doubleday.
- Duffy, R. (2013). Global Environmental Governance and North—South Dynamics: The Case of the Cites. *Environment and Planning C: Government and Policy*, *31*(2), 222–239.  
<https://doi.org/10.1068/c1105>

- Duffy, R. (2022). *Security and Conservation: The Politics of the Illegal Wildlife Trade*. Yale University Press.
- Duffy, R., Massé, F., Smidt, E., Marijnen, E., Büscher, B., Verweijen, J., Ramutsindela, M., Simlai, T., Joanny, L., & Lunstrum, E. (2019). Why we must question the militarisation of conservation. *Biological Conservation*, 232, 66–73.  
<https://doi.org/10.1016/j.biocon.2019.01.013>
- Emslie, R. (2020a). *Ceratotherium simum*. *The IUCN Red List of Threatened Species*.  
<https://dx.doi.org/10.2305/IUCN.UK.2020-1.RLTS.T4185A45813880.en>
- Emslie, R. (2020b). *Diceros bicornis*. *The IUCN Red List of Threatened Species*.  
<https://dx.doi.org/10.2305/IUCN.UK.2020-1.RLTS.T6557A152728945.en>
- Epstein, C. (2006). The Making of Global Environmental Norms: Endangered Species Protection. *Global Environmental Politics*, 6(2), 32–54.  
<https://doi.org/10.1162/glep.2006.6.2.32>
- Farah, N., & Boyce, J. R. (2019). Elephants and mammoths: The effect of an imperfect legal substitute on illegal activity. *Environment and Development Economics*, 24(3), 225–251.  
<https://doi.org/10.1017/S1355770X18000554>
- Favre, D. (1993). Debate within the CITES Community: What Direction for the Future. *Natural Resources Journal*, 33, 875–918.
- Ferreira, S. M., Ellis, S., Burgess, G., Baruch-Mordo, S., Talukdar, B., & Knight, M. H. (2022). *African and Asian rhinoceroses—Status, Conservation and Trade: A report from the IUCN Species Survival Commission (IUCN/SSC) African and Asian Rhino Specialist Groups and TRAFFIC to the CITES Secretariat pursuant to Resolution Conf. 9.14 (Rev. CoP17) (CoP19 Doc. 75 (Rev.1) Annex 4)*. CITES Secretariat.  
<https://cites.org/sites/default/files/eng/cop/18/doc/E-CoP18-083-01.pdf>
- Fischer, C. (2010). Does Trade Help or Hinder the Conservation of Natural Resources? *Review of Environmental Economics and Policy*, 4(1), 103–121.  
<https://doi.org/10.1093/reep/rep023>
- Frank, E. G., & Wilcove, D. S. (2019). Long delays in banning trade in threatened species. *Science*, 363(6428), 686–688. <https://doi.org/10.1126/science.aav4013>
- Friedman, K., Braccini, M., Bjerregaard-Walsh, M., Bonfil, R., Bradshaw, C. J. A., Brouwer, S., Campbell, I., Coelho, R., Cortés, E., Dimlich, W., Frisk, M. G., Kingma, I., Phillips, S. R. M., O’Criodain, C., Parker, D., Shephard, S., Tovar-Ávila, J., & Yokawa, K. (n.d.). Informing CITES Parties: Strengthening science-based decision-making when listing marine species. *Fish and Fisheries*, 0(0). <https://doi.org/10.1111/faf.12411>

- Fusch, P., & Ness, L. (2015). Are We There Yet? Data Saturation in Qualitative Research. *The Qualitative Report*, 20(9), 1408–1416. <https://doi.org/10.46743/2160-3715/2015.2281>
- Gaffney, A. C. B., & Evensen, D. (2019). Addressing the Elephant in the Room: Learning from CITES CoP17. *Global Environmental Politics*, 20(1), 3–10. [https://doi.org/10.1162/glep\\_a\\_00537](https://doi.org/10.1162/glep_a_00537)
- Gehring, T., & Ruffing, E. (2008). When Arguments Prevail Over Power: The CITES Procedure for the Listing of Endangered Species. *Global Environmental Politics*, 8(2), 123–148.
- Geist, V. (1994). Wildlife conservation as wealth. *Nature*, 368(6471), 491–492. <https://doi.org/10.1038/368491a0>
- Gobush, K. S., Edwards, C. T. T., Balfour, D., Wittemyer, G., Maisels, F., & Taylor, R. D. (2022). *Loxodonta africana*. *The IUCN Red List of Threatened Species*. <https://dx.doi.org/10.2305/IUCN.UK.2022-2.RLTS.T181008073A223031019.en>
- Gobush, K. S., Edwards, C. T. T., Maisels, F., Wittemyer, G., Balfour, D., & Taylor, R. D. (2021). *Loxodonta cyclotis*. *The IUCN Red List of Threatened Species*. <https://dx.doi.org/10.2305/IUCN.UK.2021-1.RLTS.T181007989A204404464.en>
- Greene, J. D. (2014). Beyond Point-and-Shoot Morality: Why Cognitive (Neuro)Science Matters for Ethics. *Ethics*, 124(4), 695–726. <https://doi.org/10.1086/675875>
- Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review*, 108(4), 814–834. <https://doi.org/10.1037/0033-295x.108.4.814>
- Haidt, J. (2008). Morality. *Perspectives on Psychological Science*, 3(1), 65–72.
- Hall, P. A., & Taylor, R. C. R. (1996). Political Science and the Three New Institutionalisms\*. *Political Studies*, 44(5), 936–957. <https://doi.org/10.1111/j.1467-9248.1996.tb00343.x>
- Hart, A. G., Cooney, R., Dickman, A., Hare, D., Jonga, C., Johnson, P. K., Louis, M. P., Lubilo, R., Roe, D., Semcer, C., & Somerville, K. (2020). Threats posed to conservation by media misinformation. *Conservation Biology*, 34(6), 1333–1334. <https://doi.org/10.1111/cobi.13605>
- Harvard Law Review. (2001). The Cites Fort Lauderdale Criteria: The Uses and Limits of Science in International Conservation Decisionmaking. *Harvard Law Review*, 114(6), 1769.

- Harvey, R., Alden, C., & Wu, Y.-S. (2017). Speculating a Fire Sale: Options for Chinese Authorities in Implementing a Domestic Ivory Trade Ban. *Ecological Economics*, 141, 22–31. <https://doi.org/10.1016/j.ecolecon.2017.05.017>
- Heim, J., & Böcher, M. (2016). CITES and Science: Using the RIU Model to Analyze Institutionalized Scientific Policy Advice in Germany for the Case of Ivory Trade. *Journal of International Wildlife Law & Policy*, 19(2), 159–175. <https://doi.org/10.1080/13880292.2016.1167475>
- Hinsley, A., & 't Sas-Rolfes, M. (2020). Wild assumptions? Questioning simplistic narratives about consumer preferences for wildlife products. *People and Nature*, 2(4), 972–979. <https://doi.org/10.1002/pan3.10099>
- Hodgson, G. M. (2006). What Are Institutions? *Journal of Economic Issues*, 40(1), 1–25. <https://doi.org/10.1080/00213624.2006.11506879>
- Hoyt, J. A. (1994). *Animals in Peril: How 'Sustainable Use' is Wiping Out the World's Wildlife*. Avery.
- Hutton, J., Adams, W. M., & Murombedzi, J. C. (2005). Back to the Barriers? Changing Narratives in Biodiversity Conservation. *Forum for Development Studies*, 32(2), 341–370. <https://doi.org/10.1080/08039410.2005.9666319>
- Hutton, J. M., & Leader-Williams, N. (2003). Sustainable use and incentive-driven conservation: Realigning human and conservation interests. *Oryx*, 37(02). <https://doi.org/10.1017/S0030605303000395>
- IPBES. (2019). *Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. (E. S. Brondizio, J. Settele, S. Díaz, & H. T. Ngo, Eds.). IPBES secretariat. <https://doi.org/10.5281/zenodo.3553579>
- IUCN. (2019, October 9). *IUCN sets the record straight on a 2017 trophy hunting opinion*. <https://www.iucn.org/news/secretariat/201910/iucn-sets-record-straight-a-2017-trophy-hunting-opinion>
- Jepson, P. (2018). Recoverable Earth: A twenty-first century environmental narrative. *Ambio*, 1–8. <https://doi.org/10.1007/s13280-018-1065-4>
- Jones, M., McBeth, M., & Shanahan, E. (2014). Introducing the Narrative Policy Framework. In M. Jones, E. Shanahan, & M. McBeth (Eds.), *The Science of Stories: Applications of the Narrative Policy Framework in Public Policy Analysis* (1st ed. 2014 edition, pp. 1–25). Palgrave Macmillan.

- Kahan, D. M., Peters, E., Wittlin, M., Slovic, P., Ouellette, L. L., Braman, D., & Mandel, G. (2012). The polarizing impact of science literacy and numeracy on perceived climate change risks. *Nature Climate Change*, 2(10), Article 10.  
<https://doi.org/10.1038/nclimate1547>
- Karesh, W. B., Cook, R. A., Bennett, E. L., & Newcomb, J. (2005). Wildlife Trade and Global Disease Emergence. *Emerging Infectious Diseases*, 11(7), 1000–1002.  
<https://doi.org/10.3201/eid1107.050194>
- Kawulich, B. B. (2005). Participant Observation as a Data Collection Method. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 6(2), Article 2.  
<https://doi.org/10.17169/fqs-6.2.466>
- Kosloff, L. H., & Trexler, M. C. (1987). The Convention on International Trade in Endangered Species: Enforcement Theory and Practice in the United States. *Boston University International Law Journal*, 5(2), 327–362.
- Kriebel, D., Tickner, J., Epstein, P., Lemons, J., Levins, R., Loechler, E. L., Quinn, M., Rudel, R., Schettler, T., & Stoto, M. (2001). The Precautionary Principle in Environmental Science. *Environmental Health Perspectives*, 109(9), 871–876.  
<https://doi.org/10.2307/3454986>
- Krieps, C. (1996). Sustainable Use of Endangered Species under CITES: Is It a Sustainable Alternative? *University of Pennsylvania Journal of International Law*, 17(1), 461.
- Kuiper, T., Altwegg, R., Beale, C., Carroll, T., Dublin, H. T., Hauenstein, S., Kshatriya, M., Schwarz, C., Thouless, C. R., Royle, A., & Milner-Gulland, E. J. (2023). Drivers and facilitators of the illegal killing of elephants across 64 African sites. *Proceedings of the Royal Society B: Biological Sciences*, 290(1990), 20222270.  
<https://doi.org/10.1098/rspb.2022.2270>
- Lemos, M. C., & Agrawal, A. (2006). Environmental Governance. *Annual Review of Environment and Resources*, 31(1), 297–325.  
<https://doi.org/10.1146/annurev.energy.31.042605.135621>
- Lindsey, P., Allan, J., Brehony, P., Dickman, A., Robson, A., Begg, C., Bhammar, H., Blanken, L., Breuer, T., Fitzgerald, K., Flyman, M., Gandiwa, P., Giva, N., Kaelo, D., Nampindo, S., Nyambe, N., Steiner, K., Parker, A., Roe, D., ... Tyrrell, P. (2020). Conserving Africa's wildlife and wildlands through the COVID-19 crisis and beyond. *Nature Ecology & Evolution*, 4, 1300–1310. <https://doi.org/10.1038/s41559-020-1275-6>
- Lord, C. G., Ross, L., & Lepper, M. R. (1979). Biased assimilation and attitude polarization: The effects of prior theories on subsequently considered evidence. *Journal of Personality*

- and Social Psychology*, 37(11), 2098–2109. <https://doi.org/10.1037/0022-3514.37.11.2098>
- Ludwig, D., Hilborn, R., & Waters, C. (1993). Uncertainty, Resource Exploitation, and Conservation: Lessons from History. *Science*, 260(5104), 17–36.
- Macdonald, D. W., Harrington, L. A., Moorhouse, T. P., & D’Cruze, N. (2021). Trading Animal Lives: Ten Tricky Issues on the Road to Protecting Commodified Wild Animals. *BioScience*, biab035. <https://doi.org/10.1093/biosci/biab035>
- March, J. G., & Olsen, J. P. (1983). The New Institutionalism: Organizational Factors in Political Life. *American Political Science Review*, 78(3), 734–749. <https://doi.org/10.2307/1961840>
- Massé, F., Dickinson, H., Margulies, J., Joanny, L., Lappe-Osthege, T., & Duffy, R. (2020). Conservation and crime convergence? Situating the 2018 London Illegal Wildlife Trade Conference. *Journal of Political Ecology*, 27(1), 23–42. <https://doi.org/10.2458/v27i1.23543>
- Massé, F., & Margulies, J. D. (2020). The geopolitical ecology of conservation: The emergence of illegal wildlife trade as national security interest and the re-shaping of US foreign conservation assistance. *World Development*, 132, 104958. <https://doi.org/10.1016/j.worlddev.2020.104958>
- Masters, R. D. (1982). Is Sociobiology Reactionary? The Political Implications of Inclusive-Fitness Theory. *The Quarterly Review of Biology*, 57(3), 275–292.
- Menon, V., & Tiwari, S. Kr. (2019). Population status of Asian elephants *Elephas maximus* and key threats. *International Zoo Yearbook*, 53(1), 17–30. <https://doi.org/10.1111/izy.12247>
- Milner-Gulland, E. J. (2018). Documenting and tackling the illegal wildlife trade: Change and continuity over 40 years. *Oryx*, 52(4), 597–598. <https://doi.org/10.1017/S0030605318001047>
- Minteer, B. (2011). *Refounding Environmental Ethics: Pragmatism, Principle, and Practice*. Temple University Press.
- Nadelmann, E. A. (1990). Global Prohibition Regimes: The Evolution of Norms in International Society. *International Organization*, 44(4), 479–526.
- Naidoo, R., Weaver, L. C., Diggle, R. W., Matongo, G., Stuart-Hill, G., & Thouless, C. (2016). Complementary benefits of tourism and hunting to communal conservancies in Namibia. *Conservation Biology*, 30(3), 628–638. <https://doi.org/10.1111/cobi.12643>

- Natusch, D. J. D., Aust, P. W., & Shine, R. (2021). The perils of flawed science in wildlife trade literature. *Conservation Biology*, 35(5), 1396–1404.  
<https://doi.org/10.1111/cobi.13716>
- North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press.
- Norton, B. G. (1986). Conservation and Preservation: A Conceptual Rehabilitation. *Environmental Ethics*, 8(3), 195–220. <https://doi.org/10.5840/enviroethics1986832>
- Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press.
- Pascual, U., Adams, W. M., Díaz, S., Lele, S., Mace, G. M., & Turnhout, E. (2021). Biodiversity and the challenge of pluralism. *Nature Sustainability*, 1–6.  
<https://doi.org/10.1038/s41893-021-00694-7>
- Pinker, S. (2002). *The Blank Slate: The Modern Denial of Human Nature*. Viking.
- Poole, J. H., & Thomsen, J. B. (1989). Elephant are not beetles: Implications of the ivory trade for the survival of the African elephant. *Oryx*, 23(4), 188–198.  
<https://doi.org/10.1017/S0030605300023012>
- Princen, T. (1994). The ivory trade ban: NGOs and international conservation. In T. Princen & M. Finger (Eds.), *Environmental NGOs in World Politics: Linking the Local and the Global* (pp. 121–159). Routledge.
- Princen, T., & Finger, M. (1994). *Environmental NGOs in World Politics: Linking the Local and the Global*. Routledge.
- Ramp, D., & Bekoff, M. (2015). Compassion as a Practical and Evolved Ethic for Conservation. *BioScience*, 65(3), 323–327. <https://doi.org/10.1093/biosci/biu223>
- Redpath, S. M., Gutiérrez, R. J., Wood, K. A., & Young, J. C. (Eds.). (2015). *Conflicts in Conservation: Navigating Towards Solutions* (Illustrated edition). Cambridge University Press.
- Redpath, S. M., Young, J., Evely, A., Adams, W. M., Sutherland, W. J., Whitehouse, A., Amar, A., Lambert, R. A., Linnell, J. D. C., Watt, A., & Gutiérrez, R. J. (2013). Understanding and managing conservation conflicts. *Trends in Ecology & Evolution*, 28(2), 100–109. <https://doi.org/10.1016/j.tree.2012.08.021>
- Ripple, W. J., Chapron, G., López-Bao, J. V., Durant, S. M., Macdonald, D. W., Lindsey, P. A., Bennett, E. L., Beschta, R. L., Bruskotter, J. T., Campos-Arceiz, A., Corlett, R. T., Darimont, C. T., Dickman, A. J., Dirzo, R., Dublin, H. T., Estes, J. A., Everatt, K. T.,

- Galetti, M., Goswami, V. R., ... Zhang, L. (2016). Saving the World's Terrestrial Megafauna. *BioScience*, 66(10), 807–812. <https://doi.org/10.1093/biosci/biw092>
- Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy Sciences*, 4(2), 155–169. <https://doi.org/10.1007/BF01405730>
- Rivalan, P., Delmas, V., Angulo, E., Bull, L. S., Hall, R. J., Courchamp, F., Rosser, A. M., & Leader-Williams, N. (2007). Can bans stimulate wildlife trade? *Nature*, 447(7144), Article 7144. <https://doi.org/10.1038/447529a>
- Robinson, J. G. (2011). Ethical pluralism, pragmatism, and sustainability in conservation practice. *Biological Conservation*, 144(3), 958–965. <https://doi.org/10.1016/j.biocon.2010.04.017>
- Roca, A. L., Georgiadis, N., Pecon-Slattery, J., & O'Brien, S. J. (2001). Genetic Evidence for Two Species of Elephant in Africa. *Science*, 293(5534), 1473–1477. <https://doi.org/10.1126/science.1059936>
- Roe, D., & Lee, T. M. (2021). Possible negative consequences of a wildlife trade ban. *Nature Sustainability*, 4(1), Article 1. <https://doi.org/10.1038/s41893-020-00676-1>
- Roe, E. (1994). *Narrative Policy Analysis: Theory and Practice*. Duke University Press. <https://doi.org/10.1215/9780822381891>
- Sand, P. H. (1997). Whither CITES - The Evolution of a Treaty Regime in the Borderland of Trade and Environment. *European Journal of International Law*, 8(1), 29–58.
- Sandbrook, C., Scales, I. R., Vira, B., & Adams, W. M. (2011). Value Plurality among Conservation Professionals. *Conservation Biology*, 25(2), 285–294. <https://doi.org/10.1111/j.1523-1739.2010.01592.x>
- Schlossberg, S., Chase, M. J., Gobush, K. S., Wasser, S. K., & Lindsay, K. (2020). State-space models reveal a continuing elephant poaching problem in most of Africa. *Scientific Reports*, 10(1), Article 1. <https://doi.org/10.1038/s41598-020-66906-w>
- Schmidt, V. A. (2008). Discursive Institutionalism: The Explanatory Power of Ideas and Discourse. *Annual Review of Political Science*, 11(1), 303–326. <https://doi.org/10.1146/annurev.polisci.11.060606.135342>
- Schrad, M. L. (2010). *The Political Power of Bad Ideas: Networks, Institutions, and the Global Prohibition Wave*. OUP USA.
- Sekar, N., Clark, W., Dobson, A., Coelho, P. C. F., Hannam, P. M., Hepworth, R., Hsiang, S., Kahumbu, P., Lee, P. C., Lindsay, K., Pereira, C. L., Wasser, S. K., & Nowak, K. (2018). Ivory crisis: Growing no-trade consensus. *Science*, 360(6386), 276. <https://doi.org/10.1126/science.aat1105>

- Shanahan, E. A., Jones, M. D., & McBeth, M. K. (2011). Policy Narratives and Policy Processes. *Policy Studies Journal*, 39(3), 535–561. <https://doi.org/10.1111/j.1541-0072.2011.00420.x>
- Shanahan, E. A., Jones, M. D., McBeth, M. K., & Radaelli, C. M. (2017). The Narrative Policy Framework. In C. M. Weible & P. A. Sabatier (Eds.), *Theories of the Policy Process* (4th edition, pp. 173–213). Routledge.
- Slovic, P. (1987). Perception of risk. *Science*, 236(4799), 280–285. <https://doi.org/10.1126/science.3563507>
- Smith, K. F., Behrens, M., Schloegel, L. M., Marano, N., Burgiel, S., & Daszak, P. (2009). Reducing the Risks of the Wildlife Trade. *Science*, 324(5927), 594–595. <https://doi.org/10.1126/science.1174460>
- Somerville, K. (2017). *Ivory: Power and Poaching in Africa* (1 edition). Hurst.
- Sowell, T. (1987). *A Conflict of Visions: Ideological Origins of Political Struggles*. William Morrow.
- Srivastava, P., & Hopwood, N. (2009). A Practical Iterative Framework for Qualitative Data Analysis. *International Journal of Qualitative Methods*, 8(1), 76–84. <https://doi.org/10.1177/160940690900800107>
- Stoddard, E. (2017, April 5). South Africa’s top court lifts ban on domestic sales in rhino horn. *Reuters*. <https://www.reuters.com/article/us-wildlife-rhinos-safrica-idUSKBN1771VP>
- Stoett, P. (2002). The International Regulation of Trade in Wildlife: Institutional and Normative Considerations. *International Environmental Agreements*, 2(2), 193–208. <https://doi.org/10.1023/A:1020942110468>
- Stuart, S. N., Al Dhaheri, S., Bennett, E. L., Biggs, D., Bignell, A., Byers, O., Cooney, R., Donaldson, J., Dublin, H. T., Eggermont, H., Engels, B., van Havre, B., Hoffmann, M., Horie, M., Hutton, J., Khosla, A., Launay, F., Lees, C., Mace, G. M., ... von Weissenberg, M. (2019). IUCN’s encounter with 007: Safeguarding consensus for conservation. *Oryx*, 53(4), 741–747. Cambridge Core. <https://doi.org/10.1017/S0030605317001557>
- Sugg, I. C., & Kreuter, U. P. (1994). *Elephants and Ivory: Lessons From the Trade Ban*. Institute of Economic Affairs.
- Swanson, T., Bolton, P., & Manning, A. (1993). Regulating Endangered Species. *Economic Policy*, 8(16), 185–205. <https://doi.org/10.2307/1344571>

- Swanson, T. M. (1996). International Regulation for Environmental Protection: Learning from CITES. *Economic Affairs*, 16(5), 8–16. <https://doi.org/10.1111/j.1468-0270.1996.tb00562.x>
- 't Sas-Rolfes, M. (2017). African wildlife conservation and the evolution of hunting institutions. *Environmental Research Letters*, 12(11), 115007.
- 't Sas-Rolfes, M., Challender, D. W. S., Hinsley, A., Veríssimo, D., & Milner-Gulland, E. J. (2019). Illegal Wildlife Trade: Scale, Processes, and Governance. *Annual Review of Environment and Resources*, 44(1), 201–228. <https://doi.org/10.1146/annurev-environ-101718-033253>
- 't Sas-Rolfes, M., & Hiller, C. (2021). *Literature Review: Assessment of the Impact of Trade Restrictions and Other Policies on Wildlife Conservation and Community Wildlife Stewardship in Southern Africa*. USAID. <https://bridgebiointegration.net/mission-projects/vukanow/resources/trade-restrictions-low-res-spreads-final.pdf>
- 't Sas-Rolfes, M., Moyle, B., & Stiles, D. (2014). The complex policy issue of elephant ivory stockpile management. *Pachyderm*, 55, 62–77.
- Talbot, L. M. (1980). The World's Conservation Strategy. *Environmental Conservation*, 7(4), 259–268.
- Thompson, C. (2004). Co-producing CITES and the African Elephant. In S. Jasanoff (Ed.), *States of Knowledge: The Co-production of Science and the Social Order* (1st edition, pp. 67–86). Routledge.
- Velázquez Gomar, J. O., & Stringer, L. C. (2011). Moving Towards Sustainability? An Analysis of CITES' Conservation Policies. *Environmental Policy & Governance*, 21(4), 240–258. <https://doi.org/10.1002/eet.577>
- Venturini, T. (2010). Diving in magma: How to explore controversies with actor-network theory. *Public Understanding of Science*, 19(3), 258–273. <https://doi.org/10.1177/0963662509102694>
- Weible, C. M., & Sabatier, P. A. (2017). *Theories of the Policy Process* (4th edition). Routledge.
- Williams, V. L., & 't Sas-Rolfes, M. J. (2019). Born captive: A survey of the lion breeding, keeping and hunting industries in South Africa. *PLOS ONE*, 14(5), e0217409. <https://doi.org/10.1371/journal.pone.0217409>

## 4.9 Supplementary Material

### S1: Species descriptions

#### Elephants

African elephants (*Loxodonta* spp.) comprise one of two surviving genera from the family *Elephantidae*, which includes the recently extinct genus *Mammuthus* (mammoth) and the extant Asian elephant species, *Elephas maximus*. *Elephantidae* is the only surviving family of the order *Proboscidea*, which in prehistoric times included a wider range of species such as mastodons, gomphotheres, and stegodonts. Previously regarded as a single species with two subspecies, and classified as Vulnerable on the IUCN Red List, from 2021 two African elephant species are recognized, the African savanna elephant, *Loxodonta africana*, classified as Endangered (Gobush *et al.*, 2022), and the African forest elephant, *Loxodonta cyclotis*, classified as Critically Endangered (Gobush *et al.*, 2021). The IUCN reclassification, which has implications for CITES policy, took place some two decades after the species distinction was clearly articulated by geneticists (see Roca *et al.*, 2001). During the time of this research trade policy decisions essentially treated the genus *Loxodonta* as if it were a single species.

Whereas Asian elephants (listed as Endangered on the IUCN Red List and with an estimated global population of ~50,000 wild individuals – Menon & Tiwari, 2019) occur in 13 range states in South and Southeast Asia, the two African species are extant in ~37 countries, with ~23 savanna elephant range states and 20 forest elephant range states. The IUCN Species Survival Commission's African Elephant Specialist Group maintains an African Elephant Database (<https://africanelephantdatabase.org/>) with records of the latest continental census figures. These continental estimates are challenging to obtain (for logistical reasons) and released erratically at multi-year intervals. The most recent figures, for 2015, estimated a continental population of approximately 410,774 ( $\pm 20,163$  with 95% confidence intervals) individuals from both species, with a further possible 115,110–151,985 in a 'guess' category. Those figures did not distinguish between the two African species.

Both African species are herbivores and bulk processors of plant material. Savanna elephants occupy a variety of habitats, ranging from montane forest, through woodlands, savanna, and grasslands, to arid deserts. Forest elephants occupy a variety of forest habitats. Both species are threatened by anthropogenic land conversion, which causes habitat fragmentation and loss, and by direct killing, especially poaching for ivory. Within Africa, there is a long history of specific human communities hunting elephants for meat and skins and therefore acting as effective predators. Ornamental demand for ivory, which also dates back thousands of years, has emanated largely from Asia and Europe, providing the stimulus for international trade (Somerville, 2016).

#### Rhinos

Worldwide, five species remain of the pre-historically diverse *Rhinocerotidae* family, three occurring in Asia, and two in Africa. The two African species are the white rhino,

*Ceratotherium simum*, which is classified as Near Threatened by the IUCN Red List (Emslie, 2020a) and the black rhino, *Diceros bicornis*, which is classified as Critically Endangered (Emslie, 2020b). Two white rhino subspecies are recognized, one of which, the northern white rhino (*C.s. cottoni*) became functionally extinct in the wild in the first decade of the twenty-first century. White rhinos are grazers and occur in grassland and savanna habitats, whereas black rhinos are browsers, occurring in a wider variety of habitats from desert areas to wetter wooded areas, although most commonly also in savannas. The most recent reported official figures, for late 2021, estimated continental wild African populations at 15,942 white rhinos in ~11 range states, and 6,195 black rhinos in ~12 range states (Ferreira *et al.*, 2022).

One Asian species, the greater one-horned rhino, survives in India and Nepal, with numbers estimated at ~4014 in early 2022. The other two, the Javan and Sumatran rhinos, only survive in Indonesia; both are critically endangered, numbering less than 100 animals each. Whereas habitat loss has constituted a significant driver of rhino population decline, especially of the Asian species, all five species have also been subjected to intense poaching for their horn, which has a long tradition of being a prized commodity in Asian markets. Rhino horn is used for both ornamental and traditional healing purposes (ingested in powder form) and is viewed as a prestige product among some Asian communities. Depletion of Asian rhinos contributed toward a growing demand for African-sourced horn as a substitute, driving a burgeoning illegal international trade in the 1970s and 1980s. Poaching for this trade persists as a threat.

## **Lions**

Lions, *Panthera leo*, are a member of the family *Felidae*, which includes all cat species, and the sub-family *Pantherinae*, the big cats. The genus *Panthera* also includes tigers, jaguars, leopards, and snow leopards. Once widespread across Africa, south-western Asia, and parts of Europe, lions and their range have been substantially reduced in the face of human encroachment. Lions have a broad habitat tolerance except for tropical rainforest and extreme desert environments. They are versatile predators, with a preference for medium to large size ungulates (including typical livestock species) and may also scavenge.

According to the most recent IUCN Red list assessment (Bauer *et al.*, 2016), wild lion populations survive in 25 African range states (and possibly 7 more) and in India, and the species is classified as Vulnerable, numbering between 20,000 and 30,000 individuals. Except for four southern African countries (Botswana, Namibia, South Africa, and Zimbabwe) in which small increases were observed, African lion populations appear to have declined significantly since the early 1990s, eliciting the growing concern of conservationists.

The causes of decline in wild African lion populations are linked to human population growth, land conversion, and the consequent factors of habitat loss and fragmentation, prey depletion, and retaliatory or pre-emptive killing to protect the lives of people and their livestock. Excessive recreational hunting for trophies has also at times contributed to localised population declines and there are growing concerns that lions are being poached to supply the demand for body parts such as bones, skins, claws, and teeth. These last two threats have received significant attention in recent years.

## S2: Data collection

Table 5, below, provides a list of relevant events in which the first author actively participated during the five-year research period (2016-2020).

**Table 5. Relevant events and projects**

Date	Event/project name	Location	Capacity of engagement
Jan-16	CITES SC 66	Geneva, Switzerland	IUCN delegation member
Feb-16	IUCN SSC African Rhino Specialist Group meeting	Skukuza, South Africa	IUCN AfRSG member
Mar-16	Wildilfe policy workshop	Pretoria, South Africa	Convenor
Sep-16	IUCN World Conservation Congress	Hawaii, USA	IUCN SSC member
Sep-16	International Wildlife Ranching Symposium	Windhoek, Namibia	Participant/presenter
Oct-16	CITES CoP 17 SC 67/8	Sandton, South Africa	IUCN delegation member
2017	SANBI lion quota project part 1	South Africa	Expert consultant
Mar-17	African wildlife economy workshop	Pretoria, South Africa	Convenor
May-17	Lion skeleton traders focus group meeting	Johannesburg, South Africa	Co-convenor
Jul-17	CITES AC 29	Geneva, Switzerland	IUCN delegation member
Sep-17	OMP-IWT Conference	Oxford, UK	Participant/presenter
Nov-17	CITES SC 69	Geneva, Switzerland	IUCN delegation member
2018	SANBI lion quota project part 2	South Africa	Expert consultant
Jan-18	SANBI Rhino NDF meeting	Pretoria, South Africa	Expert consultant
Apr-18	Lion trade workshop	Hoedspruit, South Africa	Convenor
Apr-18	Hunting NDF workshop	Seville, Spain	Working group chair
May-18	CIC General Assembly	Madrid, Spain	Participant
Jun-18	Trade monitoring workshop (TRAFFIC)	Cambridge, UK	Participant/presenter
Jul-18	CITES AC 30	Geneva, Switzerland	IUCN delegation member
Aug-18	Parliamentary colloquium on lions	Cape Town, South Africa	Presenter
Oct-18	CITES SC 70	Sochi, Russia	IUCN delegation member
Oct-18	London Conference IWT & prior workshops	London, UK	Participant/presenter
Feb-19	IUCN SSC African Rhino Specialist Group meeting	Gross Barmen, Namibia	IUCN AfRSG member
Mar-19	WildCRU Conservation Geopolitics conference	Oxford, UK	Participant/presenter
Aug-19	CITES CoP 18 SC 71/ 72	Geneva, Switzerland	IUCN delegation member
Oct-19	Rhino horn price workshop (WWF/TRAFFIC)	Dinokeng, South Africa	Participant/presenter
Nov-19	SA-HLP inaugural meeting	Pretoria, South Africa	High-Level Panel Member
2020	SA-HLP	South Africa	High-Level Panel Member

**Note:** Unshaded items comprised Stage 1 of the research and shaded items comprised Stage 2

For Stage 1 of the research, participation at CITES meetings enabled direct observation of official interventions relating to policy decisions concerning the case study species. All agenda items relating to these species were noted, and classified according to whether they affected the species concerned directly or via a potential indirect mechanism (see Table 6, overleaf). To track these items, plenary meetings and, where possible, sub-committee and breakout working group meetings, were attended in person. Formal interventions by both state and non-state actors were noted, including the identity of the Party or non-state actor(s) making the intervention. The key points of interventions were noted, with the official summary records from the CITES Secretariat (available at [cites.org](http://cites.org)) providing a supplementary backup source for cross-referencing and verification. This data set was used to identify actors who made key interventions, which then enabled further research on the nature and objectives of those actors by examination of official statements and promotional materials

(e.g., websites, media releases, and printed material distributed at CITES meetings) and selection of leading individuals for key informant interviews. Further observation of actors and their positions took place at related meetings, conferences, and engagements.

**Table 6. CITES agenda items**

Issue	Species	CITES Meeting								
		SC66	SC67	CoP17	AC29	SC69	AC30	SC70	SC71	CoP18
		Jan-16	Oct-16	Oct-16	Jul-17	Nov-17	Jul-18	Oct-18	Aug-19	Aug-19
Black rhino trophy quota	rhino									48
Appropriate and acceptable destinations	elephant, rhino			40	18	39	16	38		44
Stocks, stockpiles, and stockpile destruction	elephant, rhino			27,47		43		41		51
Ivory trade decision-making mechanism	elephant			84						
Elephants	elephant	47		57		51		49		69
African lion	lion				29	58	25	54		76
Rhinos	rhino	51	21	68		60		56		83
Proposals to amend the Appendices: Lions	lion			88/4						
Proposals to amend the Appendices: Rhinos	rhino			88/7						105/8 105/9
Proposals to amend the Appendices: Elephants	elephant			88/14 88/15 88/16						105/10 105/11 105/12
Demand reduction	all			18		15		16		
Compliance: National Ivory Action Plans	elephant	29	13			29		27	11	
Enforcement: domestic markets	all			27				28		31
Captive bred and ranched specimens (incl. captive Asian big cats)	lion, rhino	41			14	32,33	13		19	
Synthetic products	rhino, elephant			27	15	35	14	33		43
Mammoth ivory	elephant			38						
Hunting trophies	all			39	16		10,15			
Proposals to amend the Appendices: Mammoth	elephant									105/13
Review of the Convention	all									11
Non-detriment findings	all				10		10			
Rural communities and livelihoods	all	18		16,26		14,16,17,18		15,17,18		17,18,26
Enforcement: corruption	all			28						
Enforcement: cybercrime	all			29		31		30		33
Traceability	all	34				42				
Asian big cats	lion			60						71
Jaguar	lion									77

**Note:**

The unshaded area comprises issues that directly concern the indicated species, i.e., agenda items affecting whether international trade in the species can take place or not and under what conditions.

The grey shaded area comprises items that may affect trade in the indicated species through an indirect mechanism.

Stage 2 of the research consisted of an initial phase of accumulating information and evidence relating to the domestic discourse in South Africa, especially concerning the captive lion industry, followed by participation in a focused stakeholder input and engagement process through the SA-HLP. The initial phase comprised regular media monitoring (newspaper articles, blogs, and selected Facebook groups) and consultations with stakeholders in the South African wildlife management sector, particularly those involved in trade-related activities such as wildlife ranching and hunting<sup>3</sup>. Following a decision at the 17<sup>th</sup> CITES CoP in 2016 to subject South African captive lion skeleton exports to an annual quota, the first author partnered with two national institutions, the South African National Biodiversity Institute (SANBI) and University of the Witwatersrand, to gain further information on the

<sup>3</sup> Further details on the specific stakeholders and communication channels, as well as methods for selection and the maintenance of records, can be provided by the authors on request.

captive lion breeding industry and the potential impacts of trade on wild lion populations. This joint research included a focus group meeting with lion skeleton exporters, an expert workshop, and a national survey of captive lion facilities. The final phase of Stage 2 comprised participation in the SA-HLP process.

Identification of relevant actors took place as follows:

For Stage 1 of the research:

- by first recording all those individuals present at the CITES and related meetings and the organisations that they represented (as per published attendance records),
- then further noting which of those actors commented on the selected issues by way of written submissions and/or by oral interventions at relevant meetings (which were attended in person),
- followed by adopting a snowball sampling approach to find other less easily identifiable actors, including journalists and academics.

For Stage 2 of the research:

- by drawing on the first author's existing knowledge of the South African spectrum of actors either affected by or attempting to influence trade policy in the case study species,
- first identifying key organisations known to have vested interests, such as wildlife producer and hunting associations, conservation NGOs, animal rights and welfare NGOs, and relevant government agencies, and then
- using snowball sampling to identify further supporting actors; and, finally,
- by recording all actors that made submissions to the SA-HLP.

Cross-referencing the two research stages, the process identified a subset of actors that engaged at both the international and national South African level.

For both stages of the research, informant consultation included informal, semi-formal, and formal interactions. Regular informal communication with various actors<sup>4</sup> provided a general sense of ideas in action, and more structured engagements were employed to gain deeper understanding of the technical complexities of some of the contested issues, especially concerning the use of evidence, and to clarify the motivations behind the more complex positions of certain actors. Such engagements took place through conference and workshop participation, convened focus groups, individual key informant interviews, and, in the case of the South African captive lion trade, an industry-wide survey questionnaire (see Williams & 't Sas-Rolfes, 2019).

Conference and workshop participation included engagements in various roles ranging from regular participant to presenter, chair, or convener. During these events, data was gathered in the form of participant feedback on relevant issues via formal questions and answers, and informal discussions. Detailed notes were compiled after each event to record the key points

---

<sup>4</sup> Further details on the identities of these actors can be provided on request.

made by specified actors. To gain insight on the range of perspectives relating to the impact of captive lion trade on wild lion populations, a participatory modelling and scenario planning workshop was convened, and information was gathered through breakout group outputs. Targeted focus groups were convened to obtain specific information from insiders involved with South Africa’s wildlife ranching and lion skeleton export industries.

**Table 7. Formal key informant interviews**

Date	Duration		Organisation	Position
	hours	mins		
2016-12-06	3	35	NGO: trade policy orientation	Species Programme Leader
2016-12-31	1	22	IUCN taxonomic specialist group	Chair
2017-05-03	1	28	Environment Ministry, range state (1)	Deputy Director General
2018-01-11	2	14	Environment Ministry, range state (2)	Permanent Secretary
2018-03-02		35	Large-scale private wildlife breeder	Owner
2018-06-29		54	IUCN Species Survival Commission	Chair (former)
2018-07-02	1	20	NGO: species conservation orientation	CEO
2018-08-16	1	29	NGO: enforcement orientation	CEO
2018-09-19	1	00	NGO: animal welfare orientation	Head of Policy

Formal, recorded key informant interviews, listed in Table 7 (above) involved senior representatives of the identified significant state and non-state actors within the debate, selected for their knowledge across the spectrum of views and interests with a focus on those with more complex and nuanced views toward the centre of the spectrum. All nine interviews took place in person and in private, at varied locations in Africa and Europe, based on convenience for the interviewees. Interviews were semi-structured, guided by a pre-determined set of questions (see ‘Sample scope of interview questions’, overleaf), which were informed and shaped by a set of topics drawn from the early phases of the research, but adjusted as deemed appropriate during the process. The interviews ranged in duration from 35 minutes to 3.5 hours, with an average time of 93 minutes. Interviewees were asked to distinguish their personal views from those of their organisations and to indicate if their organisations had no view on a topic or were otherwise internally divided—this was done both to ascertain organisational coherence around issues and to mitigate potential variation error (Bryman, 2016).

The SA-HLP solicited external stakeholder input by way of an announcement in the South African Government Gazette on 27 April 2020 (DFFE, 2020a) and received written submissions, which were followed by invited oral presentations and further written responses to follow-up questions from HLP members. A total of 75 initial written submissions were received from a range of non-state actors. These comprised 2078 pages, with many submissions providing specific input on elephants (n=39), rhinos (n=42), and lions (n=41). Although not published, the submissions are available from the South African Department of Forestry, Fisheries, and the Environment upon request.

## Sample scope of interview questions

All the following questions relate primarily to African rhinos, elephants, and lions

### Basic positioning

Does your organization have a fundamental (i.e., permanent/immutable) position for or against the following (or does it have a more flexible position)?

- Commercial trophy hunting
- Commercial harvest and trade in products collected from natural mortalities
- Commercial harvest and trade in products from farming or culling?

To what extent are these positions based on:

- Ethical concerns
- Practical concerns (scientific, economic, political)

Please elaborate

Which of the following best characterizes your position toward commercial consumptive uses and trade of rhino and elephants and their products:

It is morally unacceptable in principle

It is morally acceptable but potentially unsustainable

It is morally acceptable, potentially sustainable and should be pursued if it can be appropriately regulated.

Taking one step back, what is your organisation's main underlying priority?

(e.g., species conservation; protection of individual animals from harm; law enforcement; human development; other – please specify)

### Property rights, legality, and other institutional framings

What does your organization believe about the ownership of living rhinos, elephants and/or lions?

Some examples of positions (not mutually exclusive):

These animals (should) have rights and should not / cannot be owned by humans

It is acceptable for them to be legally owned by individuals, communities and/or corporations

Ownership rights are a matter of national sovereignty

They are / should be owned by the global community

If animals can be owned by humans, what, if any legal constraints should be placed upon ownership rights and at what level (local, national, international)?

What is your organization's attitude toward ownership of the body parts of deceased animals?

Is it ethical?

Should ownership of dead wild animals' body parts be legal or illegal? Why?

What is your organization's stance toward trade in the body parts of animals that:

- 1) are harvested off live animals (e.g., rhino horn)
- 2) are harvested from animals that died naturally
- 3) are harvested from animals that were legally culled
- 4) originate from illegal non-lethal harvesting
- 5) originate from illegal lethal harvesting?

What are the motivations for these positions?

Does your organization believe that, in any given country, there is a clear link between that nation's institutions (types of government and governance structures, property rights and land tenure regimes, market structures, social norms, local customs and culture, etc.) and species conservation performance?

If so, can you describe the types of institutions that are likely to perform better?

### Enforcement

What are the acceptable limits to enforcement, e.g., is it appropriate to shoot-to-kill poachers on site? On what basis should penalties for illegal harvesting and illegal trade be determined?

If previously recognized legal rights (e.g., to conduct trophy hunting, possession, and sale of older harvested products) are constrained or removed by changes in law, should those affected receive compensation? If so, from whom?

To what extent does trade (legal or illegal) in wildlife products present a threat to national security? Can you elaborate upon the nature of this threat and the evidence to support your organization's position? What are the implications for enforcement?

### Mechanisms of commercial consumptive use / markets

What role does your organization believe the following play in driving continued illegal trade (and therefore poaching):

- Stored illegal product stocks
- Confiscated illegal product stocks (held legally)
- Accumulated legal product stocks
- Legal farming operations

How does leakage of products from legally held stocks onto illegal markets affect poaching?

How significant is the problem of laundering? Is it ever quantified? Is there any research linking laundering to poaching and what exactly does it tell us?

### Demand reduction / substitution

What is the motivation and objective of demand reduction?

How is demand defined, assessed and/or measured? (What is the relative relevance of prices and/or quantities consumed / traded?)

How successful have demand reduction strategies been to date? How is this success assessed / measured and by whom?

What are the expectations of future demand reduction initiatives?

Is supply substitution (from legal, sustainable sources and/or synthetic alternatives) compatible or antagonistic with demand reduction? Please explain your organization's views on this and the evidence upon which these views are based. Are you aware of any research providing quantitative assessments of stigma (or reverse stigma) effects?

#### Evidence-based policy and uncertainty

How good / reliable are the data linking trade policy, market processes and conservation performance?

What information or data sets does your organization use to evaluate this relationship? Who collected and interpreted the underlying data, using what methods? Are the data statistically valid (as assessed by experts in statistical methods)?

What data are missing? Are there to plans to acquire more or better data?

In the absence of sufficient data / presence of uncertainty, how do we assess policy toward commercial consumptive use and trade in wildlife products?

Are there acceptable alternative ways to factor in uncertainty and risk? (e.g., the precautionary principle, using expert knowledge, participatory modelling / scenario planning, techniques such as info-gap decision theory, etc.). Which of these approaches does or would your organization support? (Please rank preferences).

#### Costs, benefits, and politics

Have you assessed the costs, benefits, and risks of different policy approaches 1) to your organization, and 2) to other parties? Have there been any attempts to quantify these?

Is your organization answerable to a political constituency and how large is it? Who makes up the constituency, and how are their preferences measured or assessed?

Is CITES a politically stable Convention or is there a risk that Parties will renege on it (either formally or informally)? What means of recourse are there?

What are your organization's views on the future of CITES and policy toward commercial use of endangered species?

### S3: Data Analysis

#### Actor typology and trade policy stances

Table 8, below, presents Campbell’s typology of actors (see Campbell, 2004:101). It does not explicitly include NGOs, which play a dominant role in the wildlife trade policy discourse, often adopting multiple specific roles from several of the identified actor types, and thereby acting as effective brokers.

**Table 8. Campbell’s actor typology**

<b>ACTOR TYPE:</b>	<b>Decision makers</b>	<b>Theorists</b>	<b>Framers</b>	<b>Constituents</b>	<b>Brokers</b>
<i>Ideational realm:</i>	<i>Programs</i>	<i>Paradigms</i>	<i>Frames</i>	<i>Public sentiments</i>	<i>(overarching)</i>
<b>Examples:</b>	Politicians	Academics	Spin doctors	The Public	Pollsters
	Bureaucrats	Intellectuals	Political handlers	Voters	Media
	Corporate managers		Campaign managers	Business & political elites	Public relations experts
			Advertising firms	Investors	Expert advisors
				Courts	Consultants
					Think tanks
					Business & trade associations
					Epistemic communities

Source: Campbell (2004:101)

Campbell’s typology of actors provides an initial lens through which to consider actor roles in relation to ideational realms and this was adapted to include other observed actor attributes to develop an extended thematic actor typology specifically relevant to the wildlife trade policy discourse (Table 9, below). Actors, identified and recorded at CITES meetings and through other participatory engagements, were categorised according to these attributes as well as their stances on the identified agenda items. The attributes selected were i) scale (international, national, local, or individual) and location of representation, ii) sector (state, non-state, or hybrid), and iii) nature of interest (direct, indirect, public, and academic).

**Table 9. Extended thematic actor typology**

<b>Role</b>	<b>Scale</b>	<b>Location</b>	<b>Sector</b>	<b>Interest</b>	<b>Trade stance</b>
Decision maker	International		State	Direct	Support
Theorist	National	country	Non-state	Indirect	Varying
Framer	Local	region	Hybrid	Public	Oppose
Constituent	Individual/small	city, etc.		Academic	
Broker					

Details of the additional attributes are as follows:

***Scale*** (linked to location)

International – operating in multiple national jurisdictions

National – operating countrywide in a single national jurisdiction

Local – operating only within a single province or local district

Small – actors consisting only of a single individual or group of <10 people

***Sector***

State – officially representing a national government or one of its subordinate agencies

Non-state – representing any group of individuals outside of official government structures

Hybrid – a conglomerate of both state and non-state interests (e.g., IUCN)

***Interest***

Direct – direct legal ownership and/or control of wildlife and/or habitat

Indirect – no ownership but representing a particular constituency with a special interest

Public – representing official state interests in whole or in part

Academic – representing the interests of academic institutions

***Trade stance***

Support – in favour of a particular trade-related activity

Varying – some qualified support for a particular trade-related activity and/or varying viewpoints within an organisation

Oppose – officially in favour of banning a particular trade-related activity

Based on their public statements to influence trade policy, actor stances on specific issues were classified as ‘Support’ or ‘Oppose’ or, in the case of more complex policy decisions with contingencies, the relevant details were noted to capture the nuances. Expressed links to other actors or endorsements of their positions were also noted, as were any criticisms or challenges to the legitimacy of other actors. During the research process, prominent individuals were identified by observed high activity levels and were subsequently verified as significant experts and policy influencers. Actors that made official submissions to the SA-HLP were analysed in the same way, and non-state actors that were involved at both the international and South African level were similarly confirmed as key influencers. All had already been identified as such during Stage 1 and had informed the selection of key informant interviews.

Although all actors were recorded by name during the research process, for the purpose of the final analysis they were anonymised after classification, given our core research objective of focusing on ideas rather than identities.

## **S4: Results (additional information)**

Note: *Italicized* text already appears in the main article and has been repeated here for context

### **Actors**

Positions on international trade policy are modulated through the institutions of established organizational structures. CITES meetings and deliberations provide the focal point for international wildlife trade policy discourse and are structured by the CITES Secretariat, which is administered by the United Nations (UN). CITES meetings are attended by the Parties (i.e., signatory governments and their agencies) and designated Observers, which include recognised intergovernmental and hybrid organisations (e.g., United Nations agencies, the IUCN), accredited NGOs, commercial entities, media representatives, and academics. The Parties to CITES are officially accorded preferential treatment, followed by intergovernmental and hybrid organisations and, finally, non-state actors such as environmental NGOs and trade associations. Because NGOs are provided with limited opportunity to make official interventions on the floor at CITES meetings, they tend to form coalitions to provide input and adopt stances on specific issues. The CITES system therefore facilitates identification of actor interest groups and their constituents.

The IUCN, which played a significant role in the original drafting of CITES, is a unique actor within the wildlife trade policy space, being a hybrid international organisation with extensive state and non-state (NGO) membership. Officially committed to mainstream global policies such as the World Conservation Strategy (Talbot, 1980) and UN Sustainable Development Goals (<https://sdgs.un.org/goals>), the IUCN covers a broad constituency within which diverse attitudes and stances toward wildlife conservation and trade exist. However, the organization typically opposes economic development that harms biodiversity, endorses the creation and maintenance of protected areas, and maintains a ‘Red List’ of threatened species to guide conservation priorities. IUCN policy is developed by its membership through motions passed at the quadrennial World Conservation Congress (WCC). To accommodate the full membership, policy must generally be science based and inclusive. Whereas trophy hunting has conventionally been accepted as a legitimate conservation practice, during the study period an internal debate emerged following a statement of opinion from the IUCN Ethics Specialist Group (IUCN, 2019). Similarly, motions on domestic ivory trade and captive lion breeding in South Africa proposed and passed at the 2016 WCC did not enjoy the support of some members, prompting expressions of concern from those members (Stuart et al., 2019; DFFE, 2016).

State actors influencing wildlife trade policy include various government ministries and departments and parastatal conservation agencies at country and lower jurisdictional levels. Within the CITES framework, governments appoint both a scientific and management authority. The role of the former is to evaluate threats to species and the role of the latter is compliance with and enforcement of the Convention. In some countries the authorities fall within the same government agency, whereas in others they reside in separate ministries. The

research revealed that scientific and management authorities do not always agree or cooperate with one another.

Within South Africa, there is a national environment ministry and department (DFFE) and nine provincial agencies. The scientific authority is co-ordinated by SANBI with input from the nine provinces, and the management authority is comprised of the DFFE and provincial agencies. Whereas South African wildlife conservation policy and legislation is ostensibly consistent across the country, our research revealed certain differences in policy, practice, and opinion, both among provincial agencies and between the provincial and national agencies.

A diverse set of non-state actors attempts to influence wildlife trade policy, with interests ranging from animal welfare and environmental conservation to commerce. This includes large conservation NGOs, such as the World-Wide Fund for Nature (WWF) and TRAFFIC (the Wildlife Trade Monitoring Network), a strategic alliance between WWF and IUCN. Numerous non-state actors made interventions relating to the case study species during CITES meetings, mostly as part of coalitions formed around specific issues. However, a relatively smaller number of actors were consistently engaged with most issues relating to all three species. The most visible coalition of NGOs within CITES was the Species Survival Network (SSN), which consistently opposed all forms of commercial trade in the three case study species. Fourteen non-state actors were engaged both internationally at CITES meetings and through submissions to the SA-HLP. Of those, seven represented large organisations with a substantial presence across the species and issues.

Table 10, overleaf, provides a categorised list of the fourteen CITES-engaged non-state actors that made submissions to the SA-HLP and their stances toward the seven thematic trade policy issues. In contrast with the CITES meetings, representations to the SA-HLP included numerous other non-state actors with direct ownership or commercial interests relating to the case study species. The actors have been listed loosely in descending order of size and influence, based on their global reach and prominence, budget size and apparent constituency size. They have also been classified as per Table 9 in S3.

Three additional types of actors were observed to exert significant influence on the trade policy discourse. First, academics have influenced both the cognitive and normative discourse, with more frequent contributions from legal scholars and conservation scientists, and fewer inputs from philosophers, economists, and other social scientists. Second, journalists and filmmakers played a regular role in shaping public opinion through the media. Finally, a few prominent individuals have played key roles within the CITES community for several decades and it is not uncommon for them to have switched roles between representing state and various non-state actors over time. Such CITES veterans appear to act as leading brokers in the wildlife trade policy discourse.

**Table 10. Trade policy stances of key non-state actors**

ID	Orientation	Roles	Scale	Interest	Issues						
					1 Extr.	2. Cons.	3. Trade	4. Cap. Br.	5. Stocks	6. Hunt tr.	7. Subst.
1	environmental conservation	B T F C	I	I	V	V	V	V	V	S	V
2	trade policy	B T F C	I	I	V	V	V	V	V	S	V
3	conservation science	B D T	I	P	V	V	V	V	V	S	V
4	animal welfare	B F C	I	I	O	O	O	O	O	O	O
5	animal welfare	B F C	I	I	O	O	O	O	O	O	–
6	enforcement	B F C	I	I	O	O	O	O	O	V	O
7	hunting	B T F C	I	I	V	V	V	O	–	S	–
8	species conservation	B T F C	I	I	V	V	O	O	–	S	V
9	animal welfare	B T F C	I	I	O	O	O	O	O	O	–
10	species conservation	B T F C	N	I	V	V	V	O	V	V	–
11	animal welfare	B F C	N	I	O	O	O	O	O	O	–
12	wildlife ranching	C F	N	D	S	S	S	S	S	S	–
13	private wildlife breeding	C F	N	D	S	S	S	S	S	S	–
14	private wildlife ownership	C F	N	D	S	S	S	S	S	S	–

**Notes:**

- Orientation refers to the apparent core interest of the organisation.
- Roles are classified as per the first letter of Campbell’s five actor types, i.e., **B**rokers, **D**ecision makers, **T**heorists, **F**ramers, and **C**onstituents.
- Scale and interest are classified as per S3 Table 9.
- The seven thematic issues are drawn from Table 2 in the main text, i.e., 1 Extraction from the wild, 2 Product consumption, 3 Physical commercial trade, 4 Commercial captive breeding, 5 Stockpiles of body parts, 6 Hunting trophy trade, and 7 Imitative substitute products.
- The three trade stances have been shaded for easy identification, with oppose (O) shaded darkest, varying (V) lighter, and support (S) unshaded; a dash signifies no stated position, and these have also been shaded lighter grey as this does not necessarily signify support.

**Cognitive ideas**

*Cognitive arguments against trade tended to express scepticism over whether extraction and trading regimes are sustainable in practice, whereas those in favour of trade tended to link it to postulated incentive mechanisms that benefit conservation of species and ecosystems by way of socio-economic benefits, i.e., financial, livelihood, and other returns to conservation management agencies, private landowners, and local communities. These broadly opposing views tended to be linked to other arguments relating to the identified issue themes.*

*Sustainable use sceptics were also more likely to raise animal welfare concerns in relation to the case study species, highlighting various causal links between trade-related activities and harms to individual animals.*

Concerning extraction, views diverged widely, from arguments that only live translocations within the wild are justified for threatened species, to arguments that lethal extraction is justified and sometimes even necessary for conservation. The latter arguments were largely associated with Southern African countries in which the species were most abundant and were typically motivated by concerns that animal numbers (e.g., elephant and lion populations

within confined areas, or displaced damage-causing animals) must be controlled to avoid adverse ecological and socio-economic impacts. Counterarguments were focused on the animals, highlighting social disruption and adverse individual welfare impacts of activities such as culling and hunting, especially for highly sentient species such as elephants. Similar concerns were expressed by some regarding the practice of dehorning live rhinos.

Concerning consumption of harvested products, opponents suggested that demand levels were inherently excessive, could not be met sustainably by legal supply, and therefore needed to be reduced. Converse arguments held that demand could be sustainably supplied under an appropriate regulatory environment and that legal and sustainable consumption provides an opportunity to generate positive benefits through trade. These opposing arguments were directly linked to arguments physical commercial trade, which followed similar lines of reasoning, linked to perceptions of whether it could be feasibly regulated for the benefit of the species or not. Trade sceptics argued that legal markets provide opportunities to launder illegally sourced products and thereby complicate law enforcement efforts, while also potentially enabling excessive expansion of consumer demand. These broad arguments were in turn linked to more detailed arguments about potential sources of supply and complex interactions between supply and consumer demand.

Commercial captive breeding as an alternative supply source provided a focus of much of the debate during the study period. The emergence in South Africa of a substantial market-driven captive lion breeding industry and increasingly intensive white rhino management practices attracted scrutiny of potential conservation costs and benefits, as well as animal welfare and zoonotic disease risk concerns. Although generally considered unfeasible for elephants, there was strong disagreement over the existing and potential conservation role of commercial breeding for lions and rhinos, with opponents claiming negative conservation impacts and others suggesting potential positive systemic effects. Our research revealed this topic to be poorly understood and the arguments grounded in limited empirical analysis, being mostly speculative. Regarding white rhinos, there was confusion over the definition of ‘captive’ breeding and its links to conservation, given that within South Africa there is a captive-wild continuum of management practices of this and other species (Child et al., 2019).

The retention of ivory, rhino horn, and lion skeleton stockpiles constituted another contentious subject, with varying opinions on whether such stockpiles should be destroyed, sold, or retained (either as a source of potential future income from sales or as an insurance policy against speculation). Proponents of destruction opposed legal sales and argued that retention of stockpiles involved holding costs, a risk that they may enter illegal markets, and a risk of driving further speculative accumulation supplied by poaching. Opinions on the ultimate conservation impacts of ivory stockpile destruction differed, with two opposing theories and insufficient empirical validation (Biggs, 2016; Harvey et al., 2017).

Cognitive arguments against trophy trade were linked to arguments against the practice of trophy hunting, with opponents citing animal welfare concerns, potential negative impacts on threatened wild populations, and the possibility of using CITES exemptions for trophy trade

as a mechanism for product laundering. Counterarguments emphasized the positive socio-economic and conservation benefits from such trade. Arguments in favour of trading simulant and synthetic substitute products were premised on the notion that this would suppress demand – and therefore ultimately poaching – for the genuine wildlife products concerned. Opponents of such trade cited law enforcement challenges, the potential for laundering, and concerns that such trade might perpetuate market demand for genuine products.

*A notable feature of most cognitive arguments around trade policy toward the case study species was the extent of disagreement, uncertainty, and general lack of substantive empirical evidence regarding causal relationships between trade policy, trade-related activities, and conservation outcomes, especially at international levels. This issue was acknowledged by some state actors and reflected in background peer-reviewed literature but denied by many non-state actors and some scientists, who either claimed that sufficient evidence existed or argued that certain policy decisions (typically restrictions) were justified on grounds of applying a precautionary approach. Persistent disagreement on these issues was reflected in the final report of the SA-HLP, in which Panel members had been unable to reach consensus on the causal links between captive lion breeding, hunting, and legal skeleton export trade and threats to wild lions, as well as the appropriate conservation role of private rhino breeding and trade.*

### **Normative ideas**

*Normative ideas (comprising values and attitudes) played a strong, if not dominant, role in the trade policy discourse during the study period. In most instances in which actors opposed trade or a trade-related activity, cognitive arguments were bolstered by normative arguments, with the distinction between the two categories sometimes unclear, notably regarding animal welfare concerns and perceptions of species endangerment and risk. Within the realm of normative ideas, three thematic focal areas of concern were evident, and could be categorised as anthropocentric, ecocentric, and sentiocentric. Anthropocentrism places humans at the centre of moral concern, ecocentrism holds that natural ecosystems have intrinsic value independent of humans, and sentiocentrism places sentient beings at the centre of moral concern and therefore extends consideration of the conventional norms that structure and govern relationships among humans to non-human animals. Few actors self-identified as subscribing to only one of these three value systems; however, there were clear differences in emphasis, the most noticeable being in relation to sentiocentric arguments, which tended to be juxtaposed against anthropocentric positions.*

The issue of extraction from the wild constituted a key focal point for normative arguments. Strong opposition to all forms of extraction came by way of support for ideas embodied in the concept of ‘compassionate conservation,’ which links sentiocentric values to interpretations of ecocentrism that largely reject human management of animals in natural systems, especially practices that involve killing (Ramp & Bekoff, 2015). Normative counterarguments in support of extraction tended to support the principle of sustainable use as a pragmatic ethical approach that links anthropocentric concerns – i.e., meeting imperative socio-economic needs and recognizing the cultural heritage of hunting and wild-harvesting in

developing African countries – to ecocentric ones – i.e., maintaining the natural productivity, resilience, and biodiversity of ecosystems by way of practical management interventions. Proponents of extractive practices were typically not opposed to the consumption of wildlife products, provided it was legal and sustainable. However, opponents of extraction tended to view animal product consumption as morally unjustified, given assumed inherent links with negative environmental impacts and harms to individual animals. Whereas some opponents acknowledged indigenous and cultural consumptive uses, these were generally viewed as losing legitimacy in a modernizing world, with traditional healing uses rejected as being unsupported by conventional medical science.

Opposition toward extraction and consumption was typically extended to trade and the physical commodification of wildlife, which in turn was often linked to claims of harming wild animals for the sake of human greed. Illegal trade was further linked to organised crime, and in some cases even terrorism, which were in turn linked to human welfare losses and threats to national security. Objections against trade did not always distinguish clearly between legal and illegal trade, sometimes conflating the two and suggesting that all physical trade in the case study species lacked social legitimacy. Opposition toward live animal trade, especially in elephants, was grounded in strong animal welfare concerns, whereas opposition toward trade in body parts and derivatives was grounded in looser associations with the assumed sources of those products. Normative arguments in support of legal physical trade emphasized its role in supporting conservation and sustainable development through market mechanisms that were assumed to provide gains in economic efficiency and opportunities for greater socio-economic equity and sustainability.

Commercial captive breeding, especially of lions, was strongly opposed on normative grounds by various actors. South Africa's captive lion breeding industry was associated with physical tourist interactions (e.g., cub petting) linked to a particular type of interventionist breeding, controversial hunting practices, and the eventual sale of body parts, mostly as a by-product of hunting but also supplied from mass euthanasia events. Opponents considered these activities unethical: inherently cruel and abusive, and incompatible with traditional conservation values. Most felid conservation scientists expressed an intuitive aversion toward the industry. Industry opponents also included many supporters of conventional 'fair chase' hunting of wild animals, who held that shooting captive-bred animals damaged the reputation of – and constituted an existential threat to – more conventional forms of hunting. Normative arguments in favour of commercial captive breeding were grounded in assertions of good practice, according to which animal welfare concerns were adequately addressed, 'good genetics' maintained, and benefits generated for humans (e.g., livelihoods, aesthetic animal appreciation, education, recreational, and scientific research opportunities).

Normative arguments relating to product stockpiles were closely linked to notions of the legitimacy and potential role of future trade. Proponents of stockpile destruction held the belief that such action would send a message to the world that trade and consumption would no longer be tolerated, thereby rightfully changing social norms toward use. Opponents of destruction expressed scepticism toward the efficacy and legitimacy of this approach,

believing that it constituted the unwarranted destruction of national assets and would undermine the viability of incentive-driven conservation.

The topic of trophy hunting and trade provoked a wide array of normative positions, from outright opposition or highly conditional acceptance to strong support. Fundamental opposition was grounded in ethical objections against hunting for recreational purposes, frequently labelled as ‘killing for pleasure,’ and considered especially inappropriate for iconic threatened species. More tolerant views held that recreational hunting may have a role to play as a conservation tool, subject to strict adherence of ethical principles such as fair chase and careful selection of target animals. Proponents of hunting and trophy trade argued it was justified on consequentialist ethical grounds, claiming its legitimacy as a traditional and cultural practice, and citing instances in which substantial economic benefits had flowed to local people and landowners, thereby providing financial incentives to prevent and even reverse habitat and species loss at meaningful scales.

Proponents of trade in simulant and synthetic products argued that it was wrong to try and suppress cultural consumptive traditions and that providing alternatives from sources that did not involve direct harms to animals was morally justified. Some opponents countered that it was wrong to profit from trading activities that risked undermining attempts to stigmatise all uses of the products. Others were concerned that creating products using synthetic biology (with DNA infusions) potentially violated international bioprospecting protocols and might unfairly divert resources and income away from range states eager to sell their own natural products.

## **5 Transition: From ideas to action for policy change**

My first study explored the agency of ideas, identifying elements that combine to create compelling stories (i.e., narratives) about wildlife trade in African megafauna that point to certain policy prescriptions. These narratives guide collective action. What appears as the oldest of the three identified narratives largely guided the conception of CITES, i.e., a narrative of Global Control. However, the two other narratives adopt different perspectives that do not fit comfortably within the CITES framework. The Decentralized Conservation narrative resists top-down international regulation that may be inappropriate for more specific local contexts. The Animal Protection narrative resists physical wildlife commodification, and therefore trade, even if regulated. My study concluded by contemplating how the tension between these different narratives related to the operation of CITES and its Appendix listing system. My next study investigates this question further.

Whereas the first study placed ideas in the foreground, largely disregarding the specific identities of actors, my next study focuses more specifically on the actors and their strategic behaviour in relation to the CITES regime. It therefore investigates how ideas are translated to action under the guidance of formal rules. This study builds upon the previous one, with which it shared data collection methods and the foundational data sets for the case study issues and identified themes. It therefore refers to the previous study several times and builds upon the actor analyses that were mostly presented in the Supplementary Material (section 4.9: S2–4). Readers may wish to return to that material for clarity and context. This study also places actors within a broader systemic context, by applying an institutional diagnostic approach. Readers are encouraged to refer to the Supplementary Material of this Chapter (6.10: S3) for more clarity on how that analysis was conducted.

## **6 Playing the CITES game: Lessons on global conservation governance from African megafauna<sup>5</sup>**

### **6.1 Abstract**

Growing awareness and concern over environmental issues has been accompanied by a proliferation of international environmental agreements during the last half-century. Among these, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), stands out as one of the oldest and strongest influences on global biodiversity conservation policy. However, the effectiveness of CITES has been questioned—for various reasons and from various quarters—with a range of differing opinions. To provide further insight on this issue we drew from and built upon recent advances in the environmental governance literature to develop an approach to analysing how the CITES-centred wildlife trading regime influences actor behaviour. After developing a rule-categorised framework to analyse the structure of the treaty, we conducted dynamic analysis of actor behaviour using case study material on CITES-listed African megafauna species (elephants, rhinoceroses, and lions), examining recent developments over a five-year period (2016–2020). Drawing on this material, we further applied institutional diagnostics to gain insight into the conservation effectiveness of the CITES regime. Our analysis of these case studies suggests that CITES can be gamed by special interest groups and that its institutional design facilitates the evolution of an international prohibition regime. Our research produces novel insights into the operation of this process and raises concerns about consequences for African biodiversity

---

<sup>5</sup> This chapter is co-authored with Daniel Challender and Laurence Wainwright. It was published in *Environmental Policy and Governance* on the 16<sup>th</sup> of August 2024; doi: 10.1002/eet.2123

conservation. We conclude with recommendations for wildlife trade policy reform and further research.

## **6.2 Introduction**

International trade in endangered species has attracted the attention of wildlife conservationists and regulators for more than a century and is subject to conflicting perspectives and policy positions. Threatened African megafauna—notably elephants, rhinoceroses (hereafter rhinos), and big cats—are of particular interest to influential non-state actors, who in turn have played a central role in shaping the global governance of wildlife trade (Epstein, 2006; Duffy, 2013). In the broader context, growing political recognition of environmental concerns that transcend national boundaries has spawned a rapidly expanding agglomeration of international environmental agreements over the last half century. Among these concerns, global biodiversity loss stands out as especially pressing (Rockström, 2009; Diaz, 2019) and intractable, given that agreed targets for reducing such loss remain consistently unmet (Petersson & Stott, 2022). Iconic megafauna species have acted as ‘flagships’ to mobilise public support for biodiversity conservation initiatives, thereby influencing policy directions (McGowan, 2020; Knegtering, 2002). However, as with biodiversity in general, the status of these species in the wild remains perilous (Ripple et al., 2016; 2017), calling into question both the effectiveness of contemporary conservation governance and the role of such flagships.

The evolution of global environmental governance has been accompanied by developing scholarship on the functioning of international regimes, i.e., on how they work, how effective they are, and scope for improvement (e.g., Young, 1982; 1999; 2018; Bernauer, 1995; Miles et al., 2002; Oberthür & Gehring, 2006). Amid this broader literature, a substantial subset

focuses on the biodiversity regime complex. Two of the key international agreements within this complex are the 1992 Convention on Biological Diversity (CBD) and the older Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which was ratified in 1975 and focuses on addressing deemed threats to species from international trade. Opinions differ over which of these two treaties plays the most salient role in contemporary conservation governance but there is widespread agreement that CITES plays a major role in influencing biodiversity conservation policy and practice (Velázquez Gomar, 2016; Lanchberry, 2006).

There is less agreement on the effectiveness of CITES. Opinions vary with disciplinary lenses, ideological inclinations, and the assumed purpose of the treaty, which is somewhat unclear and contested (Dickson, 2003; Bowman, 2013). Furthermore, as Young (1994) has noted, the general concept of effectiveness as applied to an international regime is at best a multidimensional variable, if not a set of distinct but related variables. A review of past CITES evaluations confirms this and raises questions over the most appropriate way to consider the treaty. Prominent scholars have recently argued that such evaluations of environmental governance should adopt a diagnostic interdisciplinary systems approach (Ostrom, 2007; Ostrom & Cox, 2010), grounded in the context of sustainability goals (Biermann et al., 2012; Burch et al., 2019; Agrawal et al., 2022) and complexity science (Anderies et al., 2004). We concur and hence investigated how CITES contributes toward conserving flagship species of African megafauna in this context.

Having considered key insights from previous broader scholarship on biodiversity regimes and CITES effectiveness (as detailed below, and in Sections 2 and 3.1), we revisited a previous evaluation of four megafauna case studies (’t Sas-Rolfes, 2000) but applied a more

rigorous dynamic institutional analytic approach (Young 2010; Woldendorp & Keman, 2010) with a focus on actor behaviour, and informed by institutional diagnostics (*sensu* Young, 2011; Schouten et al., 2018). We drew from a range of work in the environmental governance literature (e.g., Young 1999; 2002; 2008; 2018; Curlier & Andresen, 2002; Chambers, 2008), to develop a framework for analysing CITES and employed this framework to consider relevant aspects of nested case study material applying to African elephants, rhinos, and lions. We examined both the longer span of literature concerning the case study species over the life of the treaty and a more detailed analysis of recent events spanning a five-year period (2016-2020), during which the first author participated in CITES-related policy processes and conducted a parallel thematic investigation into trade policy conflict (Chapter 4 of this thesis, submitted paper with Jennifer Gooden, hereafter simply referred to as ‘Chapter 4’)—this included examining the interactions between global CITES initiatives and those in one salient country, South Africa.

Our research question concerned how CITES shapes (i.e., guides and constrains) the behaviour of actors influencing conservation outcomes, grounded in the notion that institutional arrangements shape human interaction, which in turn affects performance (North, 1990). Building on the insight gained from the parallel study—i.e., that different actors are motivated by multiple and oft-conflicting interests, ideologies, and policy narratives—we investigated how actors pursued their specific objectives within the confines of the treaty rules. We found that, in several instances relating to the case study material, at least some actions and outcomes did not align with broader official international objectives of contemporary biodiversity conservation and sustainability practice; instead, they reflected the narrower objectives of certain special interest groups.

Our research contributes to an ongoing discussion that spans several decades, and which highlights persistent conflicts within the CITES community and raises questions about the treaty's evolution, effectiveness, and purpose (e.g., Favre 1993; Princen, 1994; Sand, 1997; Bowman, 2013; Couzens, 2013a; 2013b; Wandesforde-Smith, 2016). Whereas the parallel study used the same case study material to examine the ideational elements of conflicting policy stances, our novel contribution here focuses on the evolving interactions of strategic actor behaviour and the structure of the Convention. This approach aligns with calls for more in-depth research on interactions between 'architecture and agency' (i.e., institutional dynamics, and relationships between actors and structures) in relation to Earth System Governance more generally (Burch et al., 2019) and for investigations of political processes and influence within CITES more specifically (Challender et al., 2015).

We proceed as follows: Section 6.3 provides a brief overview of relevant literature; Section 6.4 provides details of our approach and methods; Section 6.5 presents our results based on the case study research; Section 6.6 discusses lessons learned and the implications for global conservation governance of African megafauna; Section 6.7 concludes with a brief reflection and recommendations for possible policy reform and future research.

### **6.3 Literature review**

We briefly review literature on the evolution of CITES and its effectiveness, both in conserving the case study species and more generally; we include some additional useful contextual references within the broader literature on environmental governance and institutional analysis. Transatlantic attempts to regulate interjurisdictional trade in certain wild species date back to the early 20<sup>th</sup> century, with limited initial success (Sand, 1997). The establishment of a global treaty was facilitated by the mid-20<sup>th</sup> century creation of the

International Union for Conservation of Nature (IUCN), a coalition between governments and civil society organisations (Boardman, 1981). Although conceived by IUCN legal experts, the United States (USA) played a dominant role in the formation of CITES during the 1960s and early 1970s, during a time of peaking political hegemony (Keohane, 1984). The treaty text echoed the regulatory logic of the newly drafted US Endangered Species Act, was agreed in 1973 in Washington DC, and the USA was the first country to ratify it in January 1974; CITES entered into force in July 1975 (Epstein, 2006).

The initial design logic of CITES has shaped its evolution and is dominated by a system of listing species on appendices and regulating their trade accordingly (Wijnstekers, 2018). Significantly, commercial international trade in species listed on CITES Appendix I is prohibited, as they are considered threatened with extinction and affected by such trade. For Appendix II listed species, such trade is regulated through a permitting system, to mitigate potentially unsustainable levels of exploitation. The treaty also allows its member states to implement stricter domestic measures. Accession to the treaty has been gradual, with the number of Parties growing from 14 member states at ratification in 1975, to 183 nations plus the European Union (EU) in 1992; in contrast, the uptake of the CBD was rapid, surpassing CITES only two years after being signed (Escobar-Pemberthy & Ivanova, 2020).

Threatened by rampant poaching for rhino horn and elephant ivory, by early 1977, the African case study species had all been listed on either Appendix I (rhinos) or II (elephants and lions). However, poaching of African rhinos and elephants persisted, prompting a controversial decision to list the latter on CITES Appendix I in 1989 (Glennon, 1990), preceded by unilateral action by ivory ban proponents such as the USA (banning imports) and Kenya (destroying stockpiles). Whereas the listing decision initially deflated ivory markets, poaching

resumed within a few years (Dublin et al., 1995), and accelerated significantly in 2007 (Wittemyer et al., 2014). Rhino poaching was effectively suppressed from the mid 1990s, following the successful imposition of political pressure from the USA on the key consumer countries to ban their domestic markets; however, it also resurged after 2007 (di Minin et al., 2022).

The 1989 elephant listing decision (ivory ban) was strongly contested by several southern African (SADC) countries, who eventually succeeded in lobbying for the CITES Parties to approve two restricted one-off ivory sale events, in 1999 and 2008 ('t Sas-Rolfes et al., 2014). Opinions differ on both the effect of these sales and on whether any future trade should be permitted. The question of ivory stockpile sales is the subject of an extended discussion in the economics literature (e.g., Bergstrom, 1990; Barbier et al., 1990; Bulte & van Kooten, 1996; Kremer & Morcom, 2000; Heltberg, 2001; Fischer, 2004; van Kooten, 2008) and scholars have also debated the merits of legalising international rhino horn trade (e.g., Brown & Layton, 2001; Ayling, 2013; Biggs et al., 2013; Collins et al., 2016). Most of these discussions are largely theoretical, however, as robust evidence on the conservation impact of trade restrictions on these species remains limited (Hiller & 't Sas-Rolfes, 2024).

Broader discussions on the effectiveness of CITES have evolved since an initial positive legal evaluation (Lyster, 1985) was followed by a critical review (Kosloff & Trexler, 1987), which cited both theoretical and empirical concerns. In response to criticism, the CITES Parties amended the listing criteria in 1994 (Young 2003) in a move considered by some as less restrictive and thus positive for conservation (Carey, 1999); however, further evaluations took place during the late 1990s (Sand, 2001) with the Convention drawing more criticism, for varying reasons, from legal and other scholars (e.g. Matthews, 1996; Baker, 1999; Hutton &

Dickson, 2000; Reeve, 2002). The broader literature on environmental governance evolved substantially during the 1990s (e.g., Roseneau & Czempiel, 1992; Haas et al., 1993; Young, 1994; Bernauer, 1995), stimulating related subsequent critical assessments of CITES during the early 2000s (e.g., Curlier & Andresen, 2002; Lanchberry, 2006; Epstein, 2006).

The resurgent elephant and rhino poaching crisis and the start of a novel export trade in lion skeletons from South Africa in 2008 (Williams & 't Sas-Rolfes, 2019) coincided with US initiatives to link wildlife trafficking with international security concerns and thereby realign foreign conservation assistance policy (McMurray, 2008; Massé & Margulies, 2020). This approach received wider support, notably from the UK government and royal family, who convened an international initiative through the catalytic 2014 London Conference on illegal wildlife trade. These events signalled a turn against further trade restriction easing.

The subsequent literature on the effectiveness of CITES and related measures reflects widely divergent views. Some legal scholars provide generally optimistic assessments of CITES (e.g., Bowman, 2013) but many express concerns. Some argue for increased regulation and enforcement (e.g., Wiersema, 2013; 2015; 2016) or radical reform (Couzens, 2013b). Others identify limitations of the regulatory approach (e.g., Adam, 2014; Wandesforde-Smith, 2015; 2016; Trouwborst et al., 2017; Elliot, 2017), notably in the face of institutional complexity and varying (often conflicting) social norms. This latter concern is echoed in the conservation science literatures (e.g., Duffy, 2013; Challender et al., 2015; Hübschle, 2017).

The 21<sup>st</sup> century environmental governance literature has proliferated with a growing focus on causality, effectiveness, and institutional design, embracing various institutional analytic approaches (e.g., institutional diagnostics) within a complex social-ecological systems context

(e.g., Young, 2002; 2008; 2017; Oberthür & Gehring, 2006; Biermann et al., 2010). Whereas legal scholars have examined links and comparisons between CITES and other treaties (e.g., Chambers, 2008; Couzens, 2013a; Janssens & Trouwborst, 2018), evaluations to date have not taken place in a dynamic systems context, nor engaged deeply with concepts of institutional interplay, fit, and scale. Young (2010) applied dynamic institutional analysis to several environmental regimes but not CITES. Tools for dynamic institutional analysis are provided by literature on corporatist intermediation (Woldendorp & Kemen, 2010), which distinguishes between four types of government strategy toward policy conflict (passive, cooperative, congruent, and guiding) and three types of strategy employed by all actors in pursuit of their goals (confrontation, bargaining, and problem-solving). Observing actor behaviour through the lens of these strategies and their likely outcomes, is an approach toward analysing CITES that remains hitherto unexplored.

## **6.4 Approach and methods**

### ***6.4.1 Approach***

As an institutional structure, CITES could theoretically be considered as an intervening variable with consequences within the broader global biodiversity regime (Krasner, 1983). However, evaluating the treaty's effectiveness is challenging for several reasons, some of which apply to the analysis of all such institutions (see Bernauer, 1995). Evaluating CITES in narrower legal context implies assessing whether it achieves its specified objectives, which is an easier task in theory than evaluating it within a broader institutionalist framework that considers other issues such as influence on social norms (Chambers, 2008). However, even evaluating CITES more narrowly in this way is confounded by the complex nature of both the Convention and the loosely defined issues it attempts to address for thousands of diverse species across widely varying contexts. Even a basic assessment of the entire CITES regime

as a single variable influencing species conservation success is further challenged by both a paucity of counterfactual analytic opportunities and the complexity of determining such success (see Redford et al., 2011).

Recognizing these challenges, we chose to focus on a narrower research question concerning prominent species of African megafauna as an indirect approach to improving our understanding of the treaty's effectiveness. Simply stated, with respect to conserving the selected species, our research question asks: How does the CITES regime shape actor behaviour? To tackle this question we employed a dynamic institutional analytic approach toward selected nested case studies. This entailed examining and elucidating the regime structure as determined by the treaty rules and observing how relevant actors approached the issues in pursuit of their objectives as guided by the regime. Our nested approach entailed engagement at the international level (CITES meetings) and nationally within South Africa, which provided a suitable sample for two reasons: 1) it represents a frontier in radical and controversial innovations in wildlife commodification (e.g., commercial captive lion breeding) and 2) its government undertook a comprehensive review of trade policy toward iconic species during the study period (DFFE, 2020), facilitating additional observation of non-state actor lobbying efforts.

We conducted our analysis in three parts. First, we situated the treaty structure within a rule-categorised analytical framework, for which we drew on the Institutional Analysis and Development (IAD) framework (Ostrom, 2011). The IAD framework provides a conceptual guideline for analysing rule types and their respective influence on elements of actor behaviour at three different levels – constitutional, policy, and operational (Baldwin et al., 2019). Second, we built on the parallel study of Chapter 4, by examining specific elements of

actor behaviour in relation to the case study species over the five-year period, with a focus on how such elements are shaped by the CITES rules framework. Finally, we applied institutional diagnostics (Young 2002, 2008) to the case study material to gain further insight into the effectiveness of CITES in contributing toward biodiversity conservation.

An institutional diagnostic approach assesses how institutions match to specific biophysical and socio-economic conditions at appropriate scales and highlights the significance of all stakeholder actors and their incentives. In this context, we view institutions as rules that structure social interaction, *sensu* Hodgson (2006). The premises for this approach include that institutions should be resilient, but adaptable; that formal and informal institutions should align; and that institutions should ‘fit’, i.e., be well-matched in terms of scale and socio-economic setting. This stands in contrast with an ideological approach that would impose the same systems on all situations. Whereas the exact diagnostic tools that are most suited to analysis will vary between specific situations, a checklist of applicable critical factors provides us with some useful guidelines—see Table 11, overleaf, adapted from Young (2018).

**Table 11. Governance needs: Checklist of factors**

Problem structure & characteristics	Scope: spatial and temporal dimensions Nature of the problem (issue area, type, etc.)
Actors	Number and types Behavioural and other characteristics
Broader system properties	Connectivity and nature of dynamics
Socio-political setting	Socio-economic conditions Political context (systems, distribution of power, etc.) Interplay among issues and institutions
Knowledge conditions	Level of (un)certainty regarding the nature of the problem Level of (un)certainty regarding options and probable consequences

Adapted from Young (2018)

For our case study species, we therefore identified key CITES-linked policy issues and drew on these guidelines for analytical context, focussing on the actors that engage with these issues and their stances on these. To gain deeper insight into actors' behavioural and other characteristics, we further examined their stated objectives, actions, and strategies, including their use of and engagement with empirical evidence, as detailed below. We then considered the extent to which actor behaviour in these instances was shaped by the CITES rules framework. Finally, we assessed whether such behaviour is aligned with achieving species conservation objectives and, where possible, consequent conservation outcomes.

#### **6.4.2 *Methods***

The principal methods for this research consisted of document analysis (Patton, 2015) and participant observation (DeWalt & DeWalt, 2010), supported by various direct engagements (including interviews) with key informants. Following an exploratory literature review to gain a deeper understanding of the CITES treaty, key actors, and case-study relevant policy issues, data collection took place from January 2016 to December 2020, concurrent with the parallel study on ideational elements (Chapter 4), and largely employing the same methods, which are detailed in that study and summarised below. Ethics approval of the research methods employed for both projects was granted under the Oxford University CUREC system, reference # SOGE 1A-170. In addition, the first and second authors of this study analysed relevant CITES documents (including the main Convention text, Rules of Procedure, agenda items, Resolutions, and Decisions) and drew on their extensive experience of engaging with policy processes via the Convention (which included attending numerous CITES and related meetings both during and prior to the five-year case study sample period).

To assemble the case study material, the first author identified CITES agenda items that affected the relevant species, both directly and indirectly, and tracked the progress of these issues through personal attendance of the nine official CITES meetings (all Conferences of the Parties and meetings of the Standing and Animals Committees) held during the study period and various related engagements, noting all significant policy decisions and how they were reached. At the CITES meetings, all key points of formal interventions were also noted, along with the identity of the actors making those interventions. Supporting information on actor identities and positions was obtained by examining official CITES meeting records and actor statements through websites, social and other media statements, and printed material distributed at meetings. The first author also conducted and recorded nine face-to-face semi-structured key informant interviews with senior representatives of state, hybrid (IUCN), and non-state actors across a spectrum of policy stances. Interviews lasted  $93 \pm 54$  (mean + SD) minutes. Finally, by participating in the CITES-related policy process in South Africa relevant to the case study species, the first author was provided access to 75 written submissions from non-state actors, comprising 2078 pages, and representing a full spectrum of positions. Further detailed information on these case study data collection methods is provided in Chapter 4 and its supplementary material.

To generate the rule framework, the first and second authors scrutinized the CITES Rules of Procedure (CITES, 2013), guided by the rule typology descriptions provided by Baldwin et al. (2019). Interpretation was reached by mutual agreement. To analyse the case study material, the first author examined the lists of relevant CITES agenda items and South African policy issues and the recorded decisions and outcomes relating to these during the study period, revisiting the historical context where appropriate. These policy developments, already partly detailed in Chapter 4, were reviewed from the perspective of actor positions by i) drawing on

the lists of actors that made formal representations and then ii) coding specific actor characteristics, including their positions, interests, policy stances, and revealed strategic behaviours, following Woldendorp & Keman's (2010) classification system.

Supplemented by the thematic information obtained by the Chapter 4 study, examining the landscape of classified actor positions and strategic behaviour across the case study issues enabled the identification of non-state actor clusters in pursuit of specific outcomes. An identified subset of fourteen diverse non-state actors engaged at both the international (CITES) level and within the domestic process in South Africa and was analysed in more detail to gain further understanding of positionality and behaviour, and to identify significant patterns. To enhance reliability of coding results, the first author applied several triangulation techniques throughout the research period (Miles and Huberman, 1994), including multiple iterations within a flexible hierarchical coding frame, using a combination of inductive and deductive coding methods, and cross-referencing across multiple sources at the two (international and national) scales. Coding was conducted using combinations of manual document marking (notebooks with handwritten records and printed documents) and MS Excel spreadsheets—see S1 for further details.

For the final step of the analysis, the identified patterns of actor behaviour were considered in the context of the rules framework and assessed in relation to the objective of species conservation. To assist with the latter task, we compiled a list of questions, drawing on Young's (2002; 2008; 2018) work on institutional diagnostics and based on the Table 11 checklist to develop a structured approach to interrogating the data. To answer the questions, we drew on insights gleaned from the conservation and other literature, the authors'

experience from participant observation and, in some instances, more specific targeted research. Details of the questions appear along with the answers in S3.

## **6.5 Results**

We present our results in four parts, building on the findings of Chapter 4. First, we present an overview of the CITES rule framework and identify key characteristics. Second, we present salient facts from each of the case study species, providing brief historical context followed by an account of how actors influenced policy developments during the five-year period, and the apparent motivations for their stances and actions. We then draw on common themes across the cases to present the landscape of interests, positions, and institutional dynamics. Finally, we provide a brief diagnostic overview, first considering how the rules framework shapes actor behaviour and then providing a broader assessment in relation to whether the treaty effectively steers actors toward achieving species conservation outcomes.

### ***6.5.1 Rule framework***

Table 12, overleaf, provides an interpretive summary of the CITES rules framework and further details are provided in S2. The treaty is dominated by state actors (the Parties) with secondary roles assigned to intergovernmental organisations (IGOs) and non-governmental organisations (NGOs), and national governments acting as gatekeepers for the latter, assisted by the CITES Secretariat. Species listings carry greater legal weight than other collective decisions but require support of a two-thirds majority of Parties. Information channels are managed by the Secretariat, and payoffs are limited in scope. The range of outcomes specified by the Convention is limited to i) listings, the effect of which may be modulated by annotations or reservations (or superseded by stricter domestic measures), and ii) Resolutions and Decisions, being (legally) non-binding directives for Parties to take certain actions.

**Table 12. CITES Rule framework**

<b>RULE TYPE:</b>	<b>DESCRIPTION/FUNCTION OF RULE TYPE / DETAILS SPECIFIC TO CITES:</b>
<b>Position</b>	<b>Create formal positions that actors may hold in the CITES regime</b>
	Only Parties can vote and have priority speaking rights; other (accredited Observer) speaking rights are ranked, IGOs before NGOs, and none for media; some relevant actors are unrepresented
<b>Boundary</b>	<b>Define who may hold the position and how the position is assigned, passed on, and exited</b>
	Only national governments and the EU can be Parties; Observer IGOs and media must be approved by CITES Secretariat; NGOs must be approved by host governments
	Parties may leave the Convention by giving 12 months notice to the Secretariat; Observers may be removed from meetings if more than one third of Parties object to their presence
<b>Choice</b>	<b>Prescribe actions to be taken in certain circumstances</b>
	Parties must submit listing proposals, discuss, and may vote on them; listings are legally binding
	Dissenting Parties may object to new listing decisions (and thus avoid being bound by them) within 90 days by way of a 'reservation'
	Parties may also submit proposals for Resolutions and Decisions and discuss to agree on wording; Resolutions and Decisions are legally non-binding but non-compliance is frowned upon
<b>Aggregation</b>	<b>Determine how many, and which, actors must participate in a given decision</b>
	Speaking rights are strongly weighted in favour of Parties
	Listing decisions must be passed by two-thirds majority if there is no consensus
<b>Information</b>	<b>Authorise channels of information flows</b>
	Formal agenda items can be submitted by Parties or the Secretariat not less than 150 days before a CoP and not less than 60 days before other Committee meetings
	Information documents may be submitted by Parties, the Secretariat, or Observers; they may be referred to but not discussed in meetings and circulation is controlled
	Parties and Observers may hold informational side events at meetings but must follow an application process through the CITES Secretariat
<b>Payoff</b>	<b>Assign rewards or sanctions to particular actions taken or outcomes achieved</b>
	Compliant state actors may receive financial and technical support from other Parties and/or multilateral agencies and NGOs
	Non-compliant state actors may be subject to trade sanctions
	Parties and non-state actors involved in trade typically prefer to avoid listings, due to added costs
	Parties and NGOs not benefitting from trade may benefit from listings politically and otherwise
<b>Scope</b>	<b>Delimit the range of possible outcomes</b>
	Proposals to amend species listing status may succeed or fail; some compromises may be reached via annotations, reservations, and/or stricter domestic measures
	Formal Decisions may prescribe desired short-term outcomes (between meetings); formal Resolutions deal with longer term guidance on implementation of the Convention

Framework adapted from Baldwin et al. (2019)

### **6.5.2 Case studies**

During the five-year period, several institutional (policy) changes took place with respect to the case study species. At the international (CITES) level, there were no changes to CITES listings (despite 10 attempts, in both directions of easing or tightening trade restrictions), but two amendments in terms of quotas pertaining to existing listings (for black rhino hunting trophies and captive-bred lion skeleton exports, both for South Africa). There were several CITES Resolutions and Decisions, either amended or newly created, relating to the species, and several instances of stricter domestic trade measures being introduced outside of the Convention (e.g., domestic ivory trade bans and hunting trophy import restrictions), imposed by several Western countries, including the USA.

#### **Elephants**

Elephants have been a dominant CITES agenda item throughout the treaty's history and the case study period was no exception. In the wake of evident resurgent poaching in certain regions and building on the momentum created by the 2014 London Conference, numerous NGOs aligned themselves with a coalition of African countries called the Elephant Protection Initiative (EPI), which took a strong stance against any resumption of legal ivory trade, with strong support from the USA and other influential Parties. At the 17<sup>th</sup> Conference of the Parties (CoP17) coalition members introduced a pre-print article of a statistical analysis suggesting that the 2008 ivory one-off sale caused an increase in poaching (Hsiang & Sekar, 2016). The methodology of the study (to date, unpublished in the peer-reviewed literature) was contested by CITES-appointed technical analysts, but concern over the effects of resuming legal ivory trade persisted and numerous range state and NGO representatives continued to push for incremental changes to various CITES policy statements to further

entrench the trade ban. This included measures to secure and preferably destroy ivory stockpiles and outlaw domestic markets.

Africa's most significant range state, Botswana, initially supported the EPI approach (as a founding member), but after a change in government in 2018 it changed its position to realign more closely with other SADC countries, which favour sustainable use. This change in position was related to the local political unpopularity of the previous policy, which included a domestic ban on trophy hunting that had imposed economic costs and increased human-wildlife conflict in remote rural areas (Mbaiwa, 2018). At both CITES CoP17 and CoP18, there were attempts to modify listings in either direction, but all of these were defeated when put to the vote, leaving the status quo intact, under which the elephant populations of all but four countries remain on Appendix I and the Appendix II countries are subject to a zero quota for ivory trade, against which they are unable to take a reservation. The ivory ban therefore remained intact. At CoP18, the EPI coalition countries succeeded in placing further restrictions on the trade in live elephants, to which Zimbabwe objected, declaring a formal dispute, for the first time in CITES history. The SADC countries, which continue to conserve the largest elephant populations, continued to express high dissatisfaction with the ivory ban.

## **Rhinos**

Rhinos continued to attract attention on CITES agendas during the case study period, mostly as an enforcement issue, in the wake of the post 2007 poaching surge, which started to subside during this time, supported by concerted efforts to tackle illegal trade at all levels of the trade chain. A relatively small and somewhat disjointed group of South African wildlife breeders aligned with the Kingdom of Eswatini, a CITES Party, to campaign for legalization of rhino horn trade, with two proposals to amend Eswatini's annotated Appendix II white

rhino listing at both CoP17 and CoP18. Both proposals attracted some support from SADC countries but relatively little support elsewhere, with most NGOs also opposing legalization, and the proposals were decisively rejected by vote. At CoP18, Namibia also submitted a proposal to down-list its white rhino population from Appendix I to Appendix II, with a restrictive annotation (that would not allow horn trade but somewhat facilitate export of live animals and hunting trophies) but this proposal was also defeated in a vote, despite more moderate NGOs believing that it was justified.

Whereas South Africa did not pursue rhino horn trade legalization, at CoP18 it succeeded in applying for an increased export quota for black rhino hunting trophies. This happened despite strong resistance toward recreational hunting and accompanying international trophy trade of charismatic endangered mammals from a sizable constituency of NGOs aligned with Kenya, in which all such hunting has been banned since 1977. A proposal by a US-based biotechnology company to investigate the feasibility of producing and distributing a synthetic rhino horn substitute received strong resistance from many NGOs and elicited some concern from the Parties, with all arguing that a market release of such substitutes would undermine enforcement efforts and campaigns to reduce consumer demand.

## **Lions**

Whereas lions did not typically feature prominently on CITES and other trade policy agendas prior to the study period, this changed following the 2015 death of Cecil the lion. Prior to that date there had been both growing opposition to recreational lion ‘trophy’ hunting, especially that supplied by captive breeding, and to the sales to Asian markets of lion skeletons as by-product of such hunts. However, Cecil’s death, the vigorous 2016 campaign against the South African captive lion breeding industry, and revelations of widely declining African lion

populations (Bauer, 2015) raised the profile of lions and led to an attempted CITES Appendix I listing at CoP17 in 2016 (Bauer *et al.*, 2018). The attempt failed but, as a compromise, the Parties agreed to pose a zero quota on trade in lion parts and derivatives (but not hunting trophies) on all countries except South Africa, which was mandated to set an annual quota of skeletons to be provided from captive sources.

Following this decision, a coalition of South African and international activists and NGOs continued to campaign for the termination of South Africa's captive lion breeding industry and all activities associated with it, notably put-and-take 'trophy' hunting and the lion skeleton export trade, including at subsequent subsidiary CITES meetings. In South Africa, seeking public input for the quota-setting decision, the authorities were presented with two extreme positions (and no middle ground) with the breeders seeking very generous quotas and the opposition coalition motivating for a permanent zero quota. A 2016 US decision to list the African lion on the Endangered Species Act had resulted in new restrictions on lion trophy imports (an effective ban on captive-sourced lion trophies) and severely impacted the South African industry, given that US hunters accounted for the large majority of their clients. In response, several breeders sought alternative income sources by further pursuing the skeleton export market, with some euthanizing all their lions (Williams & 't Sas-Rolfes, 2019). The opposition coalition then sued the South African government, winning a judgement in 2019 to suspend the lion skeleton export quota on animal welfare (not conservation) grounds. Skeleton exports remained a contentious issue during the subsequent policy review process, with the coalition lobbying strongly against their resumption, and succeeding (DFFE, 2020).

### **6.5.3 Common features**

Whereas each case has some unique features, some common trends of actor behaviour became evident. In each case, there were strong coalitions of NGOs that opposed all forms of commercial trade in wildlife products, as well as the import of hunting trophies and even trade in synthetic substitute products. Prominent groups within these coalitions included the Humane Society (HSI) and Born Free Foundation (BFF), which both have a strong animal welfare orientation, and the Environmental Investigation Agency (EIA), which opposes legal trade of these species on grounds that it stimulates demand and complicates enforcement. These NGOs aligned with and supported like-minded Parties, notably Kenya and several West African countries, to oppose attempts by SADC countries to maintain or ease legal trading arrangements. The Parties concerned, in which historical habitat loss has been severe and only residual numbers of the subject species survive (if at all) typically face different conservation challenges to the SADC countries, where the greatest concerns are ongoing habitat conversion and human-wildlife conflict in rural areas. Significantly, these coalitions adopted a ‘confrontation’ (winner takes all) strategy in pursuit of a clear prohibition outcome and were observed to curate and present evidence to support their positions.

Opposing these campaigns, a relatively small number of special interest groups sought to defend the maintenance of trading opportunities or even expand them, with support from SADC countries and other Parties more pre-disposed toward sustainable wildlife use.

However, the ‘sustainable use’ alliance appeared fractured into specific items of interest, with the strongest being the maintenance of recreational hunting and trophy trade, receiving support from large groups such as Safari Club International, the Dallas Safari Club, and the CIC, which has an elevated intergovernmental status at CITES meetings. Private wildlife ranchers are confined to relatively few countries, notably South Africa and Namibia, and do

not form a substantial constituency with international reach. They therefore need to rely on their own governments to act in their interests and face the challenge of domestic opposition as well as international. Although these special interest groups are also outcome-oriented, the Parties that support them are more likely to adopt bargaining (compromise) strategies at CITES, referring to conservation and economic benefits to support their positions. Although the groups themselves also claimed such benefits in their representations, they typically failed to provide substantial supporting evidence, apparently lacking the resources and will to do so.

With some variability between specific issues, numerous Parties and some more centrist NGOs played a different role in CITES deliberations, weighing up evidence from both sides and more likely to adopt a bargaining (compromise) strategy. The USA and EU often fell into this category, as did NGOs such as WWF International and TRAFFIC. They would typically seek evidence but place greater weighting on scientific evidence of conservation status and impacts than on economic benefits, with the IUCN playing a unique role in focusing mainly on providing the former through its taxonomic specialist groups. As an additional category, several NGOs undertook specific activities such as demand reduction campaigns or undercover investigations to find and expose illegal activity, with some NGOs specialising in such activities alone (e.g., WildAid, EIA). For such specialized actors, their strategies were outcome-driven toward their focus of interest (moral suasion or enforcement rather than conservation impacts) and they would confront rather than bargain, using evidence selectively to support their positions (confirmed by Somerville, 2017).

Table 13 (below, page 149) represents an adapted presentation of the results of Chapter 4's study on non-state actors' official stances toward seven thematic trade policy issues. The fourteen listed actors were active both in CITES meetings and in a domestic policy

consultation in South Africa. The actors are presented in loosely descending order of stature and influence, based on a selection of attributes that includes apparent constituency size, international spread, budget, media reach, and other relevant factors. While not definitive, this sequencing provides a useful indication of the landscape of interests and positions, revealing the somewhat more nuanced and neutral views of the first three organizations, followed by the strongly prohibitionist stance of the next layer, with domestic special interest groups that favour trade at the bottom. It also indicates that trophy trade and synthetic products trade remained as outlier issues, with the former still enjoying broader support than other forms of trade, and the latter not, likely due to its novelty and ambiguous role.

In institutional terms, the most obvious trends were for non-state actors to cluster and collaborate in pursuit of simplified trade policy objectives, seeking and achieving either restrictions (mostly) or easing (rarely, and without success) as an outcome. In contrast, state actor approaches were more varied, with many CITES Parties adopting a passive stance to agenda items that did not concern them but becoming more visibly more engaged when lobbied by special interests (including NGOs and aligned Parties). Relatively few Parties adopted a 'guiding' strategy on issues (as per Woldendorp & Kemen, 2010), notably the USA and specific African countries (the latter, mostly with strong visible NGO support if they opposed trade). The EU tended to adopt a 'congruent' strategy, playing a critical role in determining policy because of its voting block power. Non-institutional outcomes were quite limited, with the most striking being the immediate and significant economic impact of the USA lion trophy restrictions on South African lion breeders, and the less obvious being the frustration of SADC country aspirations to resume trading in elephant ivory and rhino horn.

**Table 13. Trade policy stances of key non-state actors**

#	Organisation	Scale	Interest	Position	Orientation	Species	Trade issue themes							Advocacy
							1	2	3	4	5	6	7	
1	WWF	I	Indirect	NS1	Environmental conservation	E R L	V	V	V	V	V	S	V	A E1
2	TRAFFIC	I	Indirect	NS1	Wildlife trade monitoring	E R L	V	V	V	V	V	S	V	A E1 E2
3	IUCN	I	Public	H	Environmental conservation	E R L	V	V	V	V	V	S	V	E1
4	HSI	I	Indirect	NS2	Animal welfare	E R L	O	O	O	O	O	O	O	A E2
5	BFF	I	Indirect	NS2	Animal welfare	E R L	O	O	O	O	O	O	-	A E2
6	EIA	I	Indirect	NS2	Compliance & enforcement	E R L	O	O	O	O	O	V	O	A E2
7	CIC	I	Indirect	NS2/IGO	Hunting & conservation	E R L	V	V	V	O	-	S	-	A E1
8	Panthera	I	Indirect	NS2	Species conservation	L	V	V	O	O	-	S	V	A E1
9	WAP	I	Indirect	NS2	Animal welfare	L	O	O	O	O	O	O	-	A E2
10	EWT	N	Indirect	NS3	Species conservation	E R L	V	V	V	O	V	V	-	A E1
11	EMS Foundation	N	Indirect	NS3	Animal welfare	E R L	O	O	O	O	O	O	-	A E2
12	WRSA	N	Direct	NS4	Wildlife ranching	E R L	S	S	S	S	S	S	-	A
13	SAPA	N	Direct	NS4	Private captive breeding	L	S	S	S	S	S	S	-	A
14	PROA	N	Direct	NS4	Wildlife ranching/breeding	R	S	S	S	S	S	S	-	A

Source: Adapted from Chapter 4, S3

**Legend:**

**Organisation** names have mostly been abbreviated – see S4 for full names

**Scale** is classified as:

International – operating in multiple national jurisdictions

National – operating countrywide in a single national jurisdiction

**Interest** is classified as:

**Direct** – direct legal ownership and/or control of wildlife and/or habitat

**Indirect** – no ownership but representing a particular constituency with a special interest

**Public** – representing official state interests in whole or in part

**Position** is classified as:

**NS1** – Large international NGO, broad constituency

**NS2** – Medium-sized international NGO, narrower constituency

**NS3** – National or domestic NGO

**NS4** – National producer or trade association

**IGO** – Intergovernmental organisation

**H** – Hybrid organisation (state and non-state constituents)

**Orientation** refers to the apparent core interest of the organisation

**Species** of interest are Elephants, Rhinos, and Lions

**Trade issue themes** are taken from Chapter 4 and are as follows: **1** Extraction from the wild; **2** Product consumption; **3** Physical commercial trade; **4** Commercial captive breeding; **5** Stockpiles of body parts; **6** Hunting trophy trade; **7** Imitative substitute products

The three trade stances have been shaded for easy identification, with **Oppose** shaded darkest, **Varying** lighter, and **Support** unshaded; a dash signifies no stated position, and these have also been shaded lighter grey as this does not necessarily signify support.

**Evidence** is classified as follows:

**E1** Provision of scientific evidence related to conservation outcomes

**E2** Provision of evidence related to legal violations and/or ethically contested practices

#### **6.5.4 Diagnostic overview**

We now consider the case study observations in the light of our CITES rule framework and institutional diagnostic analysis. Our analysis suggests that the rules tend to entrench the established positions and interests of certain privileged Parties (e.g., USA, EU) and large NGOs, and largely exclude the voices of critical constituencies such as local rural people and product consumers. Domestic producers such as wildlife ranchers are also disadvantaged. The pulsed and constrained flow of information adversely affects rapid and flexible policy-making, inhibiting adaptive management. The scope rules tend to frame commercial trade as a threat with limited flexibility around restrictive policy measures, and the aggregation rules accompanied by the dual Appendix listing system tend to simplify most issues down to a largely polarized trade / no trade debate. For the case study species, the only trade types that could prevail under CITES were exemptions for hunting trophies, lion skeleton exports from captive animals and some domestic ivory markets; however, even these activities were placed under further pressure from anti-trade coalitions, including some Parties seeking to exert influence outside of the CITES remit.

With official payoffs limited in scope, the mostly passive stance of state actors affirmed that they are likely to act only so far as they are lobbied and financially incentivised, either by domestic business interests or by external actors such as bi-lateral or multi-lateral aid agencies and NGOs (or alternatively, by threat of financial loss through more generalised trade sanctions). Enforcement (from protected areas to border customs controls) is costly and there are strong incentives to free ride. There is apparent flexibility in trade policy outcomes, but the scope of trade policy is essentially very narrow, with most measures either facilitating it or inhibiting it. NGOs are visibly incentivised to promote up-listings and other trade restrictions so that they can claim victory and credit for achieving greater levels of protection (Challender

& McMillan, 2019) and will do so even outside of the remit of the Convention (by way of promoting stricter domestic measures).

Further applying a detailed diagnostic checklist to the CITES regime, we can make the following observations (see S3 for further details). CITES provides a vehicle for actors to pursue multiple and conflicting objectives in a complex dynamic global system. Whereas some actors pursue conservation goals as broadly defined by international policy (e.g., IUCN et al., 2013; the United Nations Sustainable Development Goals), others are driven by a focus on the welfare of individual animals or ideological opposition to trade in wild animals and their body parts. The threat of unsustainable harvest for trade is unevenly spread and in the countries that have successfully conserved the greatest numbers, it is relatively low (with the recent exception of rhino poaching in South Africa). The systemic threats are also cumulative and long-term, requiring adequate administrative capacity and funding, which in many cases does not exist. Trade policy is only in part a collective action problem, affected by value conflict and high potential externalities, and requires both coordination and collaboration.

Actors in the regime are highly heterogeneous and variously motivated by rationality and legitimacy concerns; there is a high degree of cultural heterogeneity, economic inequality, and asymmetry in political power. Illegal trade is facilitated by high levels of corruption, signalling that trade restrictions widely lack social legitimacy. There are also significant asymmetries in capacity and the actions of the numerous subject actors (poachers, traffickers, and consumers) are concealed, calling for costly monitoring procedures. For all case study species there are substantial knowledge gaps, and although these vary between species, the existence of these gaps also creates uncertainty regarding options and probable consequences,

leading to calls for the use of a ‘precautionary’ approach as a stop-gap option, which many actors seek to interpret in favour of restricting trade (Dickson, 1999).

## **6.6 Discussion**

CITES has existed for some five decades and evolved substantially as a treaty, growing in membership and complexity. It is, however, unclear that the conservation status of the case study species has improved markedly. Elephants and rhinos remain threatened by poaching in many parts of their range and CITES is unable to address the effects of human encroachment on habitat that largely threatens elephants and lions. Attempts by southern African countries to partly address this latter threat by exploring trade options to finance and otherwise incentivise local conservation efforts are thwarted by the external imposition of trade restrictions. Whereas in the past CITES appeared to play a constructive role in reversing the fortunes of threatened species such as the South American vicuña and crocodilians through the fostering of legal and sustainable trading mechanisms, the evolution of the Convention has created conditions less favourable to applying such solutions to the case study species (Cooney et al., 2021).

The issues that actors attempt to address through wildlife trade policy have the characteristics of a wicked environmental problem, calling for a significantly adaptive approach (Norton, 2012). However, analysis of the three case studies suggests that, at least for these charismatic flagship species, CITES may be facilitating the evolution of a global prohibition regime, rather than acting as a trade regulation regime (see Nadelmann, 1990; Princen, 1994). The strategic vision of the coalitions opposed to trade appears to be shaped by an ideological ‘animal protection’ narrative (see Chapter 4) and this movement seeks complete prohibition of all physical commercial trade activities relating to the case study species, including trophy

hunting bans and continued suppression of all physical markets for animal products such as ivory, rhino horn, and lion parts, which includes banning domestic markets, synthetic substitutes, commercial captive breeding, and most live animal trade, and destroying existing stockpiles of products.

Opposing the animal protection movement is a disparate set of smaller interest groups and a few countries attempting to defend or promote niche activities such as sales of lion parts, ivory, rhino horn, hunts with permitted trophy exports, and synthetic products. They receive some support from sympathetic state actors and some mainstream non-state actors such as large centrist NGOs, all of whom must nevertheless represent all their constituents in a context of sociocultural values that appear to be shifting away from wildlife harvesting and trade in wealthier urbanizing countries (Manfredo et al., 2020). In this context, the animal protection narrative appears compelling and to hold moral high ground, providing growing public leverage to the actors that support it.

Given that CITES appears to remain structurally dominated by Parties and NGOs that are Western, wealthy, and urbanized, actors that support niche trading interests are vulnerable to speculative attacks from well-resourced animal protection coalitions, who view CITES up-listings and other trade restrictions as virtuous victories and can sell them as such to their constituencies. These coalitions employ a broad strategy of confrontation rather than bargaining, playing uncompromising winner-takes-all politics to lobby for policy and legal change, often accompanied or followed by litigation against state actors in the wildlife sector. They invoke moral philosophical arguments linked to the intrinsic value of wild animals to gain academic leverage and their tactics include shaming detractors (Fine, 2019), supporting directionally motivated scientific research in the absence of good data on conservation

impacts (Meyer et al., 1997; Hiller & 't Sas-Rolfes, 2024) and undercover investigations to expose illegal activity, which provides evidence to suggest that trade cannot be controlled.

Global trade restrictions tend to result in resistant infractions, especially given significantly inadequate levels of CITES implementation and enforcement (Wyatt, 2011), and these then provide further opportunities to identify illegal activity. The added uncertainty and complexity in the system provides a basis to argue for further restrictions as a 'precautionary' approach. The interpretation of precaution as an embedded principle within CITES is a hotly debated topic (Janssens & Trouwborst, 2018; 't Sas-Rolfes et al., 2019). Whereas CITES Resolution 9.24 on species listing criteria adopts neutral wording, in practice CITES listing and other decisions reflect that the Parties tend to prefer tightening trade restrictions in the face of uncertainty (Trouwborst et al., 2019). This tendency was again reflected in South Africa's recent decision to capitulate to demands to ban lion skeleton exports, despite evidence of adequate traceability mechanisms for legal export trade (Williams et al., 2021) and that restricting output from wildlife farming operations risks inducing feedback effects that ultimately negatively impact wild populations (Rieder et al., 2021).

As revealed by the rule framework and institutional diagnostic analysis, the CITES structure creates significant obstacles for commercial interests in developing countries, which nevertheless may be responsible for conserving the greatest numbers of the subject species. Orenstein et al. (2022) argue that benefits from commercial trade seldom benefit previously disadvantaged communities; however, these obstacles require substantial and coordinated collective action to overcome and without prospects of future economic opportunities there are limited incentives to build the necessary institutional and capacity for the future fair distribution of benefits. What are the consequences for conservation and how does that reflect

on the effectiveness of the treaty? At its core, and according to its most recent Strategic Vision articulated in Resolution 18.3 (CITES, 2019), CITES is intended to support conservation of wild species and the welfare of captive live animals in transit, but not the rights of individual animals in the wild. However, examining the inherent nature of the three case study species issues points to problems.

In the case of elephants, the problem is one of heterogeneous needs across range states and unevenly distributed costs and benefits. Recent research suggests that elephant poaching is relatively inelastic, and that trade policy alone may not be as significant a factor as previously assumed (see Lopes, 2015; Do et al., 2020; Kuiper et al., 2023). The ivory ban perversely penalizes a few countries for conserving high numbers of elephants by denying them income opportunities while imposing upon them additional management costs (which may include extensive long-term damage to natural habitat if elephant numbers are not controlled), while benefitting virtue-signalling actors and the greater number of countries with small elephant populations, without adequate compensation for the externality. This amounts to a free-rider problem. Recent initiatives linked to CITES elephant policies include raising the profile of animal welfare beyond transportation and calling for domestic trade bans, both of which are beyond the remit of the treaty and amount to ‘mission creep’ (Einhorn, 2001).

Further questionable initiatives include the framing of illegal ivory trade as a global security issue, with now largely disproven claims of links to terrorist organisations, an initiative that appears to be linked to other political agendas (Massé & Margulies, 2020; Duffy, 2022).

Other related initiatives that lack evidential support of conservation benefit include the promotion of stockpile destruction (Biggs, 2016) and action to restrict mammoth ivory trade and leakage of old ivory stocks from Japan to China, with economic research suggesting that

the former may be suppressing consumer prices in China (Farah & Boyce, 2019), which, by implication may be true of the latter too.

In the case of rhino conservation, given that consumer demand for horn appears highly persistent, the trade ban appears to have locked in a reinforcing detrimental feedback effect, whereby as the species become increasingly rare, the illicit market value is raised, increasing incentives for crime and corruption (see Di Minin et al., 2022). The net consequence of this effect could be to doom rhinos to be trapped in a ‘poaching pit,’ i.e., at low population numbers from which the only exit might be a combination of intensive breeding in heavily secured areas and trade legalisation, which continues to be opposed for values-based reasons. Recent NGO-driven initiatives to constrain intensive breeding operations in South Africa and restrict live rhino exports to approved ‘appropriate and acceptable destinations’ also extend outside the intended scope of CITES. In the case of lions, extending the logics of trade restriction to products sourced from captive animals (otherwise widely used for other species—see Harfoot et al., 2018) also extends beyond the remit of CITES, especially given a paucity of evidence that these activities pose a serious threat to wild populations.

What do these observations imply about the overall effectiveness of the CITES regime?

Young (2018) identifies three aspects of regime effectiveness, namely constitutive (assigning roles to and settling disputes between actors), generative (identifying problems and formulating agendas), and goal-setting (steering towards goals as opposed to being confined by inflexible rules). For the case study species, we conclude as follows. First, in terms of constitutive effectiveness, CITES appears to be defective insofar that the essentially polarized listing system (Appendix I prohibitions versus Appendix II regulated legal trade) entrenches rather than resolves policy conflict between Parties with varying interests and ideologies.

Being based on a majority voting system it incentivises ideologically-motivated prohibitionists to pursue a winner takes all political strategy through confrontation and lobbying rather than compromise. Second, in terms of generative effectiveness, CITES risks diagnosing problems with multiple causes (e.g., habitat conversion and illegal killing driven by broader economic factors) as being solvable by a one-dimensional trade restrictive solution that can in some cases aggravate the other factors. Finally, in terms of goal-setting effectiveness, by tending to approach trade as a blanket global threat rather than focusing on adaptable solutions to site-specific challenges, CITES arguably facilitates goal displacement, away from ‘conservation’ as defined by the IUCN’s World Conservation Strategy (IUCN, 2013) and towards ‘protection’ of individual animals through blanket global measures.

## **6.7 Conclusion**

We investigated the effectiveness of the CITES regime through a specific lens of evaluating how the treaty shaped actor behaviour in relation to charismatic African megafauna. We examined the CITES rules in a structured way (through the IAD framework), applied dynamic institutional analytic tools to examine actor behaviour over a five-year period, and then further applied institutional diagnostics to the case study material. This approach enabled us to gain insight into the limitations of CITES, both as a treaty and a broader regime to frame wildlife trade policy for the purposes of conserving substantial populations of threatened African megafauna species within their natural habitat across a complex variety of landscapes and contexts. Our results highlighted the risk of CITES becoming a vehicle for coalitions of well-resourced non-state actors to game the rules in pursuit of objectives outside of the assumed foundational conservation remit of the treaty, with potentially adverse long-term consequences.

Whereas global governance in other domains such as water management are changing to recognize complexity (Pahl-Wostl, 2017), for the case study species CITES appears to suffer from institutional lock-in (Bogers et al., 2022) and a ‘freeze-framing effect’ (Wandesforde-Smith, 2015), unable to coordinate effectively with the more flexible regime of the Convention on Biological Diversity (Sand 2016; Velázquez Gomar et al., 2014; Velázquez Gomar, 2016) and at risk of becoming a victim of dynamic institutional ‘diversion’ similar to the regime for whales and whaling (Young, 2010; Couzens 2013b). Whereas Couzens (2013a; 2013b) recommends a ‘reverse listing’ approach to reform CITES, we agree with Sand (2016) that this approach is problematic and impractical, failing to address many of the concerns we have raised. We therefore recommend policy reform to increase the flexibility of CITES with better recognition of the practical implications and incentive drives resulting from the multiple and oft-conflicting objectives of different actors. This could take the form of a possible move away from the polarizing Appendix-listing system, toward one that enables and incentivises the development of more tailored localized solutions that can employ certified, traceable, and sustainable trading arrangements to supplement their financing options beyond dependence on aid and potentially fickle tourism markets (see Lindsey et al., 2020).

The findings of this study are supported by past research raising concerns about CITES effectiveness (e.g., Curlier & Andreson, 2002; Epstein, 2006; Duffy, 2013; Wandesforde-Smith, 2016; Cooney et al., 2021) and complemented by recent research that adopted a different approach (Challender et al., submitted paper). However, having focused on specific case studies of dangerous charismatic African megafauna, and furthermore focused on policy dynamics mostly within one country, South Africa, the results of this study have potential limitations. South Africa represents an outlier with its extreme extent of commodification and

intensive management of rhinos and lions, but nevertheless provided a useful lens to analyse actor strategies through a dynamic institutional lens. The results of this research suggest that broader analyses of other species and jurisdictions may be worth pursuing to gain further insight on the treaty's overall effectiveness in shaping global conservation governance. Our results also point to significant research gaps in terms of empirically established causal links between trade policy interventions and species conservation outcomes.

## **6.8 Acknowledgements**

Michael 't Sas-Rolfes gratefully acknowledges funding from Earthmind.

## 6.9 References

- Adam, R. (2014). *Elephant Treaties*. University Press of New England.
- Agrawal, A., Brandhorst, S., Jain, M., Liao, C., Pradhan, N., & Solomon, D. (2022). From environmental governance to governance for sustainability. *One Earth*, 5(6), 615–621. <https://doi.org/10.1016/j.oneear.2022.05.014>
- Anderies, J., Janssen, M., & Ostrom, E. (2004). A Framework to Analyze the Robustness of Social-ecological Systems from an Institutional Perspective. *Ecology and Society*, 9(1). <https://doi.org/10.5751/ES-00610-090118>
- Ayling, J. (2013). What Sustains Wildlife Crime? Rhino Horn Trading and the Resilience of Criminal Networks. *Journal of International Wildlife Law & Policy*, 16(1), 57–80. <https://doi.org/10.1080/13880292.2013.764776>
- Baker, J. E. (1999). A substantive theory of the relative efficiency of environmental treaty compliance strategies: The case of cites. *Journal of International Wildlife Law & Policy*, 2(1), 1–45. <https://doi.org/10.1080/13880299909353918>
- Baldwin, E., Chen, T., & Cole, D. (2019). Institutional analysis for new public governance scholars. *Public Management Review*, 21(6), 890–917. <https://doi.org/10.1080/14719037.2018.1538427>
- Barbier, E. B., Burgess, J. C., Swanson, T. M., & Pearce, D. W. (1990). *Elephants, Economics and Ivory*. Earthscan.
- Bauer, H., Chapron, G., Nowell, K., Henschel, P., Funston, P., Hunter, L. T. B., Macdonald, D. W., & Packer, C. (2015). Lion (*Panthera leo*) populations are declining rapidly across Africa, except in intensively managed areas. *Proceedings of the National Academy of Sciences*, 112(48), 14894–14899. <https://doi.org/10.1073/pnas.1500664112>
- Bauer, H., Nowell, K., Sillero-Zubiri, C., & Macdonald, D. W. (2018). Lions in the modern arena of CITES. *Conservation Letters*, 11(5), e12444. <https://doi.org/10.1111/conl.12444>
- Bergstrom, T. (1990). On the Economics of Crime and Confiscation. *The Journal of Economic Perspectives*, 4(3), 171–178.
- Bernauer, T. (1995). The Effect of International Environmental Institutions: How We Might Learn More. *International Organization*, 49(2), 351–377. JSTOR.
- Biermann, F., Abbott, K., Andresen, S., Bäckstrand, K., Bernstein, S., Betsill, M. M., Bulkeley, H., Cashore, B., Clapp, J., Folke, C., Gupta, A., Gupta, J., Haas, P. M., Jordan, A., Kanie, N., Kluvánková-Oravská, T., Lebel, L., Liverman, D., Meadowcroft, J., ... Zondervan, R. (2012). Transforming governance and institutions for global

- sustainability: Key insights from the Earth System Governance Project. *Current Opinion in Environmental Sustainability*, 4(1), 51–60.  
<https://doi.org/10.1016/j.cosust.2012.01.014>
- Biermann, F., Betsill, M. M., Gupta, J., Kanie, N., Lebel, L., Liverman, D., Schroeder, H., Siebenhüner, B., & Zondervan, R. (2010). Earth system governance: A research framework. *International Environmental Agreements: Politics, Law and Economics*, 10(4), 277–298. <https://doi.org/10.1007/s10784-010-9137-3>
- Biggs, D. (2016). Track the impact of Kenya’s ivory burn. *Nature*, 534(7606), 179–179.  
<https://doi.org/10.1038/534179a>
- Biggs, D., Courchamp, F., Martin, R., & Possingham, H. P. (2013). Legal Trade of Africa’s Rhino Horns. *Science*, 339(6123), 1038–1039. <https://doi.org/10.1126/science.1229998>
- Boardman, R. (1981). *International Organization and the Conservation of Nature*. Macmillan.
- Bogers, M., Biermann, F., Kalfagianni, A., Kim, R. E., Treep, J., & de Vos, M. G. (2022). The impact of the Sustainable Development Goals on a network of 276 international organizations. *Global Environmental Change*, 76, 102567.  
<https://doi.org/10.1016/j.gloenvcha.2022.102567>
- Bowman, M. (2013). A Tale of Two CITES: Divergent Perspectives upon the Effectiveness of the Wildlife Trade Convention. *Review of European, Comparative & International Environmental Law*, 22(3), 228–238. <https://doi.org/10.1111/reel.12049>
- Brown, G., & Layton, D. F. (2001). A market solution for preserving biodiversity: The black rhino. In J. F. Shogren & J. Tschirhart (Eds.), *Protecting Endangered Species in the United States Biological Needs, Political Realities, Economic Choices*. Cambridge: Cambridge University Press.  
[http://books.google.co.uk/books?hl=en&lr=&id=ypIhM5Dqh10C&oi=fnd&pg=PA32&dq=brown+layton+rhino&ots=MeojVkrJRX&sig=y\\_je2nrXC3NfeS65bvbnlseegHk](http://books.google.co.uk/books?hl=en&lr=&id=ypIhM5Dqh10C&oi=fnd&pg=PA32&dq=brown+layton+rhino&ots=MeojVkrJRX&sig=y_je2nrXC3NfeS65bvbnlseegHk)
- Bulte, E. H., & van Kooten, G. C. (1996). A note on ivory trade and elephant conservation. *Environment and Development Economics*, 1(04), 433–443.  
<https://doi.org/10.1017/S1355770X00000796>
- Burch, S., Gupta, A., Inoue, C. Y. A., Kalfagianni, A., Persson, Å., Gerlak, A. K., Ishii, A., Patterson, J., Pickering, J., Scobie, M., Van der Heijden, J., Vervoort, J., Adler, C., Bloomfield, M., Djalante, R., Dryzek, J., Galaz, V., Gordon, C., Harmon, R., ... Zondervan, R. (2019). New directions in earth system governance research. *Earth System Governance*, 1, 100006. <https://doi.org/10.1016/j.esg.2019.100006>

- Carey, J. E. (1999). Improving the Efficacy of Cities by Providing the Proper Incentives to Protect Endangered Species Notes. *Washington University Law Quarterly*, 77(4), 1291–1322.
- Challender, D., 't Sas-Rolfes, M., Broad, S., & Milner-Gulland, E. J. (n.d.). *A theory of change to improve conservation outcomes through CITES*. [osf.io/preprints/socarxiv/gjs38](https://osf.io/preprints/socarxiv/gjs38)
- Challender, D. W. S., Harrop, S. R., & MacMillan, D. C. (2015). Towards informed and multi-faceted wildlife trade interventions. *Global Ecology and Conservation*, 3, 129–148. <https://doi.org/10.1016/j.gecco.2014.11.010>
- Challender, D. W. S., & MacMillan, D. C. (2019). Investigating the Influence of Non-state Actors on Amendments to the CITES Appendices. *Journal of International Wildlife Law & Policy*, 22(2), 90–114. <https://doi.org/10.1080/13880292.2019.1638549>
- Chambers, W. B. (2008). *Interlinkages and the Effectiveness of Multilateral Environmental Agreements*. United Nations University Press.
- CITES. (2013). *Rules of Procedure of the Conference of the Parties (as amended at the 16th meeting, Bangkok, 2013)*. CITES/UNEP. <https://cites.org/sites/default/files/eng/cop/E16-Rules.pdf>
- CITES. (2019). *Res. Conf. 18.3, CITES Strategic Vision: 2021–2030*. [https://cites.org/sites/default/files/document/E-Res-18-03\\_0.pdf](https://cites.org/sites/default/files/document/E-Res-18-03_0.pdf)
- Collins, A., Fraser, G., & Snowball, J. (2016). Issues and concerns in developing regulated markets for endangered species products: The case of rhinoceros horns. *Cambridge Journal of Economics*, 40(6), 1669–1686. <https://doi.org/10.1093/cje/bev076>
- Cooney, R., Challender, D. W. S., Broad, S., Roe, D., & Natusch, D. J. D. (2021). Think Before You Act: Improving the Conservation Outcomes of CITES Listing Decisions. *Frontiers in Ecology and Evolution*, 9. <https://doi.org/10.3389/fevo.2021.631556>
- Couzens, E. (2013a). CITES at Forty: Never Too Late to Make Lifestyle Changes. *RECIEL*, 22(3), 311–323.
- Couzens, E. (2013b). *Whales and Elephants in International Conservation Law and Politics: A Comparative Study* (1st edition). Routledge.
- Curlier, M., & Andresen, S. (2002). International Trade in Endangered Species: The CITES Regime. In E. L. Miles, S. Andresen, E. M. Carlin, J. B. Skjaereth, & A. Underdal (Eds.), *Environmental Regime Effectiveness: Confronting Theory with Evidence* (pp. 357–378). MIT Press.

- DeWalt, K. M., & DeWalt, B. R. (2010). *Participant Observation: A Guide for Fieldworkers* (2nd edition). AltaMira Press.
- DFFE / South African Department of Forestry, Fisheries, and the Environment. (2020). *High-Level Panel Report – For Submission to the Minister of Environment, Forestry and Fisheries*. [https://www.environment.gov.za/sites/default/files/reports/2020-12-22\\_high-levelpanel\\_report.pdf](https://www.environment.gov.za/sites/default/files/reports/2020-12-22_high-levelpanel_report.pdf)
- Di Minin, E., 't Sas-Rolfes, M., Selier, J., Louis, M., & Bradshaw, C. J. A. (2022). Dismantling the poachernomics of the illegal wildlife trade. *Biological Conservation*, 265, 109418. <https://doi.org/10.1016/j.biocon.2021.109418>
- Díaz, S., Settele, J., Brondízio, E. S., Ngo, H. T., Agard, J., Arneth, A., Balvanera, P., Brauman, K. A., Butchart, S. H. M., Chan, K. M. A., Garibaldi, L. A., Ichii, K., Liu, J., Subramanian, S. M., Midgley, G. F., Miloslavich, P., Molnár, Z., Obura, D., Pfaff, A., ... Zayas, C. N. (2019). Pervasive human-driven decline of life on Earth points to the need for transformative change. *Science*, 366(6471). <https://doi.org/10.1126/science.aax3100>
- Dickson, B. (1999). The Precautionary Principle in CITES: A Critical Assessment. *Natural Resources Journal*, 39(2), 211–228.
- Dickson, B. (2003). What is the Goal of Regulating Wildlife Trade? Is Regulation a Good Way to Achieve this Goal? In *The Trade in Wildlife: Regulation for Conservation* (pp. 23–32). Earthscan.
- Do, Q.-T., Levchenko, A. A., Ma, L., Blanc, J., Dublin, H., & Milliken, T. (2020). The Price Elasticity of African Elephant Poaching. *The World Bank Economic Review*, 35(3), 545–562. <https://doi.org/10.1093/wber/lhaa008>
- Dublin, H. T., Milliken, T., & Barnes, R. F. W. (1995). *Four Years After the CITES Ban: Illegal Killing of Elephants, Ivory Trade and Stockpiles*. IUCN.
- Duffy, R. (2013). Global Environmental Governance and North—South Dynamics: The Case of the Cites. *Environment and Planning C: Government and Policy*, 31(2), 222–239. <https://doi.org/10.1068/c1105>
- Duffy, R. (2022). *Security and Conservation: The Politics of the Illegal Wildlife Trade*. Yale University Press.
- Einhorn, J. (2001). The World Bank's Mission Creep. *Foreign Affairs*, 80(5), 22–35. JSTOR. <https://doi.org/10.2307/20050248>
- Elliott, L. (2017). Cooperation on Transnational Environmental Crime: Institutional Complexity Matters. *Review of European, Comparative & International Environmental Law*, 26(2), 107–117. <https://doi.org/10.1111/reel.12202>

- Epstein, C. (2006). The Making of Global Environmental Norms: Endangered Species Protection. *Global Environmental Politics*, 6(2), 32–54.  
<https://doi.org/10.1162/glep.2006.6.2.32>
- Escobar-Pemberthy, N., & Ivanova, M. (2020). Implementation of Multilateral Environmental Agreements: Rationale and Design of the Environmental Conventions Index. *Sustainability*, 12(17), Article 17. <https://doi.org/10.3390/su12177098>
- Farah, N., & Boyce, J. R. (2019). Elephants and mammoths: The effect of an imperfect legal substitute on illegal activity. *Environment and Development Economics*, 24(3), 225–251.  
<https://doi.org/10.1017/S1355770X18000554>
- Favre, D. (1993). Debate within the CITES Community: What Direction for the Future. *Natural Resources Journal*, 33, 875–918.
- Fine, G. A. (2019). Moral Cultures, Reputation Work, and the Politics of Scandal. *Annual Review of Sociology*, 45(1), 247–264. <https://doi.org/10.1146/annurev-soc-073018-022649>
- Fischer, C. (2004). The complex interactions of markets for endangered species products. *Journal of Environmental Economics and Management*, 48(2), 926–953.  
<https://doi.org/10.1016/j.jeem.2003.12.003>
- Glennon, M. J. (1990). Has International Law Failed the Elephant? *American Journal of International Law*, 84(1), 1–43.
- Haas, P. M., Keohane, R. O., & Levy, M. A. (Eds.). (1993). *Institutions for the Earth: Sources of Effective International Environmental Protection*. MIT Press.
- Harfoot, M., Glaser, S. A. M., Tittensor, D. P., Britten, G. L., McLardy, C., Malsch, K., & Burgess, N. D. (2018). Unveiling the patterns and trends in 40 years of global trade in CITES-listed wildlife. *Biological Conservation*, 223, 47–57.  
<https://doi.org/10.1016/j.biocon.2018.04.017>
- Heltberg, R. (2001). Impact of the ivory trade ban on poaching incentives: A numerical example. *Ecological Economics*, 36(2), 189–195. [https://doi.org/10.1016/S0921-8009\(00\)00234-2](https://doi.org/10.1016/S0921-8009(00)00234-2)
- Hiller, C., & 't Sas-Rolfes, M. (2024). Systematic review of the impact of restrictive wildlife trade measures on conservation of iconic species in southern Africa. *Conservation Biology*, n/a(n/a), e14262. <https://doi.org/10.1111/cobi.14262>
- Hodgson, G. M. (2006). What Are Institutions? *Journal of Economic Issues*, 40(1), 1–25.  
<https://doi.org/10.1080/00213624.2006.11506879>

- Hsiang, S., & Sekar, N. (2016). *Does Legalization Reduce Black Market Activity? Evidence from a Global Ivory Experiment and Elephant Poaching Data* (w22314). National Bureau of Economic Research. <https://doi.org/10.3386/w22314>
- Hübschle, A. M. (2017). The social economy of rhino poaching: Of economic freedom fighters, professional hunters and marginalized local people. *Current Sociology*, 65(3), 427–447. <https://doi.org/10.1177/0011392116673210>
- Hutton, J., & Dickson, B. (2000). *Endangered Species, Threatened Convention: The Past, Present and Future of CITES, the Convention on International Trade in Endangered Species of Wild Fauna and Flora*. Earthscan Publications Ltd.
- IUCN, T. W. C. U., UNEP, & WWF. (2013). *Caring for the Earth: A Strategy for Sustainable Living*. Routledge.
- Janssens, B., & Trouwborst, A. (2018). Rhinoceros Conservation and International Law: The Role of Wildlife Treaties in Averting Megaherbivore Extinction. *Journal of International Wildlife Law & Policy*, 21(2–3), 146–189. <https://doi.org/10.1080/13880292.2018.1483300>
- Keohane, R. O. (1984). *After Hegemony: Cooperation and Discord in the World Political Economy* (Revised edition). Princeton University Press.
- Knegtering, E., Hendrickx, L., Van Der Windt, H. J., & Uiterkamp, A. J. M. S. (2002). Effects of Species' Characteristics on Nongovernmental Organizations' Attitudes toward Species Conservation Policy. *Environment and Behavior*, 34(3), 378–400. <https://doi.org/10.1177/0013916502034003006>
- Kosloff, L. H., & Trexler, M. C. (1987). The Convention on International Trade in Endangered Species: No Carrot, but Where's the Stick Comment. *Environmental Law Reporter News & Analysis*, 17(7), 10222–10237.
- Krasner, S. D. (1983). *International Regimes*. Cornell University Press.
- Kremer, M., & Morcom, C. (2000). Elephants. *The American Economic Review*, 90(1), 212–234.
- Kuiper, T., Altwegg, R., Beale, C., Carroll, T., Dublin, H. T., Hauenstein, S., Kshatriya, M., Schwarz, C., Thouless, C. R., Royle, A., & Milner-Gulland, E. J. (2023). Drivers and facilitators of the illegal killing of elephants across 64 African sites. *Proceedings of the Royal Society B: Biological Sciences*, 290(1990), 20222270. <https://doi.org/10.1098/rspb.2022.2270>
- Lanchberry, J. (2006). The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): Responding to Calls for Action from Other Nature

- Conservation Regimes. In S. Oberthür & T. Gehring (Eds.), *Institutional Interaction in Global Environmental Governance: Synergy and Conflict among International and EU Policies* (pp. 157–179). MIT Press.
- Lindsey, P., Allan, J., Brehony, P., Dickman, A., Robson, A., Begg, C., Bhammar, H., Blanken, L., Breuer, T., Fitzgerald, K., Flyman, M., Gandiwa, P., Giva, N., Kaelo, D., Nampindo, S., Nyambe, N., Steiner, K., Parker, A., Roe, D., ... Tyrrell, P. (2020). Conserving Africa's wildlife and wildlands through the COVID-19 crisis and beyond. *Nature Ecology & Evolution*, 4, 1300–1310. <https://doi.org/10.1038/s41559-020-1275-6>
- Lopes, A. A. (2015). Organized Crimes Against Nature: Elephants in Southern Africa. *Natural Resource Modeling*, 28(1), 86–107. <https://doi.org/10.1111/nrm.12058>
- Lyster, S. (1985). *International Wildlife Law: An Analysis of International Treaties concerned with the Conservation of Wildlife*. Cambridge University Press.
- Manfredo, M. J., Teel, T. L., Don Carlos, A. W., Sullivan, L., Bright, A. D., Dietsch, A. M., Bruskotter, J., & Fulton, D. (2020). The changing sociocultural context of wildlife conservation. *Conservation Biology*, 34(6), 1549–1559. <https://doi.org/10.1111/cobi.13493>
- Massé, F., & Margulies, J. D. (2020). The geopolitical ecology of conservation: The emergence of illegal wildlife trade as national security interest and the re-shaping of US foreign conservation assistance. *World Development*, 132, 104958. <https://doi.org/10.1016/j.worlddev.2020.104958>
- Matthews, P. (1996). Problems Related to the Convention on the International Trade in Endangered Species. *International and Comparative Law Quarterly*, 45(02), 421–431.
- Mbaiwa, J. E. (2018). Effects of the safari hunting tourism ban on rural livelihoods and wildlife conservation in Northern Botswana. *South African Geographical Journal*, 100(1), 41–61. <https://doi.org/10.1080/03736245.2017.1299639>
- McGowan, J., Beaumont, L. J., Smith, R. J., Chauvenet, A. L. M., Harcourt, R., Atkinson, S. C., Mittermeier, J. C., Esperon-Rodriguez, M., Baumgartner, J. B., Beattie, A., Dudaniec, R. Y., Grenyer, R., Nipperess, D. A., Stow, A., & Possingham, H. P. (2020). Conservation prioritization can resolve the flagship species conundrum. *Nature Communications*, 11(1), Article 1. <https://doi.org/10.1038/s41467-020-14554-z>
- McMurray, C. A. (2009). Wildlife Trafficking: U.S. Efforts to Tackle a Global Crisis. *Natural Resources & Environment*, 23(3), 16–18.

- Meyer, J. W., Frank, D. J., Hironaka, A., Schofer, E., & Tuma, N. B. (1997). The Structuring of a World Environmental Regime, 1870–1990. *International Organization*, 51(4), 623–651. <https://doi.org/10.1162/002081897550474>
- Miles, E. L., Andresen, S., Carlin, E. M., Skjaereth, J. B., & Underdal, A. (2002). *Environmental Regime Effectiveness: Confronting Theory with Evidence*. MIT Press.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed). Sage Publications.  
<http://catdir.loc.gov/catdir/enhancements/fy0655/93041204-t.html>
- Nadelmann, E. A. (1990). Global Prohibition Regimes: The Evolution of Norms in International Society. *International Organization*, 44(4), 479–526.
- Norton, B. G. (2005). *Sustainability: A Philosophy of Adaptive Ecosystem Management* (New edition edition). University of Chicago Press.
- Oberthür, S., & Gehring, T. (Eds.). (2006). *Institutional Interaction in Global Environmental Governance: Synergy and Conflict among International and EU Policies*. MIT Press.
- Orenstein, R. I., Freyer, D., Lieberman, S., Lyman, E., Reeve, R., Sanerib, T., & Schubert, D. J. (2022). Commentary: Think Before You Act: Improving the Conservation Outcomes of CITES Listing Decisions. *Frontiers in Ecology and Evolution*, 10.  
<https://www.frontiersin.org/article/10.3389/fevo.2022.889234>
- Ostrom, E. (2007). A diagnostic approach for going beyond panaceas. *Proceedings of the National Academy of Sciences*, 104(39), 15181–15187.  
<https://doi.org/10.1073/pnas.0702288104>
- Ostrom, E. (2011). Background on the Institutional Analysis and Development Framework. *Policy Studies Journal*, 39(1), 7–27. <https://doi.org/10.1111/j.1541-0072.2010.00394.x>
- Ostrom, E., & Cox, M. (2010). Moving beyond panaceas: A multi-tiered diagnostic approach for social-ecological analysis. *Environmental Conservation*, 37(4), 451–463.  
<https://doi.org/10.1017/S0376892910000834>
- Pahl-Wostl, C. (2017). An Evolutionary Perspective on Water Governance: From Understanding to Transformation. *Water Resources Management*, 31(10), 2917–2932.  
<https://doi.org/10.1007/s11269-017-1727-1>
- Patton, M. Q. (2015). *Qualitative Research & Evaluation Methods: Integrating Theory and Practice* (Fourth Edition edition). SAGE Publications, Inc.
- Petersson, M., & Stoett, P. (2022). Lessons learnt in global biodiversity governance. *International Environmental Agreements: Politics, Law and Economics*, 22(2), 333–352.  
<https://doi.org/10.1007/s10784-022-09565-8>

- Princen, T. (1994). The ivory trade ban: NGOs and international conservation. In T. Princen & M. Finger (Eds.), *Environmental NGOs in World Politics: Linking the Local and the Global* (pp. 121–159). Routledge.
- Redford, K. H., Amato, G., Baillie, J., Beldomenico, P., Bennett, E. L., Clum, N., Cook, R., Fonseca, G., Hedges, S., Launay, F., Lieberman, S., Mace, G. M., Murayama, A., Putnam, A., Robinson, J. G., Rosenbaum, H., Sanderson, E. W., Stuart, S. N., Thomas, P., & Thorbjarnarson, J. (2011). What Does It Mean to Successfully Conserve a (Vertebrate) Species? *BioScience*, *61*(1), 39–48. <https://doi.org/10.1525/bio.2011.61.1.9>
- Reeve, R. (2002). *Policing International Trade in Endangered Species: The CITES Treaty and Compliance*. Earthscan Ltd.
- Rieder, E., Larson, L. R., 't Sas-Rolfes, M., & Kopainsky, B. (2021). Using Participatory System Dynamics Modeling to Address Complex Conservation Problems: Tiger Farming as a Case Study. *Frontiers in Conservation Science*, *2*, 61. <https://doi.org/10.3389/fcosc.2021.696615>
- Ripple, W. J., Chapron, G., López-Bao, J. V., Durant, S. M., Macdonald, D. W., Lindsey, P. A., Bennett, E. L., Beschta, R. L., Bruskotter, J. T., Campos-Arceiz, A., Corlett, R. T., Darimont, C. T., Dickman, A. J., Dirzo, R., Dublin, H. T., Estes, J. A., Everatt, K. T., Galetti, M., Goswami, V. R., ... Zhang, L. (2016). Saving the World's Terrestrial Megafauna. *BioScience*, *66*(10), 807–812. <https://doi.org/10.1093/biosci/biw092>
- Ripple, W. J., Chapron, G., López-Bao, J. V., Durant, S. M., Macdonald, D. W., Lindsey, P. A., Bennett, E. L., Beschta, R. L., Bruskotter, J. T., Campos-Arceiz, A., Corlett, R. T., Darimont, C. T., Dickman, A. J., Dirzo, R., Dublin, H. T., Estes, J. A., Everatt, K. T., Galetti, M., Goswami, V. R., ... Zhang, L. (2017). Conserving the World's Megafauna and Biodiversity: The Fierce Urgency of Now. *BioScience*, *67*(3), 197–200. <https://doi.org/10.1093/biosci/biw168>
- Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S., Lambin, E. F., Lenton, T. M., Scheffer, M., Folke, C., Schellnhuber, H. J., Nykvist, B., de Wit, C. A., Hughes, T., van der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P. K., Costanza, R., Svedin, U., ... Foley, J. A. (2009). A safe operating space for humanity. *Nature*, *461*(7263), 472–475. <https://doi.org/10.1038/461472a>
- Rosenau, J. N., & Czempiel, E.-O. (Eds.). (1992). *Governance without Government: Order and Change in World Politics*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511521775>

- Sand, P. H. (1997). Whither CITES - The Evolution of a Treaty Regime in the Borderland of Trade and Environment. *European Journal of International Law*, 8(1), 29–58.
- Sand, P. H. (2001). A Century of Green Lessons: The Contribution of Nature Conservation Regimes to Global Governance. *International Environmental Agreements*, 1(1), 33–72. <https://doi.org/10.1023/A:1010113809755>
- Sand, P. H. (2016). Ed Couzens: Whales and elephants in international conservation law and politics: a comparative study. *International Environmental Agreements: Politics, Law and Economics*, 16(1), 161–164. <https://doi.org/10.1007/s10784-015-9282-9>
- Schouten, G., Vink, M., & Vellema, S. (2018). Institutional diagnostics for African food security: Approaches, methods and implications. *NJAS: Wageningen Journal of Life Sciences*, 84(1), 1–5. <https://doi.org/10.1016/j.njas.2017.11.002>
- Somerville, K. (2017). *Ivory: Power and Poaching in Africa* (1 edition). Hurst.
- 't Sas-Rolfes, M. (2000). Assessing CITES: Four Case Studies. In J. Hutton & B. Dickson (Eds.), *Endangered Species, Threatened Convention* (pp. 69–87). Earthscan Publications Ltd.
- 't Sas-Rolfes, M., Challender, D. W. S., Hinsley, A., Veríssimo, D., & Milner-Gulland, E. J. (2019). Illegal Wildlife Trade: Patterns, Processes, and Governance. *Annual Review of Environment and Resources*, 44(1), 201–228. <https://doi.org/10.1146/annurev-environ-101718-033253>
- 't Sas-Rolfes, M., Moyle, B., & Stiles, D. (2014). The complex policy issue of elephant ivory stockpile management. *Pachyderm*, 55, 62–77.
- Trouwborst, A., Blackmore, A., Boitani, L., Bowman, M., Caddell, R., Chapron, G., Cliquet, A., Couzens, E., Epstein, Y., Fernández-Galiano, E., Fleurke, F. M., Gardner, R., Hunter, L., Jacobsen, K., Krofel, M., Lewis, M., López-Bao, J. V., Macdonald, D., Redpath, S., ... Linnell, J. D. C. (2017). International Wildlife Law: Understanding and Enhancing Its Role in Conservation. *BioScience*, 67(9), 784–790. <https://doi.org/10.1093/biosci/bix086>
- Trouwborst, A., Loveridge, A. J., & Macdonald, D. W. (n.d.). Spotty Data: Managing International Leopard (*Panthera pardus*) Trophy Hunting Quotas Amidst Uncertainty. *Journal of Environmental Law*. <https://doi.org/10.1093/jel/eqz032>
- Van Kooten, G. C. (2008). Protecting the African elephant: A dynamic bioeconomic model of ivory trade. *Biological Conservation*, 141(2008), 2012–2022.
- Velázquez Gomar, J. O. (2016). Environmental policy integration among multilateral environmental agreements: The case of biodiversity. *International Environmental*

- Agreements: Politics, Law and Economics*, 16(4), 525–541.  
<https://doi.org/10.1007/s10784-014-9263-4>
- Velázquez Gomar, J. O., Stringer, L. C., & Paavola, J. (2014). Regime Complexes and National Policy Coherence: Experiences in the Biodiversity Cluster. *Global Governance*, 20(1), 119–145.
- Wandesforde-Smith, G. (2015). On the Life and Death of Wildlife Treaties. *Journal of International Wildlife Law & Policy*, 18(1), 84–96.  
<https://doi.org/10.1080/13880292.2015.1010913>
- Wandesforde-Smith, G. (2016). Looking for Law in All the Wrong Places? Dying Elephants, Evolving Treaties, and Empty Threats. *Journal of International Wildlife Law & Policy*, 19(4), 365–381. <https://doi.org/10.1080/13880292.2016.1248701>
- Wiersema, A. (2013). Uncertainty and Markets for Endangered Species under CITES. *Review of European, Comparative & International Environmental Law*, 22(3), 239–250.  
<https://doi.org/10.1111/reel.12047>
- Wiersema, A. (2015). Uncertainty, Precaution, and Adaptive Management in Wildlife Trade. *Michigan Journal of International Law*, 36(3), 375–424.
- Wiersema, A. (2016). Incomplete Bans and Uncertain Markets in Wildlife Trade. *University of Pennsylvania Asian Law Review*, 12, 65.
- Wijnstekers, W. (2018). *The Evolution of CITES: A reference to the Convention on International Trade in Endangered Species of Wild Fauna and Flora* (11th ed.). International Council for Game and Wildlife Conservation.  
[https://cites.org/sites/default/files/common/resources/The\\_Evolution\\_of\\_CITES\\_2018.pdf](https://cites.org/sites/default/files/common/resources/The_Evolution_of_CITES_2018.pdf)
- Williams, V. L., Coals, P. G., Bruyn, M. de, Naude, V. N., Dalton, D. L., & Kotzé, A. (2021). Monitoring compliance of CITES lion bone exports from South Africa. *PLOS ONE*, 16(4), e0249306. <https://doi.org/10.1371/journal.pone.0249306>
- Williams, V. L., & 't Sas-Rolfes, M. J. (2019). Born captive: A survey of the lion breeding, keeping and hunting industries in South Africa. *PLOS ONE*, 14(5), e0217409.  
<https://doi.org/10.1371/journal.pone.0217409>
- Wittemyer, G., Northrup, J. M., Blanc, J., Douglas-Hamilton, I., Omondi, P., & Burnham, K. P. (2014). Illegal killing for ivory drives global decline in African elephants. *Proceedings of the National Academy of Sciences*, 111(36), 13117–13121.  
<https://doi.org/10.1073/pnas.1403984111>

- Woldendorp, J., & Keman, H. (2010). Dynamic institutional analysis: Measuring corporatist intermediation. *Quality & Quantity*, 44(2), 259–275. <https://doi.org/10.1007/s11135-008-9195-6>
- Wyatt, T. (2021). *Is CITES Protecting Wildlife?: Assessing Implementation and Compliance* (1st edition). Routledge.
- Young, O. (2011). Land use, environmental change, and sustainable development: The role of institutional diagnostics. *International Journal of the Commons*, 5(1), Article 1. <https://doi.org/10.18352/ijc.244>
- Young, O. R. (1982). *Resource Regimes: Natural Resources and Social Institutions*. University of California Press.
- Young, O. R. (1994). *International Governance: Protecting the Environment in a Stateless Society*. Cornell University Press.
- Young, O. R. (Ed.). (1999). *The Effectiveness of International Environmental Regimes: Causal Connections and Behavioral Mechanisms*. MIT Press.
- Young, O. R. (2002). *The Institutional Dimensions of Environmental Change: Fit, Interplay, and Scale*. MIT Press.
- Young, O. R. (2008). Building Regimes for Socioecological Systems: Institutional Diagnostics. In O. R. Young, L. A. King, & H. Schroeder (Eds.), *Institutions and Environmental Change: Principal Findings, Applications, and Research Frontiers* (First Edition, pp. 115–144). The MIT Press.
- Young, O. R. (2010). *Institutional Dynamics: Emergent Patterns in International Environmental Governance*. MIT Press.
- Young, O. R. (2017). *Governing Complex Systems: Social Capital for the Anthropocene*. MIT Press.
- Young, O. R. (2018). Research strategies to assess the effectiveness of international environmental regimes. *Nature Sustainability*, 1(9), Article 9. <https://doi.org/10.1038/s41893-018-0132-y>
- Young, S. (2003). Contemporary Issues of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Debate over Sustainable Use. *Colorado Journal of International Environmental Law and Policy*, 14, 167.

## 6.10 Supplementary Material

### S1: Detailed analysis of actors, behaviour, and outcomes

The actor analysis for this research built on the work in Chapter 4, including the methods used [Chapter 4, S3] and detailed findings [Chapter 4, S4].

Adding to Chapter 4's thematic classification of actors into Role, Scale (and location), Sector, Interest, and Trade stance (for each of seven thematic trade-related activities), to gain further insight into strategic actor interventions to influence policy decisions and their outcomes, the following additional attributes were noted and considered (1.1–1.7).

#### 1.1 Position – (based on actor role, scale, and sector)

*Who are the key actors engaged with CITES processes and what are their official roles?*

The following detailed attributes could be readily observed, and the actors coded accordingly:

##### **State (S):**

- Significant range state
- Insignificant range state
- Transit country
- Consumer country
- Concerned country
- Unaffected country

##### **Intergovernmental organisation (IGO)**

##### **Hybrid (H)** (e.g., IUCN)

##### **Non-state (NS):**

1. Large international NGO, broad constituency
2. Medium-sized international NGO, narrower constituency
3. National or domestic conservation NGO
4. National producer or trade association
5. Local community association
6. Academic and research institution
7. Specialist consultant (mostly legal/technical)
8. Media

#### 1.2 Orientation – detailed

*What are their stated objectives and revealed interests?*

The objectives and interests of state actors will be dictated by i) their positionality in relation to the species (see above, 1.1) and ii) internal influence of constituencies, balanced with external funding sources and diplomatic relations. The relative weights of these influences are seldom easily identifiable.

The objectives of non-state actors are typically more easily identified, varying by orientation, which is in turn based on individual sentiments and financial interests, which will tend to be aggregated in the case of larger organisations. These orientations were deduced through a combination of perusing official websites, documentation (printed and online) and through direct engagement with representatives. Some observed orientations of significant non-state actors include:

- Environmental conservation (broad-based, ecosystems and species—e.g., WWF)
- Species conservation (focused on distinct species—e.g., Panthera)
- Wildlife conservation, zoo-based (e.g., Wildlife Conservation Society/WCS)
- Wildlife trade monitoring (e.g. TRAFFIC)
- Animal welfare/protection (e.g., Humane Society International/HSI)
- Legal compliance and enforcement (e.g., Environmental Investigation Agency/EIA)
- Consumer demand reduction (e.g., WildAid)
- Hunting (e.g., CIC)
- Wildlife ranching (e.g., Wildlife Ranching South Africa/WRSA)
- Private captive breeding (e.g., South African Predators Association/SAPA)

To assess breadth of species interest, non-state actor inputs on species were recorded and coded for **E**lephants, **R**hinos, and **L**ions.

### 1.3 Policy stances on agenda items

*What stances did actors adopt on specific policy issues?*

As with the stances on thematic issues observed in the Chapter 4 study, stances toward specific agenda items could typically be classified as trade-restrictive (coded **O**) or trade-enabling (coded **S**), with some instances of nuanced interventions that were trade-neutral but aimed for certain outcomes (coded **V**).

### 1.4 Strategies

*What strategies did they employ to pursue their objectives?*

Following Woldendorp & Keman (2010), and noting that actors may be process-driven or outcome-driven, state actor approaches toward resolving a policy issue could be classified into four different categories:

- 1 Passive – government abstains from direct intervention in negotiations
- 2 Co-operative – government only facilitates negotiations but does not influence outcome
- 3 Congruent – government intervenes with policy proposals once negotiations are under way
- 4 Guiding – government places its policy proposals first

All actors in pursuit of specific policy outcomes may adopt one of three strategies:

- A Confrontation (winner takes all),
- B Bargaining (compromise), or
- C Problem-solving (win-win)

## **1.5 Role of evidence**

*What role did evidence play in their strategies?*

Actors that engaged in advocacy were coded with an **A**. Consistent with the category of ‘cognitive ideas’ for policy influence (see Chapter 4), two distinct types of empirical evidence were used to exert influence; these were classified and coded as follows:

**E1** Scientific evidence clearly relating to species conservation outcomes

**E2** Evidence concerning legal infringements and/or ethically contested practices

The quality of evidence varied with, for example, data robustness and peer review. However, this aspect was not rigorously assessed.

A potential third type of evidence could be applied to arguments, namely specific evidence of economic costs and benefits. However, apart from general statements, actors did not submit more specific quantitative evidence (i.e., data) on this; hence this has been ignored for the purposes of analysis.

Evidence may be used in three different ways:

1. In the pursuit of evidence-driven policy, considering all evidence relevant to the stated species conservation goals of CITES.
2. In the pursuit of bounded evidence-driven policy, which sets ethical limits around certain policy choices—for example, traditional medicinal uses of animal products may be viewed as unscientific and therefore unsupportable in the presence of uncertainty.
3. Policy-driven evidence, which is selectively curated in support of the desired policy objective, which is pre-determined (e.g., an ethically-motivated trade ban). Other evidence is ignored or contested if it conflicts with the policy goal.

## **1.6 Outcomes: institutional**

*What were the institutional outcomes of their actions?*

There were four possible outcomes on the issues concerned:

1. Changes to CITES Appendix listings (up or down)
2. Amended annotations or quotas pertaining to existing listings
3. Resolutions and/or Decisions (these are technically non-binding but influential)
4. Stricter domestic measures (falling outside the CITES remit, but still trade-related and impactful – e.g., domestic trade bans and hunting trophy import restrictions)

## **1.7 Outcomes: other**

*Were there any other discernible outcomes of these actions?*

These could include measurable species conservation impacts (which are difficult to determine) or socio-economic impacts with possible longer-term feedback effects to conservation.

## **S2: Analysis of rule types (IAD framework)**

We provide a brief outline of the different rule types within the CITES regime that influence the dynamic interactions of actors and functional effectiveness of CITES. We employ the IAD framework and an associated rule typology (see Baldwin et al., 2019; Ostrom 2005), which is systems-oriented and grounded in complexity science (Ostrom, 2007; Anderies et al., 2004).

### **2.1 Position rules**

*Create positions that actors may hold in the regime*

The CITES position rules create different categories of participation at meetings. Only Parties can vote and have priority speaking rights. Other categories with speaking rights, in order of preference, are non-Party States, UN agencies and other IGOs, and NGOs/private sector representatives. Media representatives may attend as observers with no speaking rights. Some informal actors (e.g., local communities, product consumers) are unrepresented.

### **2.2 Boundary rules**

*Define 1) who can hold positions, 2) the process by which they are assigned to actors, and 3) how they may be exited*

Only UN-recognized national governments and one supranational union, the EU, qualify as Parties (and are thus entitled to vote). Before receiving voting rights at meetings, Party representatives must be formally accredited. UN agencies and IGOs recognized by the UN system may apply to attend as observers with speaking rights and are approved by the CITES Secretariat. NGOs and private sector representatives may attend with speaking rights if they receive official approval from their national host governments. Media representatives must be accredited by the CITES Secretariat.

Parties may leave ('denounce') the Convention by officially informing the Secretariat, following which their membership will terminate after 12 months. To date, although some SADC States have threatened to do this, none has done so. Observers may be removed from meetings by a vote of the Parties if one third or more object to their presence.

### **2.3 Choice rules**

*Prescribe the actions that actors in given positions must or must not take in various circumstances*

Parties can submit listing proposals and may vote on these after presenting and deliberating over them at meetings. They may also submit proposals for Resolutions and Decisions, which must be similarly presented and discussed to reach agreement on wording. Whereas listings are technically binding in terms of international law, Resolutions and Decisions are not, but

non-compliance with these is frowned upon. Dissenting Parties may also object to new listing decisions that they opposed by taking out a reservation within 90 days of the end of the meeting at which the decision was taken.

## **2.4 Aggregation rules**

*Determine how many, and which, actors must participate in a given decision*

Speaking rights are strongly weighted in favour of the Parties; where there are dissenting views from Parties, these are typically awarded equal weighting in terms of allocated time. Parties most affected by a decision are typically afforded time to speak (and more than once) but, in some instances, less affected Parties may be allowed a disproportionately large amount of time to air their dissenting views. IGOs receive preference over NGOs but both are provided with relatively limited speaking time and sometimes no time at all if the meeting is running behind schedule.

All listing decisions, if not agreed by consensus, must be passed by a two-thirds voting majority of Parties present and voting. Chairs try and take decisions by consensus but where this is not possible (e.g., Parties seemingly blocking consensus), a two-thirds majority vote will be held. In line with the CoP Rules of Procedure, Parties can ask for the vote to be by secret ballot, i.e., direction of Parties votes are not disclosed to the meeting.

## **2.5 Information rules**

*Authorize channels of information flows available to participants, including assigning obligations, permissions, or bans on communication*

The submission of formal agenda items to meetings and other documents is subject to the Rules of Procedure for the respective meetings. Formal agenda items for CoPs should be submitted to the CITES Secretariat at least 150 days before the meeting and 60 days for the Standing Committee and Animals and Plants Committees. Formal agenda items can be submitted by Parties or the CITES Secretariat.

Information documents for CoPs, Standing and Animals and Plants Committees may be submitted for information purposes only and cannot be discussed at the respective meetings, but they can be referred to in the meeting. The Rules of Procedure indicate that such documents may be submitted by Parties, members of committees (e.g., Animals Committee), and observer organisation (e.g., NGOs) or the Secretariat. However, in recent years the Secretariat has become more discerning concerning the submission of information documents, encouraging observers to solicit the support of range states in the submission of these documents. The CITES logo cannot be used on these documents unless explicitly authorised by the CITES Secretariat. These documents and others, i.e., those that convey information relevant to the meeting, but which have not been submitted as information documents to the

meeting, may be distributed in the meeting venue, but not at Party or other delegations' desks in the meeting rooms.

Finally, side events may be held to discuss issues of relevance to respective meetings. Applications to hold side events are submitted to the CITES Secretariat on a timeline determined by the Secretariat ahead of each meeting. The CITES Secretariat has discretion on which side events may be held though ostensibly accepts most applications from Parties and observers.

## **2.6 Payoff rules**

*Assign rewards or sanctions to particular actions that have been taken or outcomes achieved*

Officially, payoff rules to actors are fairly limited in scope. Willingly compliant state actors may receive financial and technical support from multi-lateral and other state sources, as well as NGOs, whereas non-cooperative or noncompliant state actors may be subject to sanctions, including trade sanctions on all CITES-listed species (as a last resort). However, different actors also assume different unofficial rewards-linked outcomes of CITES decision-making. At the Party (i.e., state) level, many Parties, especially those in the global south, are typically keen to avoid the listing of species in CITES to avoid transactions costs associated with implementing and enforcing international trade regulations. Some northern Parties, including the EU and US, may be willing to bear such costs but may also engage in virtue signalling by supporting the inclusion of species—especially those in the global south—in the Appendices.

Observers may also differ in what they consider rewards. Producer and trade associations are typically satisfied with species not being added to the Appendices because doing so increases the cost of trade. Conversely, many animal protection NGOs strongly support all proposals to tighten trade measures and consider their adoption as victories (Challender & MacMillan, 2019) even when outcomes related to the status of species following inclusion under the convention are contested or unproven in many cases.

## **2.7 Scope rules**

*Delimit the range of possible outcomes*

For any given agenda item, there is a range of potential outcomes. Agenda items typically include what is being asked of the respective Committee and/or Parties (e.g., consider a particular issue and make recommendations) but the CITES Secretariat—ahead of each meeting—may also provide comment on potential actions. The respective committees and/or Parties may decide to follow the suggestions of the Parties that submitted the document or deviate depending up on the issue being discussed. Where detailed discussion is required, Committees can establish in-session (i.e., within the margins of that meeting) or inter-sessional working groups (i.e., between the current and future meetings) through which to hold such discussions and agree on a series of actions or way forward. Time-bound outcomes,

which direct a particular Committee, the Secretariat, and/or Parties to act on an issue, are adopted through formal Decisions. They typically run from one CoP to the next, subject to their implementation. Longer-standing outcomes of discussions are captured in Resolutions, which typically provide guidance on implementation, problem-solving, and improving the effectiveness of the convention.

For proposals to amend the Appendices, there is a range of possible outcomes. They include that the CoP accepts or rejects the proposal as submitted, the proposal may be revised during discussion, or the Parties which submitted the document may withdraw it. There is an unwritten rule that the first proposal that a Party ever submits should be accepted. Amendments to the Appendices may also include a range of tools that the convention has embraced to differing degrees for the management of species over time; these include annual quotas, annotations to the Appendices (which prescribe further provisions on the harvest and trade in particular taxa), and delayed implementation of trade measures, where this is deemed in the best interests of achieving compliance among Parties.

Two main mechanisms exist through which Parties can also deviate from trade measures agreed by CoPs. Reservations, which Parties have 90 days after CoPs to make, entail Parties opting to not apply the provisions of the Convention to a particular species. Parties may also adopt ‘stricter domestic measures,’ which comprise trade controls that are more restrictive than those agreed by CoPs.

## References specific to S2

- Anderies, J., Janssen, M., & Ostrom, E. (2004). A Framework to Analyze the Robustness of Social-ecological Systems from an Institutional Perspective. *Ecology and Society*, 9(1). <https://doi.org/10.5751/ES-00610-090118>
- Baldwin, E., Chen, T., & Cole, D. (2019). Institutional analysis for new public governance scholars. *Public Management Review*, 21(6), 890–917. <https://doi.org/10.1080/14719037.2018.1538427>
- Ostrom, E. (2005). *Understanding Institutional Diversity*. Princeton University Press.
- Ostrom, E. (2007). A diagnostic approach for going beyond panaceas. *Proceedings of the National Academy of Sciences*, 104(39), 15181–15187. <https://doi.org/10.1073/pnas.0702288104>

### **S3: Detailed diagnostic checklist**

This checklist has been compiled by drawing on and synthesizing the work of Young (2002; 2008; 2018). Elements introduced here (including input on specific implications) are linked to those three references, and labelled in square brackets, respectively, as [1],[2], or [3].

#### **3.1 Problem structure & characteristics**

Drawing from Chapter 4, we frame the problem to be analysed in the broader sense in which the CITES regime is interpreted and utilized by actors. Therefore, whereas some actors might interpret the problem to be addressed as simply the *conservation of species* through trade regulation, here (relating to the case study species) we include the broader interpretation employed by some actors, namely the *protection* of elephants, rhinos, and lions through trade measures. Whereas *species conservation* is typically addressed at a collective level, the concept of *protection* may also be interpreted as shielding individual animals from harm.

##### **3.1.1 Problem description**

The main concerns for each species, and overall, are as follows:

###### Elephants:

- Unsustainable levels of poaching, driven by trade, in certain areas
- Animal welfare concerns and ethical objections to i) elephant culling, ii) ‘trophy hunting’ and iii) the keeping and human use of elephants under certain captive conditions

###### Rhinos:

- Unsustainable levels of poaching, driven by trade, in certain areas
- Concerns about conservation and welfare impacts of intensified management practices
- Ethical objections to i) ‘trophy hunting’ and ii) private ownership by elites and/or for commercial gain

###### Lions:

- Concerns about potential threat of trade-driven poaching
- Animal welfare concerns and ethical objections relating to i) various management practices (especially commercial captive breeding), ii) various forms of ‘trophy hunting’ and iii) interactive tourism with tamed lions

###### Overall:

Putative threats from trade as a driver of unsustainable levels of poaching, accompanied by animal welfare concerns and aversions to various aspects of wildlife commodification, which potentially constrain the accepted range of solutions.

##### **3.1.2 Scope: Spatial dimensions**

*What is the geographic distribution of the problem?* [3]

#### Elephants:

- Multiple range states in Africa (~37) with widely varying population sizes
- Multiple Asian range states (13) with the Asian species, also varying
- Multiple consumer countries and some favoured transit countries for illegal trade

#### Rhinos:

- Multiple range states in Africa (15) with varying population sizes
- Three Asian range states with the Asian species
- Multiple consumer countries (currently two dominant markets for horn products) and some favoured transit countries for illegal trade

#### Lions:

- Multiple range states in Africa (~22) with varying population sizes
- One Asian range state (India)
- Multiple consumer countries and some favoured transit countries for illegal trade

Overall:

Heterogenous and imbalanced, with global reach.

### **3.1.3 Scope: Temporal dimensions**

*Is the problem duration indefinite or time-bound? Is a one-off solution possible or is it necessary to find ways to address the problem on an ongoing or long-term basis? [1,2,3]*

In all cases, the problem is indefinite as long as the species survive, but potentially time-bound if they become extinct. No one-off solution is realistically possible (extinction cannot be considered an acceptable 'solution'). Growth and recovery rates vary between species:

#### Elephants:

Relatively slow population growth and recovery rates (maximum ~7% per annum).

#### Rhinos:

Moderate population growth and recovery rate (maximum ~12% per annum), with faster compounded horn growth rate (if regularly harvested from live animals).

#### Lions:

Rapid population growth and recovery rates with sufficient food (prey).

**Implication:** For open-ended, longer-term problems, adequate administrative capacity, funding mechanisms, and dispute resolution procedures are critical elements of effective governance. [1]

### **3.1.4 Nature of the problem (issue area, type, etc.)**

#### Overall:

a) *What is the issue area?*

Environmental (biodiversity conservation) and intersecting ethical concerns for animal welfare and well-being.

*b) Is it a collective action problem? [3]*

To the extent that biodiversity, ecosystems, and their constituent species are considered as global resources (i.e., public goods), there is a collective action problem. However, individuals of the species concerned also display various attributes of private goods and, depending on local institutional context, groups of individuals display attributes of common-pool resources and/or toll goods, which constrain the boundaries of the collective action problem.

*c) Are there externalities involved? [3]*

Yes, countries that conserve these species provide positive externalities to global society and may impose negative externalities upon local rural people. External actors that impose trade bans that may result in increased poaching and trafficking and associated costs do not bear the consequences of the increased risk, so there is also a problem of moral hazard.

*d) Is it a value conflict problem? [3]*

Yes, there are multiple and conflicting value-driven interests between actors that affect, and are affected by, the issues. There is clear value conflict between actors that prioritize the interests of individual animals versus those that prioritize the interests of humans, various collectives (discrete populations, species), and systems (social-ecological systems integrity and resilience).

*e) Is it a collaboration or coordination problem? [2]*

It is both. Avoiding global species extinctions is ostensibly a ‘dilemma of common aversions’ (Stein, 1982), which qualifies as a global coordination problem. However, at national and local scales, devising rules to govern actor behaviour relating to animal management and harvesting is a collaboration problem [2]. Hence, the nature of the problem varies with scale.

*f) Is the problem cumulative or systemic? [2]*

The problem is essentially cumulative, being place-based and recurring in many different settings [2]. However, there is a systemic element insofar that a species extinction could have long-term functional consequences at the global scale.

*g) Is the problem likely to give rise to changes that are abrupt, nasty, and irreversible? [2]*

Yes, notably in the case of species extinction (given that the technology for de-extinction remains unproven), which may result in unexpected system shocks and undesirable self-reinforcing feedback loops (see Section 1.3, below).

*h) Do the actions of government agencies, private corporations (including NGOs) and community structures, individuals, or some combination of those categories lie at the heart of the problem? [2]*

Ostensibly, the focus is on individuals (poachers, traffickers, and product consumers), but all categories play a role in shaping the problem (e.g., governments define, allocate, and enforce property rights that create certain incentives) and/or contributing toward the governance of this issue. Furthermore, the problem is characterized by tensions between some of these actor categories due to their conflicting interests.

## **3.2 Actors**

### **3.2.1 Number and types**

Overall:

*a) How many actors are involved in the problem? [3]*

Adopting a broad definition of actors as all humans and organizations with an influence on the system, large numbers of individuals, organizations, and governmental bodies play a role. There are 184 Parties to CITES plus some additional non-Party state actors that have not signed the treaty. There are ~25 intergovernmental organizations that participate at CITES meetings, and many organizational non-state actors, including NGOs varying from large multi-nationals to small local groups, and special interest groups such as trade associations.

Numerous individual actors play roles in the policy process, such as expert consultants, members of the media, activists, and academics. Many more individuals and groups play roles outside of the policy process as members of civil society involved in either the conservation or exploitation of the species, the latter including through (legal and illegal) harvesting, trade, and consumption.

*b) How can the relevant actors be classified according to types? [3]*

Actors may be classified by roles and interests within the system, as per the descriptions above. CITES itself categorizes participants at its meetings. State actors vote, make, and implement CITES decisions. Intergovernmental organisations represent collective state actor positions in specific areas of interest and mostly provide technical input thereon. The IUCN, as a hybrid actor, provides technical input through its taxonomic specialist groups. Non-state actors play varying advocacy roles, sharing information, lobbying, and even providing financial and other support to selected state actors (Chapter 4; S2).

### **3.2.2 Behavioural and other characteristics**

Overall:

*a) How heterogenous are the actors' interests? [1]*

Substantially heterogenous, with interests ranging from animal welfare and protection to commercial trade in live animals and wildlife products, and consumption of the latter. Further interests include policy development, law enforcement, consumer and civil society engagement, environmental conservation, academic research, hunting, and wildlife ownership and breeding.

*b) Are there asymmetries in causal responsibility? [1]*

Yes, there are significant asymmetries. Wildlife range states are responsible for implementing and enforcing constraints on non-compliant individuals, but often lack the resources to do so. External parties (states or NGOs) that support the imposition of trade restrictions on countries (that don't want them) but do not provide support to implement and enforce them are also partly responsible for adverse outcomes but may deny this. Certain countries dominate as consumers (e.g., East Asian countries for products such as ivory and rhino horn).

*c) Are there asymmetries in capacity? [1]*

Yes, there are also significant asymmetries, as indicated by various studies. A small group of high-income countries have greater enforcement capacity, but most countries are chronically underfunded in conservation enforcement, especially in Africa (see Lindsey et al., 2018).

*d) Are actors guided by notions of rationality or legitimacy? [2]*

They are guided by both, to varying degrees (see Chapter 4).

*e) Are organizational actors unitary or are there internal tensions and dynamics? [2]*

This varies. Smaller organisations are more likely to be unitary, but obvious internal tensions and dynamics are common in larger organizations, and especially within state actors. Because it represents a broad spectrum of state and non-state actors, the IUCN

*f) Is the group of target subjects small or large? [2]*

Large (poachers, traders and traffickers, and consumers are numerous).

*g) Is the group of target subjects homogenous or heterogenous? [2]*

The group of target subjects, being harvesters, traders, and consumers of wildlife products, is highly heterogenous in terms of geography, income, culture, and context.

*h) Are the actions of subjects transparent? [1,2]*

The illegal actions of subject actors are typically concealed, and frequently covertly introduced into legal channels (i.e., laundering)

**Implication:** Monitoring procedures are critically important [1]

### 3.3 Broader system properties

Overall:

*a) How do we define the broader system in which this problem is embedded?*

The broader system is the social-ecological system in which management and exploitation of the species and international trade takes place. It is global in extent and encompasses land and animal management, multilevel institutional systems governing conservation and commerce, and feedbacks between these, individual human actions, and natural systems.

*b) Is the broader system self-contained or does it impact other arrangements (i.e., interconnected)? [1,2]*

The broader system consists of various significantly interconnected social and ecological sub-systems. Any interventions within the system are likely to have secondary systemic effects (including potential feedbacks).

*c) Is the system linear or non-linear? [1,2,3]*

The system is essentially non-linear (Capra & Luisi, 2016). There are various system thresholds (e.g., minimum viable populations, below which biological extinction eventually results; choke point prices beyond which certain actions become economically unviable).

*d) Is there functional interplay within the system? [1,3]*

There is functional interplay between individual animals, collectives, and habitats/ecosystems across scales (Jolles et al., 2020; Norberg, 2004; Levin et al., 2012).

**Implication:** for substantial functional interdependencies it is crucial to establish appropriate institutional links or co-ordination mechanisms in building regimes [1].

### 3.4 Socio-political setting

#### 3.4.1 Socio-economic conditions and systems

*How variable are the socio-economic conditions and systems? Is human behaviour driven by social legitimacy or economic incentives? [1,3]*

There is a high degree of variability, both culturally and economically. The influence of social legitimacy versus economic incentives varies with context. There is also some fluidity of social norms over space and time. As an example, trends of urbanization and growing awareness of animal sentience have caused rapid shifts in attitudes toward physical commodification of live animals and their body parts (see Chapter 4).

**Implication:** A high degree of variability calls for allowing flexibility in the rules and procedures that different actors adopt to address the problem. [1]

### 3.4.2 Political context (systems, distribution of power, etc.)

a) *How variable are relevant political systems?* [1]

There is a high degree of variability, given that most of the world's countries are involved. Political systems vary from democratic to autocratic, with varying legal systems, levels of freedom of expression, market institutions, etc.

b) *To what extent is power and influence concentrated, dispersed, and/or symmetrical?* [2]

Power is somewhat concentrated (a few key political actors) but nevertheless quite dispersed (long tail) and asymmetrical. The USA and EU exert disproportionate influence and wealthier countries can afford to finance larger agencies and delegations to CITES meetings. Certain range state agencies also exert disproportionate influence with the assistance of large NGOs. The less economically developed countries have more rudimentary conservation agencies and budgets and often struggle to exert influence outside of their privileges to vote on issues.

c) *Are there negotiating blocs or coalitions with strongly divergent interests?* [2]

Yes. Coalitions tend to be variably divided along geographic, geo-political, and ideological lines (e.g., promoting animal protection versus promoting socio-economic development through sustainable use).

d) *Does the problem fit comfortably into a well-established and widely accepted discourse and lend itself to the use of well-known policy instruments?* [2]

Aspects of the problem fit into the discourse whereas others are contested. Similarly, the policy instruments, although well-known, are widely questioned (e.g., trade bans).

e) *How pervasive are corrupt practices that undermine the regime?* [2]

Corrupt practices are widely pervasive, although somewhat unevenly distributed.

**Implications:** Again, a high degree of variability calls for allowing flexibility in the rules and procedures that different political actors adopt to address the problem.

### 3.4.3 Interplay among issues and institutions

*To what extent does interplay among issues and institutions exist? [3]*

CITES is one multilateral environmental agreement in the broader wildlife trade regime and other instruments also focus on preventing the overexploitation of species. These include the CBD and Convention on Migratory Species (CMS) among others. Interplay between CITES and these other conventions has been formalized through Memorandums of Understanding (MoUs) which emphasize that interaction comprises coordination and avoiding the duplication of effort, developing joint work programmes, and exploring joint funding opportunities.

Interplay may also focus on specific issues and/or taxa. As examples, the MoU with CMS emphasizes that initiatives under CITES should reinforce efforts underway under CMS pursuant to the conservation of various species, including the Saiga antelope (*Saiga tatarica*). At respective CMS and CITES meetings in 2019 and 2020, the joint CITES and CMS African Carnivore Initiative (ACI) was launched to conserve these species more effectively, and which focuses on the lion, cheetah (*Acinonyx jubatus*), leopard (*Panthera pardus*) and African Wild Dog (*Lycaon pictus*) across their geographic ranges.

Interplay also exists between CITES formal implementing institutions (management authorities) and various informal institutions at smaller scales (e.g., local community interests and cultures), which are not always aligned.

## 3.5 Knowledge conditions

### 3.5.1 Level of (un)certainty regarding the nature of the problem?

#### Elephants:

Numbers are difficult to monitor, as is extent and impact of poaching. The effect of trade policy is also ambiguous. The extent of the need for population control (if any) is contested, partly driven by knowledge gaps.

#### Rhinos:

Numbers are well monitored (of live animals and poaching incidents) but there are some limitations. The extent of demand for rhino horn and the elasticity of its drivers remains inadequately understood.

#### Lions:

Numbers are somewhat well monitored, although with varying accuracy across the continent. Poaching is sometimes difficult to detect. The drivers of poaching are not fully understood and somewhat contested (e.g., motivated primarily by revenge or markets for body parts). The consumer market is poorly understood. Impacts of trophy hunting variable and contested.

#### Overall:

The dynamic relationships between consumer markets, trading regimes, and drivers of poaching that threatens species remains poorly understood, aggravated by various data gaps.

### 3.5.2 Level of (un)certainty regarding options and probable consequences?

#### Elephants:

Strongly contested views on the consequences of enabling legal trading regimes.

#### Rhinos:

Strongly contested views on the consequences of enabling legal trading regimes.

#### Lions:

Strongly contested views on the consequences of trade regulation.

#### Overall:

Strongly contested views on the consequences of trade regulation, especially on enabling legal trading regimes.

### References specific to S3

#### Chapter 4

- Capra, F., & Luisi, P. L. (2016). *The Systems View of Life: A Unifying Vision* (Reprint edition). Cambridge University Press.
- Jolles, J. W., King, A. J., & Killen, S. S. (2020). The Role of Individual Heterogeneity in Collective Animal Behaviour. *Trends in Ecology & Evolution*, 35(3), 278–291. <https://doi.org/10.1016/j.tree.2019.11.001>
- Levin, S., Xepapadeas, T., Crépin, A.-S., Norberg, J., Zeeuw, A. de, Folke, C., Hughes, T., Arrow, K., Barrett, S., Daily, G., Ehrlich, P., Kautsky, N., Mäler, K.-G., Polasky, S., Troell, M., Vincent, J. R., & Walker, B. (2013). Social-ecological systems as complex adaptive systems: Modeling and policy implications. *Environment and Development Economics*, 18(2), 111–132. <https://doi.org/10.1017/S1355770X12000460>
- Lindsey, P. A., Miller, J. R. B., Petracca, L. S., Coad, L., Dickman, A. J., Fitzgerald, K. H., Flyman, M. V., Funston, P. J., Henschel, P., Kasiki, S., Knights, K., Loveridge, A. J., Macdonald, D. W., Mandisodza-Chikerema, R. L., Nazerali, S., Plumptre, A. J., Stevens, R., Zyl, H. W. V., & Hunter, L. T. B. (2018). More than \$1 billion needed annually to secure Africa's protected areas with lions. *Proceedings of the National Academy of Sciences*, 201805048. <https://doi.org/10.1073/pnas.1805048115>
- Norberg, J. (2004). Biodiversity and ecosystem functioning: A complex adaptive systems approach. *Limnology and Oceanography*, 49(4part2), 1269–1277. [https://doi.org/10.4319/lo.2004.49.4\\_part\\_2.1269](https://doi.org/10.4319/lo.2004.49.4_part_2.1269)
- Stein, A. A. (1982). Coordination and Collaboration: Regimes in an Anarchic World. *International Organization*, 36(2), 299–324.
- Young, O. R. (2002). *The Institutional Dimensions of Environmental Change: Fit, Interplay, and Scale*. MIT Press.
- Young, O. R. (2008). Building Regimes for Socioecological Systems: Institutional Diagnostics. In O. R. Young, L. A. King, & H. Schroeder (Eds.), *Institutions and Environmental Change: Principal Findings, Applications, and Research Frontiers* (First Edition, pp. 115–144). The MIT Press.

Young, O. R. (2018). Research strategies to assess the effectiveness of international environmental regimes. *Nature Sustainability*, 1(9), Article 9.  
<https://doi.org/10.1038/s41893-018-0132-y>

#### **S4: List of abbreviations**

BFF	Born Free Foundation
CBD	Convention on Biological Diversity
CIC	International Council for Game and Wildlife Conservation
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CoP	Conference of Parties
EIA	Environmental Investigation Agency
EPI	Elephant Protection Initiative
EU	European Union
EWT	Endangered Wildlife Trust
HSI	Humane Society International
IAD	Institutional Analysis and Design
IUCN	International Union for Conservation of Nature (also known as World Conservation Union)
NGO	Non-governmental organisation
PROA	Private Rhino Owners Association
SADC	Southern African Development Community
SAPA	South African Predators Association
TRAFFIC	Trade Records Analysis of Fauna and Flora in Commerce (also known as the Wildlife Trade Monitoring Network)
UK	United Kingdom of Great Britain and Northern Ireland
USA/US	United States of America
WAP	World Animal Protection
WRSA	Wildlife Ranching South Africa
WWF	World-Wide Fund for Nature (also known as World Wildlife Fund in the USA)

## **7 Transition: From policy to consequences**

My second study scrutinized the mechanism of the CITES regime more closely, by analysing its rule framework, drawing on my case study material to observe strategic actor behaviour, and then placing those findings in a broader context, using institutional diagnostics. My findings reconfirmed the findings of the first study, that different actors pursue different and oft-conflicting objectives within the CITES framework, which struggles to accommodate heterogeneity within its essentially binary framework of trade restriction or trade facilitation. My findings further indicate that at least some actors promote restrictive trade policy as an end goal, rather than as a means to achieve effective conservation outcomes. The findings further suggest that the CITES framework is susceptible to being gamed to enable the evolution of a prohibition regime for the case study species (and others).

My final study contemplates the likely consequences of a continuing trend of trade prohibition by taking a step back to examine the relationship between institutional arrangements and conservation outcomes. Enabled by the availability of a uniquely robust long-term continental data set relating to the two African rhino species, this study takes advantage of existing sample frames in the data to conduct comparative institutional analysis over time and space, relating institutional characteristics to rhino population trends. In this way, I was able to test which of the identified policy narratives appears to be the best fit for rhino conservation, and whether the trend toward prohibition should be viewed as positive. Readers may be interested in the Supplementary Material 8.10: S1, which further elucidates some of the conceptual underpinnings of market institutions but are especially encouraged to refer to 8.10: S2 for more information on the two counterfactual methods of comparative institutional analysis that I used, i.e., natural experiments and process tracing.

## 8 African rhino conservation and the interacting influences of property, prices, and policy<sup>6</sup>

### 8.1 Abstract

Conserving terrestrial megafauna presents distinct challenges to policymakers. Despite decades of evolving regulatory measures, wild rhinoceros populations remain threatened by illegal killing to acquire rhino horn, a valuable commodity in East Asian markets. In Africa, rhino conservation performance has varied with geography and over time. This research draws on institutional economic theories to seek plausible explanations for such variable conservation outcomes. Such theories suggest that institutional variables such as property rights profoundly influence human behaviour, leading to hypotheses that we test using comparative institutional analytic methods. Our inquiry affirms that blanket trade restrictions do not account for local conservation success and that other institutional factors appear more relevant. We find that positive overall conservation outcomes correlate with greater institutional diversity within countries, notably those that enable non-state actors to play a meaningful role in rhino management. Our research further suggests that strengthening institutions through decentralization is a sensible conservation strategy for rhinos. However, a specific case study of the economics of white rhino ownership in South Africa reveals that this approach is not considered a panacea for conservation as it raises concerns over potential domestication. We conclude with recommendations for policy—notably, to avoid recentralization—and further research.

---

<sup>6</sup> This chapter/paper is co-authored with Richard Emslie. It was published in *Ecological Economics* on 21 March 2024; doi: 10.1016/j.ecolecon.2024.108123.

## 8.2 Introduction

Conserving the earth's biological diversity is a pressing global concern and challenge for policymakers (IPBES, 2019; Helm & Hepburn, 2012; Dasgupta, 2021). Charismatic megafauna such as rhinoceros species (hereafter rhinos) serve as 'umbrellas' for this cause (Ripple et al., 2015; 2017). However, despite their charisma and role as flagships for conservation fundraising over a period spanning decades, wild rhinos remain under severe threat, worldwide (Western, 1987; Veríssimo et al., 2011; Ferreira et al., 2022). A mix of factors, including excessive hunting and deliberate eradication and loss of suitable habitat for agricultural land clearing, accounts for the historical attrition of wild rhino populations, but since the 1970s the dominant driver of rhino loss in Africa has been illegal killing (poaching) to supply market demand for rhino horn (Martin & Martin, 1983; Emslie, 2020a; 2020b). This vexing (and essentially economically driven) conservation challenge provides the key focus and motivation for this research.

Rhino horn is an unusual commodity. Prized by humans for many centuries for both its ornamental and reputed healing properties, its observed wholesale market price by weight has risen substantially since the mid 1970s, in the face of concerted formal international efforts to curtail its trade and use (Leader-Williams, 1992; Vigne & Martin, 2018). Persistent pockets of consumer demand have continued to drive illegal trade and sustained conditions under which all surviving wild rhino populations require at least some measure of monitoring and physical security to deter poachers (Di Minin et al., 2022; Barichievy et al., 2017). This imposes unavoidable and often substantial financial costs on the actors responsible for conserving them (Collins et al., 2016; 't Sas-Rolfes et al., 2022). Whereas other wild megafauna such as elephants and big cats are similarly i) physically threatening to humans, ii) threatened with extinction, and iii) subject to illegal commercial exploitation for body parts, both the potential

monetary gain from poaching a rhino and the average financial cost of protecting one currently appear to be the greatest for any large terrestrial mammal species.

Against this background, rhino conservation success has varied substantially over time and space, as well as between rhino species and subspecies (Amin et al., 2006; Chanyandura et al., 2021). Applying appropriate comparative analytical methods to identify the causes of such variation in past conservation performance should provide useful lessons for future policy. Viewed within a social-ecological systems (SES) framework (McGinnis & Ostrom, 2014), relevant causal factors may include inherent biophysical characteristics that vary between different rhino species and their habitats, but certainly also include variables that influence the human actions that ultimately determine conservation outcomes. We propose that, in the case of rhino conservation, the latter can be usefully analysed through the lens of institutional economics (see Sills & Jones, 2018).

The relevance of institutional arrangements (i.e., systems of rules), and especially property-rights regimes, to achieving effective renewable natural resource management has long been recognised in the conventional economics literature, following seminal work on fisheries (Gordon, 1954; Scott, 1955) and the emergence of exclusive hunting control (Demsetz, 1967). Whereas these analyses indicated that competitive open access regimes were more likely to result in overexploitation than those with private property rights, later work suggested that under certain conditions (i.e., slow species reproductive growth and high discount rates), private-property profit maximisation may be similarly problematic (Clark, 1973). Subsequent literature has developed more nuanced conceptual analyses of property-rights regimes (Schlager & Ostrom, 1992; Sikor et al., 2017) and further highlights that managing terrestrial wildlife with commercial harvest value entails more complex concerns than open access

marine resources, calling for analytical models that incorporate the impact of habitat conversion in addition to direct overexploitation—and the allocation of resources required to mitigate both (Swanson, 1994; Barbier & Shulz, 1997). A key finding of this later work is that terrestrial wildlife habitat converts to other forms of human use through a ‘disinvestment’ process when it is economically uncompetitive (Skonhøft, 1999). This implies that conservationists should aim to identify and promote institutional arrangements that elevate the perceived economic value of such intact natural ecosystems and their component species to relevant decision-makers, official and unofficial (see Dasgupta, 2021).

However, regarding terrestrial megafauna with potential harvest value, opinions differ over effective institutional arrangements for conservation. The conventional (and internationally influential) ‘North American Model’ essentially eschews private property rights and prohibits wildlife commerce, instead relying on state wildlife ownership underpinned by the public trust doctrine (Peterson & Nelson, 2017; Lueck & Miceli, 2007). Its foundational principles of ‘wilderness’ protection and strict regulation of harvest appear to have been heavily influenced by the near loss of the American bison and extinction of the passenger pigeon during the nineteenth century—and remain strongly evident in contemporary policy (Tober, 1981; Mahoney et al., 2015). In contrast, from the 1950s onwards several southern African countries embraced decentralization and market institutions in wildlife conservation, enabling both the devolution of property rights to non-state actors and managed commercial exploitation (Child et al., 2012), building on principles articulated in the literature on common property governance (see Ostrom, 1990; Mahajan et al, 2021).

These substantially different policy approaches are linked to well-documented debates over the so-called ‘sustainable use’ of wildlife (Allen & Edwards, 1995), with supporters

emphasizing incentive-driven conservation (Hutton & Leader-Williams, 2003) and sceptics raising concerns relating to governance effectiveness and the welfare of individual animals (Hoyt, 1994). They are further linked to broader philosophical debates as to whether biodiversity conservation is best pursued through anthropocentric approaches that emphasize instrumental values to humans versus approaches that emphasize intrinsic values (of ecosystems, species, and individual organisms), which are claimed to exist independent of human interests (McShane, 2007; Justus et al., 2009; Vucetich et al., 2015). Such long-standing debates, which persist in contemporary policy deliberations, have potentially profound implications for the future evolution of conservation governance, given that contrasting positions point toward fundamentally different conceptions of legal property rights (e.g., wild animals as objects of human rights versus wild animals as subjects of their own rights—see Epstein, 2004, and Bradshaw, 2018).

Focusing on specific megafauna, scholars have investigated institutional and economic issues concerning the American bison (Lueck, 2002; Taylor, 2011; Hill, 2014) and elephants, for which a rich and diverse literature exists, ranging from more conventional economic analyses (e.g., Barbier et al., 1990; Kremer and Morcom, 2000; van Kooten, 2008; Do et al., 2020) to more overtly institutional (e.g., Kreuter & Simmons, 1995; McPherson & Nieswiadomy 2000; Brennan & Kalsi, 2015). Within the broader literature on rhino conservation (see Chanyandura et al., 2021) economists have focused on anti-poaching measures and trade policy (e.g., Brown & Layton 2001; Collins et al., 2016), reflecting the actual focus of rhino conservation effort (Leader-Williams, 2003). However, consistent with broader species conservation research (Ando & Langpap, 2018), there has been limited empirical analysis of the effectiveness of rhino conservation laws. There has also been limited focus on the functional role of market institutions (but see 't Sas-Rolfes, 1995; 2017, and Child, 2012),

despite recognition of the growing significance of private landowners as rhino conservation actors (Rubino & Pienaar, 2017; Emslie et al., 2019; Chapman & White, 2020b; Ferreira et al., 2022; Clements et al., 2023).

We provide a novel contribution to the literature by systematically analysing a substantial body of historical evidence on evolving institutional arrangements in relation to rhino conservation performance in Africa over six decades. We explicitly examine the interplay between policy, property rights, market prices, and rhino conservation outcomes, thereby adding to the literature on evaluation of biodiversity policy instruments (see Miteva et al., 2012). We proceed by briefly outlining some relevant history, following which Section 8.4 explains our theoretical framework. Section 8.5 describes our methodological approach, providing details of data sources used and the qualitative methods we use to infer relevant causal relationships. Section 8.6 presents the results of our analysis and Section 8.7 concludes by noting some caveats, policy implications, and possible avenues for further research.

### **8.3 Historical background**

The pre-historically diverse rhinoceros family (*Rhinocerotidae*) comprises five extant species, three of which occur in Asia, and two in Africa (Liu et al., 2021). All five species, once widely distributed, endured centuries of hunting for meat and other products (notably horn), as well as habitat loss, in the face of expanding human populations. In some instances, rhino populations were deliberately eliminated simply to create space for agricultural development. Two of the Asian species (the Sumatran and Javan) have declined to the point of near extinction, with less than one hundred individuals of each surviving in the wild, in Indonesia. The third Asian species (the greater one-horned rhino, numbering ~4,014 in early 2022 in India and Nepal) and two African species have fared better, albeit in relatively few countries

with meaningful success. At the end of 2021, wild African populations were estimated at 15,942 white rhinos in ~11 range states, and 6,195 black rhinos in ~12 range states (Ferreira et al., 2022).

Although the fate of wild rhino populations has mostly been one of continued decline over recent centuries, there have been a few notable instances of recovery since the start of the twentieth century. The nineteenth century was characterised by European colonial control of most rhino range, in which extensive hunting took place subject to various regulations of questionable effectiveness (Adams, 2004; Mackenzie, 1997). The most effective means to control hunting was the eventual creation of designated protected areas within which hunting was essentially prohibited. In 1933, colonial government delegates to the London Conference on African Wildlife agreed that state protected areas would constitute the primary vehicle for wildlife preservation (Jepson & Whittaker, 2002) and these enabled at least two clear instances of rhino recovery during the twentieth century. The greater one-horned rhino population in India recovered from <20 individuals in 1908 (in Kaziranga National Park) to ~2,300 regionally in 2009 (Zschokke et al., 2011) and the southern white rhino subspecies in South Africa recovered from <50 individuals in Hluhluwe-iMfolosi National Park (HiP) at the start of the twentieth century to become the world's most abundant variety, with >20,000 descendants worldwide, in 2010 (Pernetta, 2014).

Whereas wildlife protection in the first half of the twentieth century was undertaken in a relatively uncoordinated manner by designated state agencies with some support from elite international networks, the mid-twentieth century saw the establishment of the International Union for the Conservation of Nature (IUCN) as a coordinated world federation of state and non-state actors (Jepson & Whittaker, 2002). However, at around the same time, rhino

conservation strategies started to diverge. Whereas all Asian rhinos remained under conventional state protection and management, various innovations emerged in Africa. These were largely initiated by the Natal Parks Board (NPB), a South African parastatal (i.e., partly autonomous) provincial agency established in 1947 and tasked with managing Natal's protected areas, including HiP (Hughes, 2001). As a parastatal, the NPB was empowered to manage and retain its own finances and engage in commercial activities to support its conservation mission.

The NPB's initiatives started with a strategy to re-establish founder populations of white rhinos outside of HiP in other areas of their former range. Enabled by advances in sedation and transport technology, from 1961 to 1972 a total of 1,109 live white rhinos were translocated to other protected areas within South Africa and as exports to seven former range states and various captive facilities elsewhere in the world (Player, 2013). In 1969 the Natal government eased provincial laws to enable recreational ('trophy') hunting of excess males and then started supplying them to private landowners for a nominal fee using a wait-list allocation system. With relatively insecure ownership of live free-ranging wild animals and substantially higher trophy fees on offer, private landowners were incentivized to sell hunts immediately rather than breed rhinos ('t Sas-Rolfes, 1990). However, this changed after the NPB switched to live auctions as an allocation mechanism from 1986, further supported by new national legislation (the 1991 Game Theft Act) that recognized intentional private ownership of wild animals contained by fences ('t Sas-Rolfes et al., 2022; Taylor et al., 2020), following which a vibrant domestic market in live rhinos emerged.

While South Africa rebuilt its rhino populations from the 1960s to early 1990s, most other African range states experienced dramatic declines in theirs, driven by a surge of poaching for

rhino horn to supply burgeoning demand in Yemen and East Asia (Leader-Williams, 1992). This prompted the listing, by early 1977, of all rhino species on Appendix I of the newly established Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES), which amounted to an effective ban on commercial rhino trade between the member countries (numbering ~31 at the time). The CITES listing was met by immediate dramatic increases in recorded wholesale import prices of horn in (non-member) consumer countries and poaching continued unabated in most of Africa until the early 1990s, despite further attempts at trade-restrictive measures in 1981 and 1987 (’t Sas-Rolfes, 2000). By 1993 the number of CITES signatories had risen to 120 and the USA applied diplomatic pressure on the four most significant consumer countries to bring about domestic trade restrictions. The latter measures were followed by a substantial reduction in poaching and thus appear to have enabled the subsequent recovery of populations in several range states, notably Kenya, Namibia, and Zimbabwe (Emslie et al., 2007), being countries that also adopted various innovative policy changes to allow some devolution of rhino management.

Rhino numbers continued to grow in South Africa, and in 1994 the CITES Parties agreed to down-list that country’s white rhino population to Appendix II to enable commercial international trade in live animals and easier export of hunting trophies; however, this explicitly excluded commercial rhino horn trade, which remained internationally prohibited (while remaining legal within South Africa). In 2004, the CITES Parties approved proposals from both South Africa and Namibia to enable the legal hunting and trophy export of a small annual quota of black rhinos (Leader-Williams et al., 2005). From the mid-1990s until 2010, rhino populations of both species thrived in both countries, with sales of live animals and trophy hunts providing a substantial source of income to both private actors and government

conservation agencies, further enabling the expansion of both rhino range and state protected areas (’t Sas-Rolfes et al., 2022).

Whereas continental African rhino poaching levels remained low from 1996 to 2001, from 2002 they started to increase and from 2003 a phenomenon of legal ‘pseudo-hunting’ began, whereby foreign nationals visiting South Africa masqueraded as *bone fide* trophy hunters to exploit the legal loophole for exporting rhino horns as hunting trophies (’t Sas-Rolfes, 2017). This, accompanied by rapidly growing live rhino exports to China, indicated a resurgent interest in rhino horn as a commodity in East Asia (Hall-Martin et al., 2009; Milliken & Shaw, 2012; Gao et al., 2016). In 2007, South Africa promulgated new legislation aimed at protecting threatened species, including both rhino species, the so-called ‘ToPS’ regulations. ToPS mandated specific permit applications for a comprehensive range of rhino management activities, thereby imposing substantial administrative restrictions on private rhino owners. In 2008, rhino poaching increased sharply in both Zimbabwe and South Africa, prompting the latter country to impose a moratorium on the domestic trade of rhino horn, effective from February 2009. However, poaching in South Africa continued to increase dramatically for the next few years, reaching a peak in 2015. Other range states were also affected during this time and rhino horn crimes even extended to European zoos and museum thefts.

A range of concerted international regulatory, enforcement, and campaign efforts over the last decade has been followed by a decline in observed illegal rhino horn market prices and poaching numbers since 2016. However, this has come at a considerable financial cost, poaching pressure persists, rhino range has been significantly reduced, and the world’s largest rhino population within South Africa’s Kruger National Park has declined significantly (from ~10,500 white and ~650 black in late 2010 to ~2,607 white and ~202 black by 2020). Private

landholders have adopted diverse strategies in response to the poaching crisis (Clements et al., 2020), but volumes of live rhino auction sales and recorded prices have declined substantially, adversely affecting the finances of both public and private owners; rhino conservation has become increasingly dependent on state subsidies and charitable donors. The COVID-19 pandemic has placed further substantial economic pressure on African conservation in general (Lindsey et al., 2020) and the future for rhinos appeared to remain perilous in late 2022 (Ferreira et al., 2022).

## **8.4 Theoretical Framework**

We employ an institutional economic approach, situated in a complex-adaptive SES context (Ostrom, 2007). Agreeing that economics matters for endangered species protection (Shogren et al., 1999) and recognizing the limitations of conventional neoclassical approaches (Colander et al., 2004; Hodgson, 2007; Smith & Wilson, 2019), we draw on insights from institutional theory and broader social science research to provide a set of conceptual tools for analysis. In this section (and subsequent subsections) we outline our basic approach, with further elaboration in S1.

We define institutions as ‘systems of established and embedded social rules that structure social interactions’ (Hodgson, 2006: 18). Institutions, which may be static or dynamic (i.e., changing in response to evolving social norms—see Platteau, 2000), both shape and are shaped by human behaviour (Vatn, 2006). They vary in formality, from relatively informal customs to formal written laws enforced by the state (North, 1991; Lauth, 2015), and in ‘strength’, which may be assessed in two dimensions: i) extent of compliance, and ii) durability (Levitsky & Murillo, 2009).

Our analysis of rhino conservation focuses on the role of market institutions, which we define as the rules that govern recurrent voluntary exchanges of assets between actors. We define an asset as anything that is valuable or useful to an actor. We consider three key components of market institutions: property, prices, and policy. Both property and price systems are well-established informal institutions that have become increasingly formalised in recent history, with the state reducing transactions costs by defining property rights and enforcing contracts (McMillan, 2016). This formalisation process has entailed the co-evolution of markets and political institutions (Greif, 2005), with clear ongoing tensions between the two in response to varying moral sentiments (Abercrombie, 2020).

#### **8.4.1 Property**

The concept of property describes a relationship between individuals with respect to an asset (Fabbri et al., 2021). Property entails a social agreement over rights, benefits, and duties (Hodgson, 2009) and property rights may be loosely defined as the rules governing ownership in a society (Harris et al., 2020) with the implication that a property ‘right’ constitutes a socially recognized claim in respect of an asset. We distinguish between the core legal intuition of having property in a thing—‘*in rem*’—and secondary elements of ownership such as secure tenure and beneficial use, which tend to be the focus of economic scholarship (Arruñada, 2012). These variable elements determine the strength of property ownership as an institution (Alchian & Demsetz, 1973) and may be assessed by four variable dimensions, namely: i) clarity of allocation, ii) security from trespass (or unauthorised use), iii) alienability (i.e., capacity to transfer to another party), and iv) credibility of persistence (Harris et al., 2020).

We recognize the vital role of an external enforcer in determining the strength of ownership by influencing these four variable dimensions and propose that ‘strong ownership’ implies an enforceable *in rem* claim with relatively unfettered secondary beneficial rights, and that weakness emerges to the extent that these are compromised. However, the potential for strong ownership is also influenced by the nature of the asset in question, as determined by the two key variable attributes of i) excludability and ii) rivalry or ‘subtractability’ of use (Ostrom, 2010). These attributes, which may vary over time with technological advances and human intervention, are frequently used to define four broadly different types of goods/resources (private, toll, common pool, and public) as represented in Table 14, below.

**Table 14. Four types of goods**

		Subtractability of use (extent of rivalry in consumption)	
		High	Low
Excludability (ability to exclude potential beneficiaries)	High	<p><b>Private good</b></p> <p>e.g., rhino horn medicine, hide &amp; meat; individually owned live rhinos</p>	<p><b>Toll good</b></p> <p>e.g., rhino tourist viewing in private reserve</p>
	Low	<p><b>Common pool resource</b></p> <p>e.g., unowned ('wild') live rhino populations</p>	<p><b>Public good</b></p> <p>e.g., rhino species existence value; ecosystem services</p>

Adapted from Ostrom (2010: 645)

Distinct from the four attribute-based asset typologies are four types of property regimes (aka systems or models), namely private, common, and state property, and ‘non-property’ (Bromley, 1989; Lueck & Miceli, 2007; Table 15, overleaf). Non-property, as formalised by the legal concept of *res nullius*, equates to an open access regime, and is most likely to result in the overexploitation of resources that yield private benefits. The standard policy prescription to prevent such overexploitation is to establish private, common, or state property

regimes, depending on the type of asset and context (see Hanna & Munasinghe, 1995). Typically, private property is prescribed for private goods. However, property regimes of environmental assets are typically complex mixtures of the basic models, and such composite assets are furthermore often divisible into stock and flow components, calling for a nuanced approach (Lueck & Miceli, 2007; Fennell, 2011). Accordingly, scholars of commons governance have developed sophisticated frameworks of property regimes, divisible into various categories of rights, including rights to manage resources and rights to define and allocate such management rights, i.e., ‘authoritative rights’ (Schlager & Ostrom, 1992; Sikor et al., 2017).

**Table 15. Property regimes**

Regime type	Basic description	Rights	Duties
Private property	Exclusive ownership by an individual	Individuals can undertake socially acceptable uses; society can prevent socially unacceptable uses	Individuals to refrain from socially unacceptable uses; society to respect ownership and refrain from preventing socially acceptable uses
Common property	Exclusive ownership and management by a group	Assigned group members can exclude non-members; individual members have specified use privileges	Non-members must abide by exclusion; members have specified responsibilities in terms of management and use
State property	Ownership by government departments and agencies	Assigned government agencies can determine access and use rules	Society must abide by the access and use rules determined by government agencies
Non-property (open access)	Unrestricted access and use (absence of ownership)	Benefit streams are available to all	None

Adapted from Bromley (1989: 872)

Property rights relevant to rhino conservation include those over their habitat (i.e., land rights), the animals themselves, and any harvested body parts. Viable rhino populations that play a functional ecological and evolutionary role in ecosystems provide collective benefits to

society and therefore exhibit public good attributes, even at a global level. However, individuals or small groups of live rhinos have attributes of toll goods (for tourist viewing) or private goods (for hunting and harvest of body parts). Of interest for policy is the relative value of these different benefits and how to design property institutions for socially optimal effect (as defined through political processes).

#### **8.4.2 Prices**

Prices, expressed in monetary terms, are a critical component of market institutions, transmitting information about relative scarcity to diverse actors and creating economic incentives to guide their action (Hayek, 1945). Market prices, determined through competitive processes between buyers and sellers, are ‘crude but often effective indicators of error or success’ (Hodgson, 2015: 145). However, market prices may diverge from reflecting the true preferences of actors in the presence of weak property rights or asymmetries of information and market power (i.e., monopolies); these factors can cause mismatches between private and social costs and benefits. Accordingly, market prices may not reflect public values, economic or otherwise.

Economists have developed a total economic value (TEV) framework to assess the full spectrum of economic values of natural resources and wildlife (Swanson & Barbier, 1992), distinguishing between use values, which may be direct, indirect, or future (‘option value’) and non-use values, which include human claims to value the mere existence of wildlife (Krutilla, 1967; Freeman, 1993). Empirical efforts to assess non-use values for rhinos suggest that these are considerable and in partial conflict with certain use values such as trophy hunting (Swanson et al., 2002). Critics of conventional economic valuation argue that TEV fails to consider other types of value that may be intrinsic (non-anthropocentric) rather than

instrumental, cannot be expressed in monetary terms, and are therefore incommensurable (Aldred, 2006; O’Neill, 2017; Spash & Hache, 2021). Non-use and non-anthropocentric value sentiments represent a challenge to the credibility of market prices as a measure of the social value of rhinos, especially of their public good attributes. Nonetheless, actual market prices matter because of their ultimate influence on social outcomes (including conservation).

### **8.4.3 Policy**

As with biodiversity in general, rhino conservation represents a social dilemma in the context of a complex social-ecological system—and a consequent challenge for collective action, calling for the thoughtful design of effective policy instruments and delegation of authoritative rights (see Ostrom, 1990; 2007). The economic literature on biodiversity policy evaluation recognises at least three policy instruments: protected areas, decentralization of resource management, and payments for ecosystem services (Miteva et al., 2012; Sills & Jones, 2018). In the case of rhino conservation, trade measures also constitute prominent instruments that interact with decentralization policies (but the use of payments for ecosystems services remains nascent—see Jeffries et al., 2019; Barichievy et al., 2021).

Decentralization may take one (or a combination) of two distinct forms. The first form, focused on economic efficiency, draws on insights from the literature on the problem of social cost, property rights, and transactions costs (Coase, 1960; Williamson, 1998; Demsetz, 2011; Anderson & Libecap, 2014) and promotes the establishment of robust market institutions (i.e., strong, devolved property rights and competitive contracting and trading environments that enable spontaneous price emergence through entrepreneurship). The second, more focused on equity, draws on insights from the literature on democratic natural resource governance (Agrawal & Ribot, 1999; Ribot, 2004; 2007; Larson & Soto, 2008) and promotes devolved

management authority. The two forms of decentralization may work synergistically or antagonistically, depending on distributions of property rights, benefits, and costs, which are typically influenced through political processes.

The literature suggests that protected areas ‘assign property rights to states or other public actors’ (Sills & Jones, 2018). However, this interpretation ignores the growing complexity of protected area categories, which includes a rapidly expanding selection of privately and indigenously protected areas and hybrid institutional arrangements (Stolton et al., 2014; Borrini-Feyerabend et al., 2015). Whereas in historical times area-based state protection aimed to strengthen property rights over open-access resources, in contemporary contexts genuine open access to rhinos and their habitat is practically non-existent; therefore, proclaiming new state protected areas implies an approach somewhat opposite to decentralization. Furthermore, state structures themselves can benefit from the application of decentralization principles, such as through the conversion of government departments to independent parastatal agencies. We therefore posit a concept of centralization—being the inverse of decentralization—as a more relevant analytical policy variable for contemporary rhino conservation than protected areas.

(De)centralization policies can affect both property rights, with longer-term consequences, and market prices, with shorter-term consequences (see Williamson, 2000). Policymakers aiming to achieve socially optimal results (such as effective rhino conservation), should assign rights and responsibilities to actors at appropriate (i.e., matching) levels of collectiveness and physical scale. We propose that what is most appropriate will be largely determined by the nature of the specific environmental asset in question, i.e., its unique mix of private and public good attributes. Conceptually, examining the spread of potential

economic values through the TEV framework can provide a sense of this mix (see Tisdell, 2004).

This leads us to two propositions for rhino conservation. The first is that decentralization policies will tend to optimize the more private attributes of rhinos, whereas a measure of centralization might attend to the more public attributes. Accordingly, rhino trophies and other exclusive use products are best provided privately by individual actors, whereas the maintenance of a (genetically robust) minimum viable population of wild rhinos implies a role for collective action, with rhino viewing tourism falling somewhere in between. The second proposition is that, given the varied and mixed attributes of rhinos, an institutionally diverse mix of appropriately focused centralization and decentralization policies will tend toward optimizing the full range of social values and thereby provide successful rhino conservation. These two propositions provide the basis of our policy analysis.

## **8.5 Methods and data**

Evaluating the effectiveness of individual policy instruments for rhino conservation is challenging, partly because of the uneven and simultaneous employment of multiple, sometimes conflicting instruments, and partly because opinions on what defines conservation success differ among scientists. To gain a deeper understanding of the plausible impact of policy interventions on rhino conservation success, we draw on principles of case study research (Gerring, 2017) to examine selected nested cases across a sixty-year period, from 1960 to 2020. The literature provides historical information on significant policy changes during this period, and we examine these in relation to sets of data we have assembled from a range of available sources. Following the theoretical framework outlined above, we classify significant policy interventions as constituting either centralization or decentralization. We

treat trade-restrictive measures as a form of centralization and trade-enabling measures as a form of decentralization.

Species conservation success may be loosely defined by a composite of inter-related attributes, which may be impacted by the intensity of human management interventions that can undermine ‘wildness’ (Redford *et al.*, 2011; Child *et al.*, 2019). Successful rhino conservation is therefore not assessed in terms of rhino numbers alone but also the extent to which viable (genetically healthy) rhino populations continue to play a functional ecological role in natural landscapes, subject to ongoing evolutionary processes. These principles guide the policies and actions of government agencies and NGOs that support African rhino conservation. However, given the continued attrition of rhino populations due to poaching and habitat fragmentation—and a desire for quick recovery—contemporary African rhino conservation policies also typically aim to optimise population growth rates through specific management interventions (see ‘t Sas-Rolfes *et al.*, 2022), and basic population data provide a useful first approximation of conservation success. For our purposes we therefore focus on recorded population trends (i.e., annual rhino numbers) at country levels to assess basic performance, before considering other factors such as the retention of adequate population sizes ( $n > 100$ ) under suitably wild conditions (following Emslie & Brooks, 1999).

The information on international and national policy changes and available country-level rhino population trends and poaching data enables us to evaluate four questions through a combination of natural experiments (Dunning, 2012) and process tracing (Bennett & Checkel, 2014; Beach & Pederson, 2019)—see S2 for further detail. Additional price data time series enable us to consider the fourth question in more detail by highlighting market intermediation effects. The four questions can be formulated as the following testable hypotheses:

1. Biophysical rhino species traits are the principal determinant of conservation success.
2. Centralization through trade restrictions results in conservation success.
3. Institutional diversity within range states is positively related to conservation success.
4. Decentralization through stronger (devolved) property rights and market pricing supports conservation success.

### **8.5.1 Data**

Data on rhino populations are collated by the IUCN Species Survival Commission's African Rhino Specialist Group. Whereas isolated local records of rhino numbers have existed since the late nineteenth century (e.g., southern white rhinos in South Africa), the first attempt at an Africa-wide population estimate took place in 1980 (Western & Vigne, 1985; Hillman Smith, 1981) and there have been regular continental surveys since then, enabling the creation of a comprehensive rhino numbers database amenable to country-specific trend analysis from ~1973 onwards. Population estimates vary in quality; prior to 1970 continental estimates were more speculative; the subsequent two decades were more accurate and precise, and from 1992 onwards considered most reliable, until the end of 2017, following which some data for South Africa remained incomplete. Comprehensive records of African rhino poaching incidents by range state exist from 2006 (Knight, 2020).

Although there is no official systematic collection of all relevant price data for live animals, hunting trophies, or rhino horn, indicative data (of varying quality) can be assembled from a wide range of sources. Live price data have been assembled from various sources (mostly South African public auction records), using the mean value from the largest available sample for each year. Data on trophy fees were recently collated by 't Sas-Rolfes et al. (2022).

Data on rhino horn prices have been collected erratically since at least the mid nineteenth century (see, for example, Ellis, 1994; Martin 1979). Following the 1977 CITES trade ban, a few consumer countries continued to record import values until the early 1980s (see Leader-Williams, 1992) but the progressive implementation of law enforcement has gradually driven almost all persisting market activity underground, thwarting any attempts at reliable standardized monitoring of price trends. S3 contains further information on data sources. All prices have been converted to US dollars, using annual nominal rates of exchange, and adjusted to 2021 values using the same deflators as 't Sas-Rolfes et al. (2022).

## **8.6 Analysis and Results**

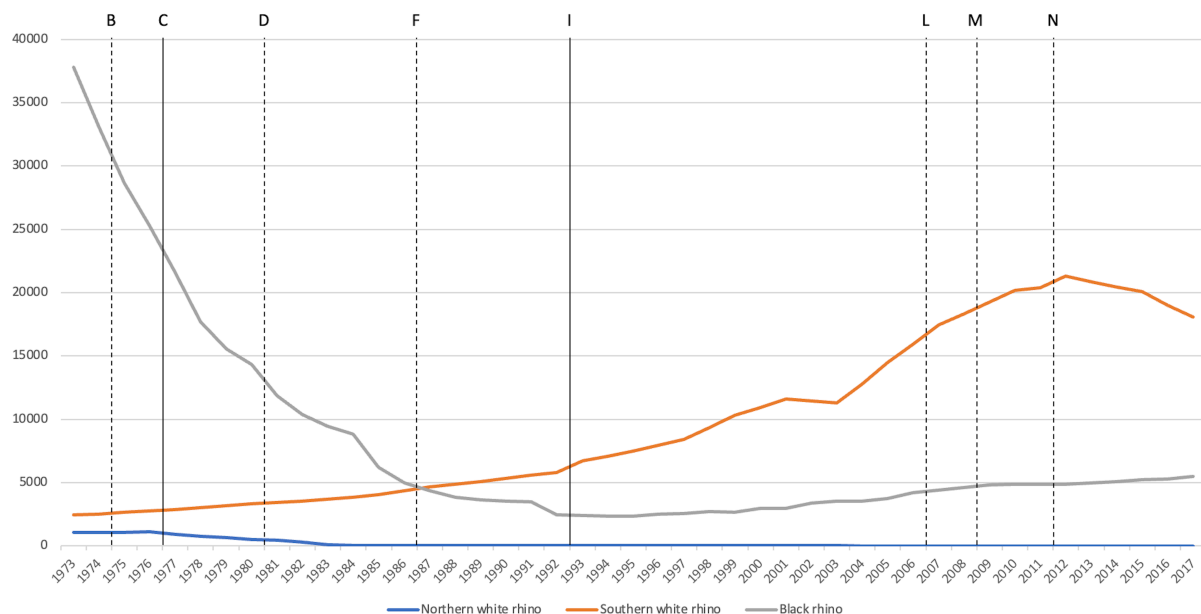
We start our analysis by considering whether rhino conservation success may be largely attributed to species characteristics, given that white and black rhinos have distinct biological and behavioural traits that may affect their value to humans and potential extinction risk.

White rhinos are more gregarious and docile grazers and typically more easily accessible to viewing tourists (and poachers) in open habitats, whereas black rhinos are more solitary and aggressive browsers and less easily seen by casual viewing tourists as they typically spend daylight hours in denser thickets. White rhinos also yield larger horns (with an average mass of ~5.9 kg per animal versus ~2.7 kg for a black rhino—see Pienaar et al., 1991) and are far more easily managed as free-ranging livestock, whereas black rhinos' temperament render them effectively unsuitable for this.

The species effect can be assessed from a simple natural experiment. Whereas the fate of the two African species has varied since 1973, as illustrated in Figure 2 (overleaf), the fate of the two geographically separated but near-identical white rhino subspecies has varied even more dramatically. In 1960, northern white rhino numbers stood at ~2,360 across 4–5 countries

(Emslie, 2020a; Emslie & Brooks, 1999) and southern white numbers were around half that (~1,250) in only one location (see Linklater & Shrader, 2017). By 2010 northern white rhinos were functionally extinct in the wild and southern white rhino numbers stood at ~20,160 across 9 range states, providing the world’s greatest rhino recovery success story. Even if optimal white and black rhino management strategies may vary, we can reject the hypothesis that species characteristics alone are the principal determinant of conservation success. We therefore turn to examine institutional variation as a causal factor.

**Figure 2. Rhino numbers and trade restrictions**



Next, we consider the extent to which attempted centralization by way of trade restrictions may account for conservation success, by examining the response of recorded rhino numbers and subjecting this hypothesis to a process tracing hoop test (Collier, 2011; S2), for which a positive post-intervention response is at least necessary for affirming causal inference.

Returning to Figure 2, we observe the effects of eight instances of tightened restrictions (indicated by vertical black lines, and drawn from Table 16, overleaf), two of which we consider as most significant (indicated by the solid lines), namely the listing of all rhino

species on CITES Appendix I by early 1977 and the banning of domestic rhino horn trade in key consumer markets in 1993. The latter event constitutes the only observable positive change of fortune for a species, as the decline in black rhino populations was reversed following this event. However, none of the other seven instances appeared to be followed by a significant positive change for black rhinos (or for northern white rhinos).

**Table 16. Significant regulatory interventions**

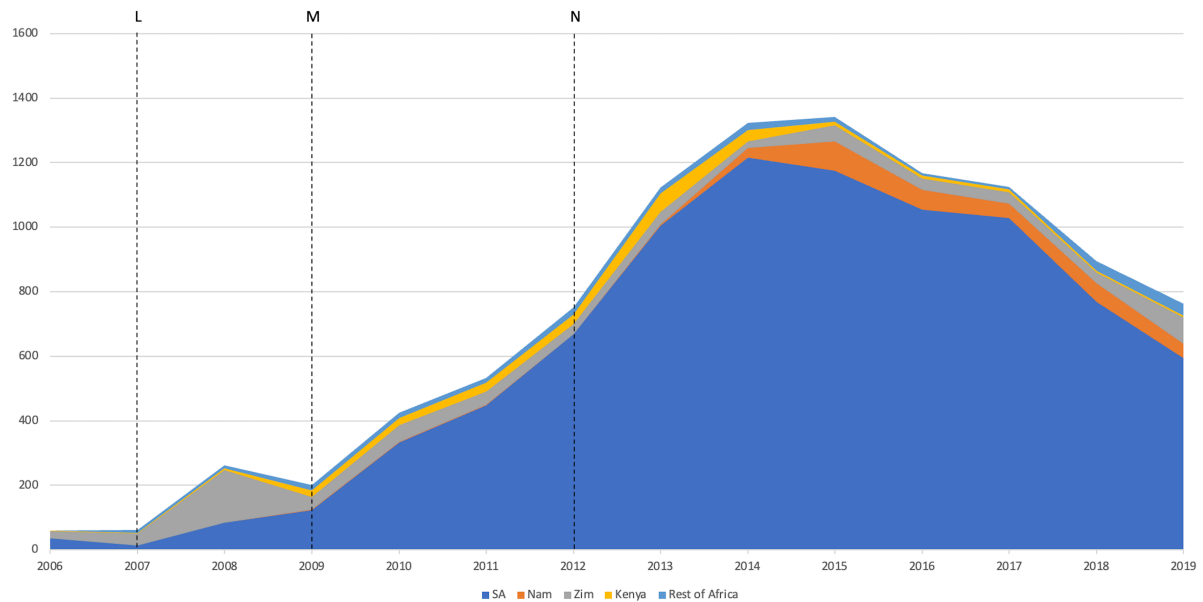
	Year	Intervention/measure		Jurisdiction(s)		Species affected		Description
		Type	Name	International	National	White	Black	
A	1969	Regulation	Natal legislative reform		SA (Natal only)	x		Easing of provincial legislation to enable legal hunting on private land
B	1975	Trade	CITES listings	All CITES signatories		x		CITES App I listing all rhinos except black
C	1977	Trade	CITES uplisting black rhino	All CITES signatories		x	x	<b>CITES App I listing black rhino</b>
D	1981	Trade	CITES Res Conf 3.11	All nations		x	x	Calls on non-CITES parties to participate; moratorium on government stocks
E	1986	Trade	Auctions - white rhino		SA	x		First live white rhino auctions from state
F	1987	Trade	CITES Res Conf 6.10	All nations		x	x	Prohibit domestic trade; destroy stockpiles (non-binding)
G	1990	Trade	Auction - black rhino		SA		x	First live black rhino auctions from state
H	1991	Ownership	Game Theft Act		SA	x	x	<b>Statutory recognition of private wildlife ownership in South Africa</b>
I	1993	Trade	US Diplomatic pressure (Pelly Amendment)	Rhino horn consumer countries		x	x	<b>Domestic trade restrictions in consumer markets</b>
J	1994	Trade	CITES down-listing	All CITES signatories	SA	x	x	CITES App II listing for SA white rhino; hunting trophies and live sales
K	2004	Trade	CITES trophy export quotas	All CITES signatories	SA, Namibia		x	Establishment of annual quotas for black rhino hunts in South Africa and Namibia
L	2007	Regulation	ToPS regulations		SA	x	x	Tighter permitting regulations affecting management and trade of both species
M	2009	Trade	SA domestic moratorium		SA	x	x	Domestic rhino horn trade moratorium for CITES compliance
N	2012	Regulation	TH norms and standards		SA	x	x	Tighter regulation of trophy hunting to deter potential horn trade

Note: Shaded areas constitute centralization interventions, unshaded areas constitute decentralization. Interventions of major significance in **bold**.

Southern white rhino numbers increased throughout the early period but started to decline as poaching levels increased rapidly following the imposition of the latter three sets of restrictions in South Africa from 2007–2012 (see Figure 3, overleaf). These trade-restrictive measures also resulted in no discernible effect on the three Asian species, numbers of which followed relatively uninterrupted trends throughout this period (i.e., one up, one down, one stable); furthermore, two African and at least one Asian rhino subspecies have become extinct

in the wild since 1993 (Di Minin et al., 2022) and trade restrictions alone have therefore also clearly failed to conserve diversity within the rhinoceros family.

**Figure 3. Rhino poaching numbers by country**



Other than the reversal of black rhino decline following domestic trade bans in key rhino horn consumer markets in 1993 (e.g., China), the evidence that trade restrictions account for rhino conservation success is weak and we therefore examine more specific institutional variation within range states as a potential stronger explanatory factor, for which we can draw on another natural experiment. A continental survey in 1979–1980 identified 20 African rhino range states (Hillman Smith, 1981). We divide these into three categories (Table 17, overleaf). The four Category 1 countries retained wild populations of their indigenous rhino species of >100 individuals throughout the subsequent period, although all also imported (relatively small) additional numbers. The five Category 2 countries saw official numbers of each species drop below 50 by 1995 but were able to recover them somewhat with assistance from imported reintroduced animals. The eleven Category 3 countries saw their indigenous

populations poached to extinction (this includes all the former northern white rhino range states); three of those countries subsequently benefited from small reintroductions by 2017 (and a further two in 2018).

**Table 17. Rhino conservation success by country category**

<b>Category 1</b>			<b>Category 3</b>		
South Africa	<b>W, B*</b>	17,761	Angola	(b)	-
Namibia	<b>B, W*</b>	2,832	Cameroon	(b)	-
Kenya	<b>B, W*</b>	1,258	CAR	(b, w)	-
Zimbabwe	<b>B, W*</b>	887	Chad	(b, w)	##
			DRC	(w)	##
<b>Category 2</b>			Ethiopia	(b)	-
Botswana	<b>W*, B*</b>	502	Mozambique	W* B*	30
Malawi	B*	28	Rwanda	B*	19
eSwatini	W*, B*	87	Somalia	(b)	-
Tanzania	<b>B*</b>	160	(South) Sudan	(b, w)	-
Zambia	B*, W*	62	Uganda	W* (b)	22

**Notes:**

Each listed country followed by species present and total number of rhinos at end 2017  
Extant rhino species indicated by W for white and B for black, with more abundant species first

Populations of >100 indicated in **bold**

Populations supplemented by imports indicated by an \*

Extinct populations of either species indicated by small letters in parentheses

## Small numbers of black (Chad) and southern white (DRC) rhinos were introduced in 2018

We find significant institutional differences between the three country categories. All Category 3 extinctions took place in a context of centralized state protection (and no institutional diversity). All Category 2 recoveries have involved parastatal or non-state actors as management partners (e.g., allowing NGOs to play key roles in managing specific local populations). Following the lead of South Africa, the Category 1 countries have all variously embraced significant decentralization reforms and consequent institutional diversity that

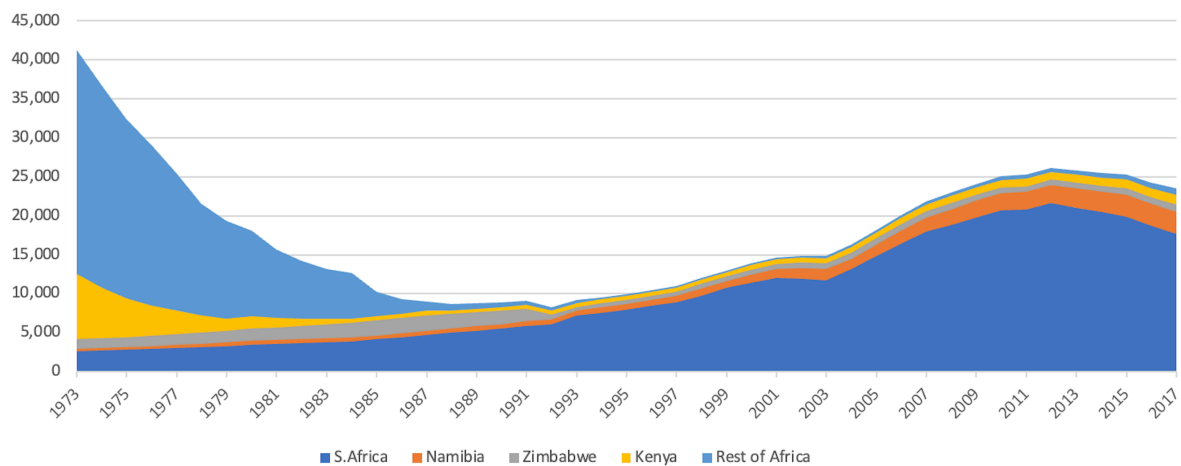
includes a substantial role for non-state actors, including private landowners. The exact nature and timing of this emergent institutional diversity varies between the four countries. South Africa has the highest diversity with a wide array of models, ranging from state agency ownership and management to full private ownership of land and rhinos. The private sector plays a substantial and growing role relative to the state (Ferreira & Dziba, 2021). Namibia allows private ownership of white rhinos and although the state retains ownership of black rhinos, it has created a custodianship programme whereby communities and private landowners may benefit from the presence of the species on their land through income from wildlife tourism and limited permitted hunts. In both South Africa and Namibia, the regulated sale of hunting experiences (with legal hunting trophy exports) is employed as a deliberate conservation strategy for both rhino species (see 't Sas-Rolfes et al., 2022, for further detail).

Kenya maintains a commercial hunting ban that was implemented in 1977 but allows custodianship of rhinos on private land. All rhinos on state land are managed by Kenya Wildlife Services (KWS), a parastatal that is empowered to retain and reinvest income from wildlife tourism (Wanyonyi, 2012). KWS was formed in 1989, the year in which Kenya's rhino numbers reached their lowest point before starting to recover. Zimbabwe's institutional arrangements also enable the custodianship of both species on private conservancies and these privately protected populations accounted for >90% of numbers in 2018 (Zimbabwe Parks & Wildlife, 2019), up from ~38% in 1994. Figure 4, overleaf, illustrates the performance of the four Category 1 countries for both rhino species relative to the rest of Africa, from 1973.

Whereas the (southern) white rhino recovery represents the most notable achievement during the study period, the preceding analysis suggests that factors other than species characteristics are more critical in determining rhino conservation success, which appears to be correlated

with institutional diversity, including a substantial measure of decentralization, most prominently in South Africa. Conversely, we lack robust evidence that trade-restrictive centralization measures have had positive effects. However, since the first five trade-restrictive instances (between 1975 and 1993) were international in scope, there is no counterfactual that enables us to infer whether the growing rhino populations in South Africa during that time would still have thrived without the imposition of these restrictions. Nonetheless, the fact that by 1993 South Africa accounted for ~78.5% of African rhino populations (~94.4% of the white and 33.8% of the black) suggests that its domestic institutions deserve closer scrutiny.

**Figure 4. African rhino numbers by country**

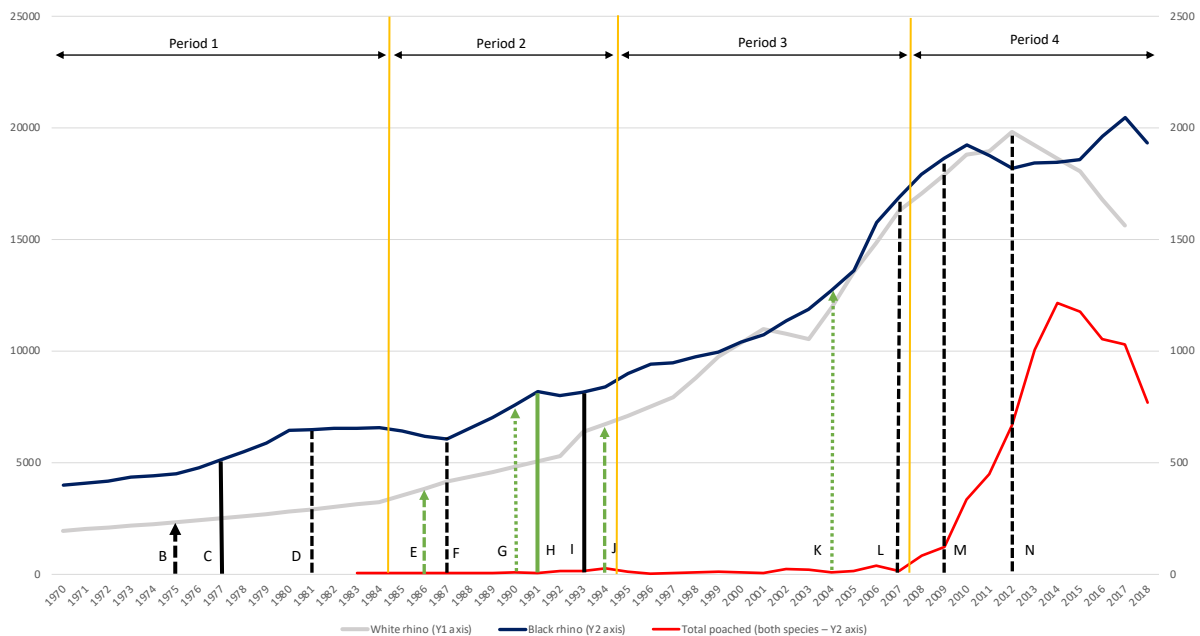


We therefore turn to focus on South Africa and observe that following the provincial legislative reform affecting white rhinos in 1969 (i.e., initial easing of hunting restrictions), nationally relevant decentralization (trade-enabling) measures were implemented for white rhinos in 1986, 1991, and 1994, and for black rhinos in 1990, 1991, and 2004 (ref. Table 16). For both species, the most significant reform was the promulgation of the 1991 Game Theft Act, which established a basis for strong private property rights over live wild animals, in

both cases also preceded by the introduction of state to private live rhino auctions and later followed by CITES measures to facilitate the export of rhino hunting trophies.

Figure 5 reflects reported numbers of each species from 1970 to 2017/18 (white rhino in light grey, primary Y-axis; black rhino in dark blue, secondary Y axis at scale = 0.1), as well as total numbers poached (in red, scaled with primary Y-axis), indicating the points at which the decentralization measures were implemented (in green) as well as centralization measures (in black, with solid lines indicating more significant events and dashed lines indicating less significant ones). Measures relevant to only one species are indicated with an arrowhead. We highlight four distinct periods along this timeline, separated by vertical yellow lines.

**Figure 5. Black and white rhino numbers in South Africa**



During the first period (Period 1, 1970–1985) white rhinos were provided by the state to private landowners at low cost and many of those were legally hunted for commercial gain. Black rhinos occurred on state land only and South Africa was essentially unaffected by rhino

poaching. Period 2 (1986–1994) was characterised by various decentralizing domestic legal reforms during a period of greater political instability and uncertainty leading up to South Africa’s transition to democracy (in 1994). Rhino poaching increased slightly during this time, prior to the imposition of domestic market restrictions in key Asian consumer countries (in 1993).

Period 3 (1995–2007) was characterized by rapid growth and spread of rhino populations on private land, following the earlier decentralization reforms and the implementation of a black rhino range expansion programme from 2003. Poaching was limited, but from 2003 some legal white rhino hunts were used to channel horn to illegal Asian consumer markets, indicating rising demand and prices. Black rhino trophy exports were approved in 2004 and legal black rhino hunts commenced in 2005, followed by a spurt of accelerated growth in black rhino numbers. Period 4 (2008–2018) was characterized by the imposition of increasing legal restrictions (on trade-related activity) and the surge in rhino poaching, which had clear negative impacts on their numbers.

The variable slopes of the two curves indicate that that overall population growth performance for both species increased each Period from Periods 1 through 3, but then deteriorated markedly in Period 4. Periods 2 and 3 stand out as the most successful for both species, suggesting that the role of decentralization policies deserves closer scrutiny.

To provide further insight on the possible mechanisms and effects of (de)centralization policies, we examine market price data for white rhino trophy fees and live sales over the period 1982–2018. Figure 6a, overleaf, illustrates the 3-year moving average of actual US\$ prices of each; Figure 6b illustrates the proportional difference between trophy and live prices

(expressed as a percentage premium: red dotted line) and a poaching index (rhinos poached as percentage of total x100: red dashed line) in relation to white rhino numbers (dark grey line; secondary Y axis). Although excluded from the Figure due to deficient data, we note that wholesale African rhino horn prices were thought to be increasing dramatically by the start of Period 4, with a peak in 2013 at an estimated US\$65,000/kg in East Asia, following which they declined gradually to between roughly 29–43% of that price (i.e., US\$19,000–28,000) at the end of 2017 (Hall-Martin et al., 2009; Vigne & Martin, 2018).

**Figure 6. White rhino trophy and live prices (a); numbers and trophy premium (b)**

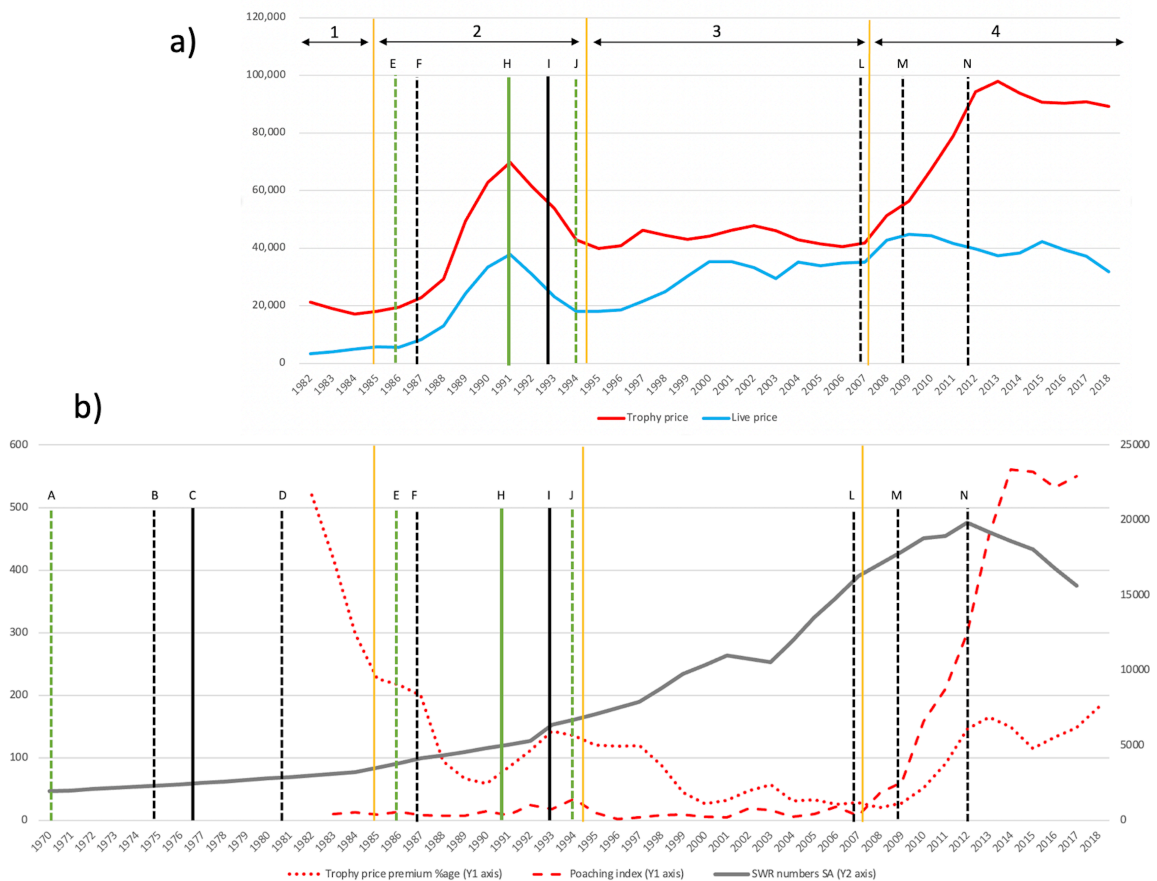


Figure 6 thus illustrates the relationship between legal market prices of rhinos and population performance, which we interpret as follows. In Period 1, state-subsidized live prices in an

environment of insecure property rights enabled a substantial trophy price premium and failed to encourage private investment in white rhino breeding. In Period 2 the subsidy was removed with the introduction of live auctions (E), following which both live and trophy prices rose rapidly to reflect the growing market demand and changing attitude toward private breeding, further enhanced by the Game Theft Act (H). However, with a growing threat of poaching and political uncertainty, these trends reversed somewhat during the early 1990s in the lead up to democratic elections, with a downward adjustment in prices and slight increase in the trophy premium; however, growth in numbers was not adversely affected by this and still exceeded Period 1 significantly. In Period 3, following a peaceful political transition, live prices rose gradually and converged toward stabilized trophy fees, reducing the trophy premium, as white rhino numbers rose steadily. However, in Period 4 the combined resurgent threats of poaching and imposition of more restrictive trade policies (L–N) was accompanied by diverging prices, with trophy fees rising markedly and live prices starting to fall, while population growth slowed down and then started to decline. By the end of this Period, the trophy premium had surpassed the pre-election (1993) level, and the population was on a downward trajectory.

The data visualisations in Figures 5 and 6 enable a hoop test of the hypothesis that decentralization through stronger property rights and market pricing causes conservation success. For both species, rhino numbers and population growth rates increased following all decentralization interventions and these trends were only reversed following the implementation of counteracting recentralization interventions. Closer analysis of white rhino price data suggests that decentralization interventions support relative increases in the market value of live animals, which act as an intermediary causal influence of conservation success. It further suggests that factors such as political stability and illegal market prices of rhino horn

are also relevant, but this does not negate the decentralization hypothesis from passing the hoop test. Assessed in terms of rhino numbers at country level, rhino conservation has appeared to benefit more from decentralization policies and less from centralization policies, which, with only one exception, fail the hoop test and may even be detrimental.

## 8.7 Discussion

Our analysis affirms that species characteristics alone do not determine rhino conservation success, that trade restrictions alone do not account for success, that countries with greater institutional diversity demonstrate greater success, and that decentralization policies that devolve authority, strengthen property rights, and boost the market values of live animals appear to perform significantly better than (re)centralization policies. These findings are consistent with our theoretical framework, which suggests that because African rhinos have both public and private good attributes, a diverse set of institutional arrangements (involving both public and private actors) is most likely to be optimal. Given the relatively high economic values of private rhino goods such as trophies (as indicated by market prices), a significant role for non-state actors is appropriate if such goods are to be legitimately provided. Furthermore, the efficient legal provision of such private goods supports higher market values for live animals linked to additional income streams that can fund range maintenance (and expansion) and essential management costs such as security.

Our findings align with those of related broader research. Property rights institutions have a first order effect on long-run economic growth, investment, and financial development, with legal uncertainty and threats of expropriation acting regressively (Acemoglu & Johnson, 2005; Weiss, 2019). Strong formal *in rem* ownership rights are furthermore found to promote individual private land conservation initiatives through varied psychological pathways across

a range of extrinsic and intrinsic (non-monetary) motivations (Gooden & Grenyer, 2019; Gooden, 2019) and these results are mirrored by surveys of private rhino owners and custodians (Rubino & Pienaar, 2018; Clements et al., 2020). Performance of state, corporate, communal, and other collective ownership regimes is influenced by internal organizational incentives, determined in turn by agency factors and residual claims, and affected by group size and homogeneity (Fama & Jensen, 1983; Cole & Ostrom, 2012). Heterogeneous management systems (arising partly from institutional diversity) are found to provide net benefits to biodiversity conservation through socio-economic and ecological functional diversity, which supports social-ecological resilience (Child et al., 2013; Walker et al., 2004).

These findings also align with those of a substantial body of recent empirical research focused on rhino conservation. For example, Hübschle (2016) found that (re)centralization policies lacked social legitimacy among critical actors, including public officials, and were thus undermined. Surveys of Asian consumers reveal significant persistent residual demand for rhino horn despite almost three decades of prohibition and supporting measures (e.g., Hanley et al., 2018; Dang Vu & Nielsen, 2018; Cheung et al., 2021). Systematic literature reviews reveal that the evidence that trade restrictions deliver long-term conservation success for terrestrial megafauna is both limited and weak (UNEP, 2019; 't Sas-Rolfes & Hiller, 2021). Centralization policies underpinned by use of militarized force in and around state protected areas have been found to entrench inequality, alienate disadvantaged rural communities, and stimulate resistance, including poaching (Hübschle & Shearing, 2018; Lunstrum & Givá, 2020; Duffy et al., 2019). Conversely, decentralization policies have enabled the employment of managed legal hunting and trophy trade to achieve biological and socio-economic goals that enhance rhino conservation ('t Sas-Rolfes et al., 2022). Multiple surveys of private land- and rhino owners in South Africa have found that most (>80%) strongly support

decentralization policies, including the legalisation of rhino horn trade, which they consider necessary to offset growing security costs (e.g., Hall-Martin et al., 2009; Rubino & Pienaar, 2018; Chapman & White, 2020a; Clements et al., 2020).

Our findings are subject to certain caveats. Whereas hoop tests suggest that decentralization measures outperform centralization measures as causal factors of success, at least one targeted centralization-supportive measure appears to have made a temporary positive contribution to rhino conservation—i.e., the 1993 domestic trade bans in rhino horn consumer countries. Relatedly, other factors are also clearly influential, notably the state of socio-economic development and governance (including political stability) of a particular country (see Underwood et al., 2013; Amano et al., 2018; Kuiper et al., 2023), and the variable price and quantity components of rhino horn consumer demand, which influence poaching incentives. For our natural experiment analysis of the 20 range states, we expect some correlation between the conservation performance of the more successful countries that embraced institutional diversity (including devolution) and proxy indicators of their socio-economic development and governance. Similarly, our specific analysis of South Africa suggests some correlation between periods of greater political stability and improved performance. That analysis also indicates a disruptive effect of significantly rising wholesale rhino horn prices, which is challenging to separate from the impact of (re)centralization policies, although there is clear evidence that rising prices pre-date the onset of the poaching surge by at least four years (Hall-Martin et al., 2009; Gao et al., 2016).

As a further caveat, species differences do appear at least partly relevant to conservation success. The biophysical differences between white and black rhinos shape distinct potential approaches to achieving optimal conservation outcomes. White rhinos are better suited to

both a wider range of tourism operations and more intensive management and husbandry practices, enabling the establishment of secure semi-wild breeding operations, as currently practiced by several private actors (’t Sas-Rolfes & Fitzgerald, 2013). Such operations have grown substantially over the last decade, with the largest poised to play a potential critical role as a source for restocking extensive areas (Emslie et al., 2019). However, the existence of these operations, most of which routinely dehorn their animals as an added security measure, raises concerns over their potential to become driven by purely commercial considerations, especially if harvested horn is sold for profit. This could incentivise practices such as selective breeding for enhanced horn growth and shift the trajectory of genetic evolution away from what might be considered as natural for the species towards ‘domestication’. Unlike black rhinos, white rhinos are therefore susceptible to another route to extinction in the wild, i.e., via a loss of wildness.

A recent policy deliberation in South Africa revealed stark differences in opinion as to how the recent trend toward intensive white rhino management should be addressed (DFFE, 2020), with a majority view calling for a policy shift away from domestication but failing to consider potential impacts on property rights that would amount to further, potentially counterproductive, centralization. Whereas the creation of stronger (private) property rights over wild animals is typically associated with a transition from natural selection to economic selection (Lueck & Torrens, 2020), such ‘domestication’ may not be inevitable for a species if strong property rights to individual animals in wild conditions can be established at sufficiently low net transactions costs, which could be achieved through a combination of appropriate technology and ‘smart’ regulation (Gunningham & Sinclair, 2017). Notwithstanding such possibilities, many resist the notion of humans owning wild animals on ideological grounds, linked to their ethical disapproval of physical animal commodification

and concerns for the welfare of individual animals that are subject to any form of harvest (see Chapter 4). The latter could be addressed through pragmatic compromise solutions that can potentially deliver welfare outcomes that are superior to the status quo of high poaching incidence and substantial associated animal suffering (Derkley et al., 2019).

Intractable ideological objections to decentralization measures such as private wildlife ownership and legal commercial harvesting are influenced by the internationally dominant framing inherent in the contemporary North American Model of wildlife conservation. However, there has been a notable exception to the application of the model within the USA itself. Following its near extinction, the American bison was reclassified as an agricultural animal in some jurisdictions and therefore not subject to the stringent conditions imposed on other wild species. Bison recovery in the USA over the last century has thus taken place in the context of widespread private ownership, market harvesting, and trade in harvested bison products such as meat (Sanderson et al., 2008). Whereas some ecologists question the conservation value of the bison recovery (Freese et al., 2007) a minimum viable population of wild bison remains secure and there are recent private initiatives to expand wild populations and their range (Lueck, 2018). This raises the question as to whether a similarly commercially valuable large herbivore such as a white rhino should be subject to more stringent restrictions in a developing country context, given evidence from South Africa that small, mostly private reserves have substantially outperformed the large publicly protected Kruger National Park in controlling poaching (Ferreira & Dziba, 2021).

Our research results yield one clear policy implication: any reversals of previously successful decentralization measures should be exercised with great caution, with due attention to the possible perverse effects of weakening property rights and undermining the market asset

values of live wild animals and their range. Whereas the state may be regarded as having a social-ecological obligation to maintain genetically robust minimum viable populations of wild rhino species, their efforts may be boosted through effective partnerships with non-state actors, enabled by smart regulation grounded in decentralization principles. Such non-state actors could include local community structures, following varied nascent examples of community-based rhino conservation initiatives in Namibia, Kenya, South Africa, and Zimbabwe.

Our results also point to potentially fruitful areas of further research. The first concerns further examination of the consequences of cross-scalar institutional mismatch, highlighted by the tensions between CITES and its North American Model logics and the successful decentralization measures implemented in Southern African countries. Second, the links between relevant biophysical and institutional notions of ‘wildness’ and elucidation of tractable and policy-relevant definitions deserve further attention. Finally, there is considerable scope for further fine-grained comparative analysis of conservation institutions in relation to their performance, also using other methodological approaches such as multivariate models and statistical methods. In the case of rhino conservation, a useful next step would be to further examine the critical role of non-state actors in rhino conservation, with a view to forging more nuanced constructive institutional links across sectors and scales.

## **8.8 Acknowledgements**

We thank Brian Child, Terry Anderson, Dustin Garrick, Amy Dickman, Constance McDermott and three anonymous reviewers for comments on earlier drafts of this paper. Michael 't Sas-Rolfes gratefully acknowledges funding from Earthmind and Oppenheimer Generations Research and Conservation.

## 8.9 References

- Abercrombie, N. (2020). *Commodification and Its Discontents* (1st edition). Polity.
- Acemoglu, D., & Johnson, S. (2005). Unbundling Institutions. *Journal of Political Economy*, 113(5), 949–995.
- Adams, W. M. (2004). *Against Extinction: The Story of Conservation*. Earthscan.
- Agrawal, A., & Ribot, J. (1999). Accountability in Decentralization: A Framework with South Asian and West African Cases. *The Journal of Developing Areas*, 33(4), 473–502. JSTOR.
- Alchian, A. A., & Demsetz, H. (1973). The Property Right Paradigm. *The Journal of Economic History*, 33(1), 16–27. JSTOR.
- Aldred, J. (2006). Incommensurability and Monetary Valuation. *Land Economics*, 82(2), 141–161. <https://doi.org/10.3368/le.82.2.141>
- Allen, C. M., & Edwards, S. R. (1995). The sustainable-use debate: Observations from IUCN. *Oryx*, 29(2), 92–98. <https://doi.org/10.1017/S0030605300020950>
- Amano, T., Székely, T., Sandel, B., Nagy, S., Mundkur, T., Langendoen, T., Blanco, D., Soykan, C. U., & Sutherland, W. J. (2018). Successful conservation of global waterbird populations depends on effective governance. *Nature*, 553(7687), 199–202. <https://doi.org/10.1038/nature25139>
- Amin, R., Thomas, K., Emslie, R. H., Foose, T. J., & Strien, N. V. (2006). An overview of the conservation status of and threats to rhinoceros species in the wild. *International Zoo Yearbook*, 40(1), 96–117. <https://doi.org/10.1111/j.1748-1090.2006.00096.x>
- Anderson, T. L., & Libecap, G. D. (2014). *Environmental Markets: A Property Rights Approach*. Cambridge University Press.
- Ando, A. W., & Langpap, C. (2018). The Economics of Species Conservation. *Annual Review of Resource Economics*, 10(1), 445–467. <https://doi.org/10.1146/annurev-resource-100517-022921>
- Aoki, M. (2007). Endogenizing institutions and institutional changes. *Journal of Institutional Economics*, 3(1), 1–31. Cambridge Core. <https://doi.org/10.1017/S1744137406000531>
- Arruñada, B. (2012). Property as an economic concept: Reconciling legal and economic conceptions of property rights in a Coasean framework. *International Review of Economics*, 59(2), 121–144. <https://doi.org/10.1007/s12232-012-0150-4>
- Barbier, E. B., Burgess, J. C., Swanson, T. M., & Pearce, D. W. (1990). *Elephants, Economics and Ivory*. Earthscan.

- Barbier, E. B., & Schulz, C.-E. (1997). Wildlife, Biodiversity and Trade. *Environment and Development Economics*, 2(02), 145–172. <https://doi.org/10.1017/S1355770X97000144>
- Barichievy, C., Altwegg, R., Balfour, D., Brett, R., Gordon, C., Henry, D. A. W., Jeffries, G., Khayale, C., Wanyama, H., & Withers, O. (2021). A demographic model to support an impact financing mechanism for black rhino metapopulations. *Biological Conservation*, 257, 109073. <https://doi.org/10.1016/j.biocon.2021.109073>
- Barichievy, C., Munro, L., Clinning, G., Whittington-Jones, B., & Masterson, G. (2017). Do armed field-rangers deter rhino poachers? An empirical analysis. *Biological Conservation*, 209(Supplement C), 554–560. <https://doi.org/10.1016/j.biocon.2017.03.017>
- Barzel, Y. (1989). *Economic Analysis of Property Rights*. Cambridge University Press.
- Beach, D., & Pedersen, R. B. (2019). *Process-Tracing Methods: Foundations and Guidelines* (2nd edition). University of Michigan Press.
- Bennett, A., & Checkel, J. T. (Eds.). (2014). *Process Tracing: From Metaphor to Analytic Tool*. Cambridge University Press.
- Borrini-Feyerabend, G., & Hill, R. (2015). Governance for the Conservation of Nature. In G. L. Worboys, M. Lockwood, A. Kothari, S. Feary, & I. Pulsford (Eds.), *Protected Area Governance and Management* (pp. 169–206). ANU Press. <https://www.jstor.org/stable/j.ctt1657v5d.14>
- Bradshaw, K. (2018). Animal Property Rights. *University of Colorado Law Review*, 89, 809.
- Brennan, A. J., & Kalsi, J. K. (2015). Elephant poaching & ivory trafficking problems in Sub-Saharan Africa: An application of O’Hara’s principles of political economy. *Ecological Economics*, 120, 312–337. <https://doi.org/10.1016/j.ecolecon.2015.08.013>
- Bromley, D. W. (1989). Property relations and economic development: The other land reform. *World Development*, 17(6), 867–877. [https://doi.org/10.1016/0305-750X\(89\)90008-9](https://doi.org/10.1016/0305-750X(89)90008-9)
- Bromley, D. W. (2009). *Sufficient Reason: Volitional Pragmatism and the Meaning of Economic Institutions*. Princeton University Press.
- Brosch, T., & Sander, D. (Eds.). (2015). *Handbook of Value: Perspectives from Economics, Neuroscience, Philosophy, Psychology and Sociology*. Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780198716600.001.0001>
- Brown, G., & Layton, D. F. (2001). A market solution for preserving biodiversity: The black rhino. In J. F. Shogren & J. Tschirhart (Eds.), *Protecting Endangered Species in the United States Biological Needs, Political Realities, Economic Choices*. Cambridge:

Cambridge University Press.

[http://books.google.co.uk/books?hl=en&lr=&id=yplhM5Dqh10C&oi=fnd&pg=PA32&dq=brown+layton+rhino&ots=MeojVkrJRX&sig=y\\_je2nrXC3NfeS65bvbnlseegHk](http://books.google.co.uk/books?hl=en&lr=&id=yplhM5Dqh10C&oi=fnd&pg=PA32&dq=brown+layton+rhino&ots=MeojVkrJRX&sig=y_je2nrXC3NfeS65bvbnlseegHk)

- Chanyandura, A., Muposhi, V. K., Gandiwa, E., & Muboko, N. (2021). An analysis of threats, strategies, and opportunities for African rhinoceros conservation. *Ecology and Evolution*, 11(11), 5892–5910. <https://doi.org/10.1002/ece3.7536>
- Chapman, L. A., & White, P. C. L. (2020a). Stakeholder perspectives on the value and challenges of private rhinoceros ownership in South Africa. *Human Dimensions of Wildlife*, 25(2), 187–197. <https://doi.org/10.1080/10871209.2020.1697838>
- Chapman, L. A., & White, P. C. L. (2020b). The future of private rhino ownership in South Africa. *Wildlife Research*, 47(6), 441–447. <https://doi.org/10.1071/WR20013>
- Cheung, H., Mazerolle, L., Possingham, H. P., & Biggs, D. (2021). Rhino horn use by consumers of traditional Chinese medicine in China. *Conservation Science and Practice*, 3(5), e365. <https://doi.org/10.1111/csp2.365>
- Child, B. (2012). The sustainable use approach could save South Africa’s rhinos. *South African Journal of Science*, 108(7–8), 21–25.
- Child, B., Musengezi, J., Parent, G. D., & Child, G. F. T. (2012). The economics and institutional economics of wildlife on private land in Africa. *Pastoralism: Research, Policy and Practice*, 2(1), 18. <https://doi.org/10.1186/2041-7136-2-18>
- Child, M. F., Peel, M. J. S., Smit, I. P. J., & Sutherland, W. J. (2013). Quantifying the effects of diverse private protected area management systems on ecosystem properties in a savannah biome, South Africa. *Oryx*, 47(1), 29–40. <https://doi.org/10.1017/S0030605312000038>
- Child, M. F., Selier, S. A. J., Radloff, F. G. T., Taylor, W. A., Hoffmann, M., Nel, L., Power, R. J., Birss, C., Okes, N. C., Peel, M. J., Mallon, D., & Davies-Mostert, H. (2019). A framework to measure the wildness of managed large vertebrate populations. *Conservation Biology*, 33(5), 1106–1119. <https://doi.org/10.1111/cobi.13299>
- Clark, C. W. (1973). The Economics of Overexploitation. *Science*, 181(4100), 630–634.
- Clements, H. S., Balfour, D., & Di Minin, E. (2023). Importance of private and communal lands to sustainable conservation of Africa’s rhinoceroses. *Frontiers in Ecology and the Environment*, 21(3), 140–147. <https://doi.org/10.1002/fee.2593>
- Clements, H. S., Knight, M., Jones, P., & Balfour, D. (2020). Private rhino conservation: Diverse strategies adopted in response to the poaching crisis. *Conservation Letters*, 13(6), e12741. <https://doi.org/10.1111/conl.12741>

- Coase, R. H. (1960). The Problem of Social Cost. *Journal of Law & Economics*, 3, 1.
- Colander, D., Holt, R., & Rosser, B. (2004). The changing face of mainstream economics. *Review of Political Economy*, 16(4), 485–499.  
<https://doi.org/10.1080/0953825042000256702>
- Cole, D. H., & Ostrom, E. (Eds.). (2012). *Property in Land and Other Resources*. Lincoln Institute of Land Policy.
- Cole, D. H. (2013). The Varieties of Comparative Institutional Analysis Symposium Issue: 30 Years of Comparative Institutional Analysis: A Celebration of Neil Komesar. *Wisconsin Law Review*, 2013(2), 383–410.
- Collier, D. (2011). Understanding Process Tracing. *PS: Political Science & Politics*, 44(4), 823–830. <https://doi.org/10.1017/S1049096511001429>
- Collins, A., Fraser, G., & Snowball, J. (2016). Issues and concerns in developing regulated markets for endangered species products: The case of rhinoceros horns. *Cambridge Journal of Economics*, 40(6), 1669–1686. <https://doi.org/10.1093/cje/bev076>
- Craig, P., Katikireddi, S. V., Leyland, A., & Popham, F. (2017). Natural Experiments: An Overview of Methods, Approaches, and Contributions to Public Health Intervention Research. *Annual Review of Public Health*, 38(1), 39–56.  
<https://doi.org/10.1146/annurev-publhealth-031816-044327>
- Curry, O. S., Alfano, M., Brandt, M. J., & Pelican, C. (2021). Moral Molecules: Morality as a Combinatorial System. *Review of Philosophy and Psychology*.  
<https://doi.org/10.1007/s13164-021-00540-x>
- Dang Vu, H. N., & Nielsen, M. R. (2018). Understanding utilitarian and hedonic values determining the demand for rhino horn in Vietnam. *Human Dimensions of Wildlife*, 23(5), 417–432. <https://doi.org/10.1080/10871209.2018.1449038>
- Dasgupta, P. (2021). *The Economics of Biodiversity: The Dasgupta Review*. HM Treasury.
- Deakin, S., Gindis, D., Hodgson, G. M., Huang, K., & Pistor, K. (2017). Legal institutionalism: Capitalism and the constitutive role of law. *Journal of Comparative Economics*, 45(1), 188–200. <https://doi.org/10.1016/j.jce.2016.04.005>
- Demsetz, H. (1967). Toward a Theory of Property Rights. *The American Economic Review*, 57(2), 347–359. <https://doi.org/10.2307/1821637>
- Demsetz, H. (2011). The Problem of Social Cost: What Problem? A Critique of the Reasoning of A.C. Pigou and R.H. Coase. *Review of Law & Economics*, 7(1), 1–13.

- Derkley, T., Biggs, D., Holden, M., & Phillips, C. (2019). A framework to evaluate animal welfare implications of policies on rhino horn trade. *Biological Conservation*, 235, 236–249. <https://doi.org/10.1016/j.biocon.2019.05.004>
- DFFE / South African Department of Forestry, Fisheries, and the Environment, 2020. High-Level Panel Report – For Submission to the Minister of Environment, Forestry and Fisheries. [https://www.dffe.gov.za/sites/default/files/reports/2020-12-22\\_high-levelpanel\\_report.pdf](https://www.dffe.gov.za/sites/default/files/reports/2020-12-22_high-levelpanel_report.pdf)
- Di Minin, E., 't Sas-Rolfes, M., Selier, J., Louis, M., & Bradshaw, C. J. A. (2022). Dismantling the poachernomics of the illegal wildlife trade. *Biological Conservation*, 265, 109418. <https://doi.org/10.1016/j.biocon.2021.109418>
- Do, Q.-T., Levchenko, A. A., Ma, L., Blanc, J., Dublin, H., & Milliken, T. (2020). The Price Elasticity of African Elephant Poaching. *The World Bank Economic Review*, lhaa008. <https://doi.org/10.1093/wber/lhaa008>
- Duffy, R., Massé, F., Smidt, E., Marijnen, E., Büscher, B., Verweijen, J., Ramutsindela, M., Simlai, T., Joanny, L., & Lunstrum, E. (2019). Why we must question the militarisation of conservation. *Biological Conservation*, 232, 66–73. <https://doi.org/10.1016/j.biocon.2019.01.013>
- Dunning, T. (2012). *Natural Experiments in the Social Sciences: A Design-Based Approach* (New edition). Cambridge University Press.
- Ellis, B. (1994). Game Conservation in Zululand 1824-1947: Changing Perspectives. *Natalia*, 23/24, 27–44.
- Emslie, R. (2020a). *Ceratotherium simum*. *The IUCN Red List of Threatened Species*. <https://dx.doi.org/10.2305/IUCN.UK.2020-1.RLTS.T4185A45813880.en>
- Emslie, R. (2020b). *Diceros bicornis*. *The IUCN Red List of Threatened Species*. <https://dx.doi.org/10.2305/IUCN.UK.2020-1.RLTS.T6557A152728945.en>
- Emslie, R., & Brooks, M. (1999). *African rhino: Status survey and conservation action plan*. IUCN. <https://portals.iucn.org/library/node/7613>
- Emslie, R. H., Milledge, S., Brooks, M., van Strien, N. J., & Dublin, H. T. (2007). *African and Asian Rhinoceroses – Status, Conservation and Trade. A report from the IUCN Species Survival Commission (IUCN SSC) African and Asian Rhino Specialist Groups and TRAFFIC to the CITES Secretariat pursuant to Decisions 13.23-25 taken at the 13th meeting of the Conference of the Parties, and further deliberations at the 53rd and 54th meetings of the Standing Committee (CoP14 Doc. 54 Annex 1)*. CITES. <https://cites.org/sites/default/files/eng/cop/14/doc/E14-54.pdf>

- Emslie, R. H., Milliken, T., Talukdar, B., Adcock, K., & Knight, M. H. (2019). *African and Asian rhinoceroses—Status, conservation and trade: A report from the IUCN Species Survival Commission (IUCN/SSC) African and Asian Rhino Specialist Groups and TRAFFIC to the CITES Secretariat pursuant to Resolution Conf. 9.14 (Rev. CoP17), CoP18 Doc. 83.1 Annex 2*. CITES Secretariat.  
<https://cites.org/sites/default/files/eng/cop/18/doc/E-CoP18-083-01.pdf>
- Epstein, R. A. (2004). Animals as Objects, or Subjects, of Rights. In C. R. Sunstein & M. C. Nussbaum (Eds.), *Animal Rights: Current Debates and New Directions* (pp. 143–161). Oxford University Press.  
<http://www.oxfordscholarship.com/view/10.1093/acprof:oso/9780195305104.001.0001/acprof-9780195305104>
- Fabbri, M., Rizzolli, M., & Maruotti, A. (2021). Possession is Nine-Tenths of the Law: Possession, property, and coordination in a Hawk–Dove Experiment. *Journal of Institutional Economics*, 17(2), 267–288. <https://doi.org/10.1017/S1744137420000442>
- Fama, E. F., & Jensen, M. C. (1983). Agency Problems and Residual Claims. *The Journal of Law & Economics*, 26(2), 327–349.
- Fennell, L. (2011). Ostrom’s Law: Property rights in the commons. *International Journal of the Commons*, 5(1), 9–27. <https://doi.org/10.18352/ijc.252>
- Ferreira, S. M., & Dziba, L. (2021). Where are rhinos safest? *South African Journal of Science*, 117(9/10), Article 9/10. <https://doi.org/10.17159/sajs.2021/11300>
- Ferreira, S. M., Ellis, S., Burgess, G., Baruch-Mordo, S., Talukdar, B., & Knight, M. H. (2022). *African and Asian rhinoceroses—Status, Conservation and Trade: A report from the IUCN Species Survival Commission (IUCN/SSC) African and Asian Rhino Specialist Groups and TRAFFIC to the CITES Secretariat pursuant to Resolution Conf. 9.14 (Rev. CoP17) (CoP19 Doc. 75 (Rev.1) Annex 4)*. CITES Secretariat.  
<https://cites.org/sites/default/files/eng/cop/18/doc/E-CoP18-083-01.pdf>
- Freeman, A. M. (1993). Nonuse values in natural resource damage assessment. In R. J. Kopp & V. K. Smith (Eds.), *Valuing Natural Assets: The Economics of Natural Resource Damage Assessment*. Resources for the Future.
- Freese, C. H., Aune, K. E., Boyd, D. P., Derr, J. N., Forrest, S. C., Cormack Gates, C., Gogan, P. J. P., Grassel, S. M., Halbert, N. D., Kunkel, K., & Redford, K. H. (2007). Second chance for the plains bison. *Biological Conservation*, 136(2), 175–184.  
<https://doi.org/10.1016/j.biocon.2006.11.019>

- Gao, Y., Stoner, K. J., Lee, A. T. L., & Clark, S. G. (2016). Rhino horn trade in China: An analysis of the art and antiques market. *Biological Conservation*, 201, 343–347. <https://doi.org/10.1016/j.biocon.2016.08.001>
- Gerring, J. (2016). *Case Study Research: Principles and Practices* (2nd edition). Cambridge University Press.
- Gooden, J., & Grenyer, R. (2019). The psychological appeal of owning private land for conservation. *Conservation Biology*, 33(2), 339–350. <https://doi.org/10.1111/cobi.13215>
- Gooden, J. L. (2019). Cultivating identity through private land conservation. *People and Nature*, 1(3), 362–375. <https://doi.org/10.1002/pan3.32>
- Gordon, H. S. (1954). The Economic Theory of a Common-Property Resource: The Fishery. *Journal of Political Economy*, 62(2), 124–142.
- Greif, A. (2005). Commitment, Coercion, and Markets: The Nature and Dynamics of Institutions Supporting Exchange. In C. Menard & M. M. Shirley (Eds.), *Handbook of New Institutional Economics* (pp. 727–786). Springer US. [https://doi.org/10.1007/0-387-25092-1\\_29](https://doi.org/10.1007/0-387-25092-1_29)
- Guala, F. (2016). *Understanding Institutions: The Science and Philosophy of Living Together* (1st edition). Princeton University Press.
- Gunningham, N., & Sinclair, D. (2017). Smart regulation. In P. Drahos (Ed.), *Regulatory Theory* (pp. 133–148). ANU Press; JSTOR. [www.jstor.org/stable/j.ctt1q1crtm.16](http://www.jstor.org/stable/j.ctt1q1crtm.16)
- Hall-Martin, A., du Toit, J. G., Hitchens, P. M., & Knight, M. H. (2009). *An exert of the 2008 survey of white rhinoceros, Ceratotherium simum simum, on private land in South Africa: Report to WWF-African Rhino Programme*. WWF South Africa. [http://www.rhinosourcecenter.com/pdf\\_files/146/1465289401.pdf](http://www.rhinosourcecenter.com/pdf_files/146/1465289401.pdf)
- Hanley, N., Sheremet, O., Bozzola, M., & MacMillan, D. C. (2018). The Allure of the Illegal: Choice Modeling of Rhino Horn Demand in Vietnam. *Conservation Letters*, 11(3), e12417. <https://doi.org/10.1111/conl.12417>
- Hanna, S., & Musinghe, M. (1995). *Property rights and the environment*. The World Bank. <https://doi.org/10.1596/0-8213-3415-8>
- Harari, Y. N. (2014). *Sapiens: A Brief History of Humankind*. Harvill Secker.
- Hare, D., Reeve, H. K., & Blossey, B. (2016). Evolutionary routes to stable ownership. *Journal of Evolutionary Biology*, 29(6), 1178–1188. <https://doi.org/10.1111/jeb.12859>
- Harris, C., Cai, M., Murtazashvili, I., & Murtazashvili, J. B. (2020). The Origins and Consequences of Property Rights: Austrian, Public Choice, and Institutional Economics Perspectives. *Elements in Austrian Economics*. <https://doi.org/10.1017/9781108979122>

- Hayek, F. A. (1945). The Use of Knowledge in Society. *The American Economic Review*, 35(4), 519–530. <https://doi.org/10.2307/1809376>
- Helm, D., & Hepburn, C. (2012). The economic analysis of biodiversity: An assessment. *Oxford Review of Economic Policy*, 28(1), 1–21. JSTOR.
- Hill, P. J. (2014). Are All Commons Tragedies? The Case of Bison in the Nineteenth Century. *The Independent Review*, 18(4), 485–502.
- Hillman Smith, K. (1981). African rhinoceros survey and conservation. *WWF Yearbook 1980-1981*, 309–313.
- Hodgson, G. M. (2006). What Are Institutions? *Journal of Economic Issues*, 40(1), 1–25. <https://doi.org/10.1080/00213624.2006.11506879>
- Hodgson, G. M. (2007). Evolutionary and Institutional Economics as the New Mainstream? *Evolutionary and Institutional Economics Review*, 4(1), 7–25. <https://doi.org/10.14441/eier.4.7>
- Hodgson, G. M. (2009). On the Institutional Foundations of Law: The Insufficiency of Custom and Private Ordering. *Journal of Economic Issues*, 43(1), 143–166. <https://doi.org/10.2753/JEI0021-3624430107>
- Hodgson, G. M. (2015). Much of the ‘economics of property rights’ devalues property and legal rights. *Journal of Institutional Economics*, 11(4), 683–709. <https://doi.org/10.1017/S1744137414000630>
- Hoffmann, S. (2013). Property, possession and natural resource management: Towards a conceptual clarification. *Journal of Institutional Economics*, 9(1), 39–60. <https://doi.org/10.1017/S1744137412000264>
- Honore´, A. M. (1961), ‘Ownership’, in Guest, G. Anthony (ed.), *Oxford Essays in Jurisprudence*, Oxford: Oxford University Press, pp. 107–147. Reprinted in the *Journal of Institutional Economics*, 9(2): 227–255.
- Hoyt, J. A. (1994). *Animals in Peril: How ‘Sustainable Use’ is Wiping Out the World’s Wildlife*. Avery.
- Hübschle, A. (2016). Security coordination in an illegal market: The transnational trade in rhinoceros horn. *Politikon*, 43(2), 193–214. <https://doi.org/10.1080/02589346.2016.1201377>
- Hübschle, A., & Shearing, C. (2018). *Ending wildlife trafficking: Local communities as change agents*. The Global Initiative Against Transnational Organized Crime. <https://globalinitiative.net/analysis/ending-wildlife-trafficking/>

- Hughes, G. R. (2001). The Natal Parks Board Experience in South Africa. In T. L. Anderson & A. James (Eds.), *The Politics and Economics of Park Management* (pp. 31–41). Rowman & Littlefield.
- Hutton, J. M., & Leader-Williams, N. (2003). Sustainable use and incentive-driven conservation: Realigning human and conservation interests. *Oryx*, 37(02).  
<https://doi.org/10.1017/S0030605303000395>
- IPBES. (2019). *Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. (E. S. Brondizio, J. Settele, S. Díaz, & H. T. Ngo, Eds.). IPBES secretariat.  
<https://doi.org/10.5281/zenodo.3553579>
- Jeffries, G., Withers, O., Barichievsky, C., & Gordon, C. (2019). The Rhino Impact Investment Project—A new, outcomes-based finance mechanism for selected AfRSG-rated ‘Key’ black rhino populations. *Pachyderm*, 60, 88–95.
- Jepson, P., & Whittaker, R. J. (2002). Histories of Protected Areas: Internationalisation of Conservationist Values and their Adoption in the Netherlands Indies (Indonesia). *Environment and History*, 8(2), 129–172. <https://doi.org/10.3197/096734002129342620>
- Justus, J., Colyvan, M., Regan, H., & Maguire, L. (2009). Buying into conservation: Intrinsic versus instrumental value. *Trends in Ecology & Evolution*, 24(4), 187–191.  
<http://dx.doi.org/10.1016/j.tree.2008.11.011>
- Kellert, S. R. (1996). *The Value of Life: Biological Diversity and Human Society*. Island Press.
- Knight, M. (2020). African Rhino Specialist Group report / Rapport du Groupe de Spécialistes du Rhinocéros d’Afrique. *Pachyderm*, 61, 23–42.
- Kremer, M., & Morcom, C. (2000). Elephants. *The American Economic Review*, 90(1), 212–234.
- Kreuter, U. P., & Simmons, R. T. (1995). Economics, Politics and Controversy over African Elephant Conservation. In M. M. R. Freeman & U. P. Kreuter (Eds.), *Elephants and Whales: Resources for Whom?* (1st edition, pp. 39–58). Gordon.
- Krutilla, J. V. (1967). Conservation Reconsidered. *The American Economic Review*, 57(4), 777–786.
- Kuiper, T., Altwegg, R., Beale, C., Carroll, T., Dublin, H. T., Hauenstein, S., Kshatriya, M., Schwarz, C., Thouless, C. R., Royle, A., & Milner-Gulland, E. J. (2023). Drivers and facilitators of the illegal killing of elephants across 64 African sites. *Proceedings of the*

- Royal Society B: Biological Sciences*, 290(1990), 20222270.  
<https://doi.org/10.1098/rspb.2022.2270>
- Larson, A. M., & Soto, F. (2008). Decentralization of Natural Resource Governance Regimes. *Annual Review of Environment and Resources*, 33(1), 213–239.  
<https://doi.org/10.1146/annurev.envIRON.33.020607.095522>
- Lauth, H.-J. (2015). Formal and Informal Institutions. In J. Gandhi & R. Ruiz-Rufino (Eds.), *Routledge Handbook of Comparative Political Institutions* (pp. 56–69). Taylor & Francis Group. <http://ebookcentral.proquest.com/lib/oxford/detail.action?docID=2011232>
- Leader-Williams, N. (1992). *World trade in rhino horn: A review*. Traffic.  
<http://bases.bireme.br/cgi-bin/wxislind.exe/iah/online/?IsisScript=iah/iah.xis&src=google&base=REPIDISCA&lang=p&nextAction=lnk&exprSearch=70654&indexSearch=ID>
- Leader-Williams, N. (2003). Regulation and protection: Successes and failures in rhinoceros—Case study. In S. Oldfield (Ed.), *The Trade in Wildlife: Regulation for Conservation* (illustrated edition). Earthscan Ltd.
- Leader-Williams, N., Milledge, S., Adcock, K., Brooks, M., Conway, A., Knight, M., Mainka, S., Martin, E. B., & Teferi, T. (2005). Trophy Hunting of Black Rhino *Diceros bicornis*: Proposals to Ensure Its Future Sustainability. *Journal of International Wildlife Law & Policy*, 8(1), 1–11. <https://doi.org/10.1080/13880290590913705>
- Levitsky, S., & Murillo, M. V. (2009). Variation in Institutional Strength. *Annual Review of Political Science*, 12(1), 115–133.  
<https://doi.org/10.1146/annurev.polisci.11.091106.121756>
- Lindsey, P., Allan, J., Brehony, P., Dickman, A., Robson, A., Begg, C., Bhammar, H., Blanken, L., Breuer, T., Fitzgerald, K., Flyman, M., Gandiwa, P., Giva, N., Kaelo, D., Nampindo, S., Nyambe, N., Steiner, K., Parker, A., Roe, D., ... Tyrrell, P. (2020). Conserving Africa's wildlife and wildlands through the COVID-19 crisis and beyond. *Nature Ecology & Evolution*, 1–11. <https://doi.org/10.1038/s41559-020-1275-6>
- Linklater, W. L., & Shrader, A. M. (2017). Rhino Management Challenges: Spatial and Social Ecology for Habitat and Population Management. In J. P. G. M. Cromsigt, S. Archibald, & N. Owen-Smith (Eds.), *Conserving Africa's Mega-Diversity in the Anthropocene: The Hluhluwe-iMfolozi Park Story* (pp. 265–285). Cambridge University Press.  
<https://doi.org/10.1017/9781139382793>
- Liu, S., Westbury, M. V., Dussex, N., Mitchell, K. J., Sinding, M.-H. S., Heintzman, P. D., Duchêne, D. A., Kapp, J. D., von Seth, J., Heiniger, H., Sánchez-Barreiro, F.,

- Margaryan, A., André-Olsen, R., De Cahsan, B., Meng, G., Yang, C., Chen, L., van der Valk, T., Moodley, Y., ... Gilbert, M. T. P. (2021). Ancient and modern genomes unravel the evolutionary history of the rhinoceros family. *Cell*.  
<https://doi.org/10.1016/j.cell.2021.07.032>
- Lueck, D. (2002). The Extermination and Conservation of the American Bison. *The Journal of Legal Studies*, 31(S2), S609–S652. <https://doi.org/10.1086/340410>
- Lueck, D. (2018). The Comparative Institutions Approach to Wildlife Governance. *Texas A&M Law Review*, 6, 147.
- Lueck, D., & Miceli, T. J. (2007). Chapter 3 Property Law. In A. M. Polinsky & S. Shavell (Eds.), *Handbook of Law and Economics* (Vol. 1, pp. 183–257). Elsevier.  
[https://doi.org/10.1016/S1574-0730\(07\)01003-1](https://doi.org/10.1016/S1574-0730(07)01003-1)
- Lueck, D., & Torrens, G. (2020). Property rights and domestication. *Journal of Institutional Economics*, 16(2), 199–215. Cambridge Core.  
<https://doi.org/10.1017/S1744137419000390>
- Lunstrum, E., & Givá, N. (2020). What drives commercial poaching? From poverty to economic inequality. *Biological Conservation*, 245, 108505.  
<https://doi.org/10.1016/j.biocon.2020.108505>
- MacKenzie, J. M. (1997). *The Empire of Nature: Hunting, Conservation and British Imperialism (Studies in Imperialism)*: 7. Manchester University Press.
- Mahajan, S. L., Jagadish, A., Glew, L., Ahmadia, G., Becker, H., Fidler, R. Y., Jeha, L., Mills, M., Cox, C., DeMello, N., Harborne, A. R., Masuda, Y. J., McKinnon, M. C., Painter, M., Wilkie, D., & Mascia, M. B. (2021). A theory-based framework for understanding the establishment, persistence, and diffusion of community-based conservation. *Conservation Science and Practice*, 3(1), e299.  
<https://doi.org/10.1111/csp2.299>
- Mahoney, S. P., Krausman, P., & Weir, J. N. (2015). Challenges for conservation and sustainable use in North America. *International Journal of Environmental Studies*, 72(5), 879–886. <https://doi.org/10.1080/00207233.2015.1073475>
- Martin, E. B. (1979). *The international trade in rhinoceros products*. WWF/ IUCN.  
[http://www.rhinosourcecenter.com/pdf\\_files/128/1283899526.pdf](http://www.rhinosourcecenter.com/pdf_files/128/1283899526.pdf)
- Martin, E. B., & Martin, C. (1983). *Run, Rhino, Run* (First Edition). Chatto & Windus.
- McGinnis, M., & Ostrom, E. (2014). Social-ecological system framework: Initial changes and continuing challenges. *Ecology and Society*, 19(2). <https://doi.org/10.5751/ES-06387-190230>

- McMillan, J. (2016). Market Institutions. In *The New Palgrave Dictionary of Economics* (pp. 1–4). Palgrave Macmillan UK. [https://doi.org/10.1057/978-1-349-95121-5\\_2398-1](https://doi.org/10.1057/978-1-349-95121-5_2398-1)
- McPherson, M., & Nieswiadomy, Ml. (2000). African elephants: The effect of property rights and political stability. *Contemporary Economic Policy*, 18(1), 14–26. <https://doi.org/10.1111/j.1465-7287.2000.tb00002.x>
- McShane, K. (2007). Anthropocentrism vs. Nonanthropocentrism: Why Should We Care? *Environmental Values*, 16(2), 169–185. JSTOR.
- Merrill, T. W., & Smith, H. E. (2001). What Happened to Property in Law and Economics Essay. *Yale Law Journal*, 111(2), 357–398.
- Milliken, T., & Shaw, J. (2012). *The South Africa-Viet Nam Rhino Horn Trade Nexus: A Deadly Combination of Institutional Lapses, Corrupt Wildlife Industry Professionals and Asian Crime Syndicates*. <http://www.traffic.org/species-reports/traffic-species-mammals66.pdf>.
- Miteva, D. A., Pattanayak, S. K., & Ferraro, P. J. (2012). Evaluation of biodiversity policy instruments: What works and what doesn't? *Oxford Review of Economic Policy*, 28(1), 69–92. <https://doi.org/10.1093/oxrep/grs009>
- Murtazashvili, I., & Murtazashvili, J. (2016). The origins of private property rights: States or customary organizations? *Journal of Institutional Economics*, 12(1), 105–128. <https://doi.org/10.1017/S1744137415000065>
- North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press.
- North, D. C. (1991). Institutions. *The Journal of Economic Perspectives*, 5(1), 97–112.
- O'Neill, J. (2017). Pluralism and incommensurability. In C. L. Spash (Ed.), *Routledge Handbook of Ecological Economics: Nature and Society* (1st edition, pp. 227–236). Routledge.
- Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press.
- Ostrom, E. (2007). A diagnostic approach for going beyond panaceas. *Proceedings of the National Academy of Sciences*, 104(39), 15181–15187. <https://doi.org/10.1073/pnas.0702288104>
- Ostrom, E. (2010). Beyond Markets and States: Polycentric Governance of Complex Economic Systems. *The American Economic Review*, 100(3), 641–672. <https://doi.org/10.2307/27871226>

- Pernetta, A. P. (2014). A disappearing drylands icon? White rhinoceros conservation and the need for public–private partnerships. *Biodiversity*, *15*(2–3), 231–233.  
<https://doi.org/10.1080/14888386.2014.931248>
- Peters, B. G. (2019). *Institutional Theory in Political Science, Fourth Edition: The New Institutionalism* (4th edition). Edward Elgar Publishing Ltd.
- Peterson, M. N., & Nelson, M. P. (2017). Why the North American Model of Wildlife Conservation is Problematic for Modern Wildlife Management. *Human Dimensions of Wildlife*, *22*(1), 43–54. <https://doi.org/10.1080/10871209.2016.1234009>
- Pienaar, D. J., Hall-Martin, A. J., & Hitchens, P. M. (1991). Horn growth rates of free-ranging white and black rhinoceros. *Koedoe*, *34*(2), 97–105.
- Platteau, J.-P. (2000). *Institutions, Social Norms and Economic Development*. Routledge.
- Player, I. (2013). *The White Rhino Saga*. Jonathan Ball.
- Redford, K. H., Amato, G., Baillie, J., Beldomenico, P., Bennett, E. L., Clum, N., Cook, R., Fonseca, G., Hedges, S., Launay, F., Lieberman, S., Mace, G. M., Murayama, A., Putnam, A., Robinson, J. G., Rosenbaum, H., Sanderson, E. W., Stuart, S. N., Thomas, P., & Thorbjarnarson, J. (2011). What Does It Mean to Successfully Conserve a (Vertebrate) Species? *BioScience*, *61*(1), 39–48. <https://doi.org/10.1525/bio.2011.61.1.9>
- Ribot, J. C. (2004). *Waiting for Democracy: The Politics of Choice in Natural Resource Decentralization*. World Resources Institute.
- Ribot, J. C. (2007). Representation, Citizenship and the Public Domain in Democratic Decentralization. *Development*, *50*(1), 43–49.  
<https://doi.org/10.1057/palgrave.development.1100335>
- Ribot, J. C., & Peluso, N. L. (2003). A Theory of Access\*. *Rural Sociology*, *68*(2), 153–181.  
<https://doi.org/10.1111/j.1549-0831.2003.tb00133.x>
- Ripple, W. J., Chapron, G., López-Bao, J. V., Durant, S. M., Macdonald, D. W., Lindsey, P. A., Bennett, E. L., Beschta, R. L., Bruskotter, J. T., Campos-Arceiz, A., Corlett, R. T., Darimont, C. T., Dickman, A. J., Dirzo, R., Dublin, H. T., Estes, J. A., Everatt, K. T., Galetti, M., Goswami, V. R., ... Zhang, L. (2017). Conserving the World’s Megafauna and Biodiversity: The Fierce Urgency of Now. *BioScience*, *67*(3), 197–200.  
<https://doi.org/10.1093/biosci/biw168>
- Ripple, W. J., Newsome, T. M., Wolf, C., Dirzo, R., Everatt, K. T., Galetti, M., Hayward, M. W., Kerley, G. I. H., Levi, T., Lindsey, P. A., Macdonald, D. W., Malhi, Y., Painter, L. E., Sandom, C. J., Terborgh, J., & Valkenburgh, B. V. (2015). Collapse of the world’s

- largest herbivores. *Science Advances*, 1(4), e1400103.  
<https://doi.org/10.1126/sciadv.1400103>
- Rose, C. (1985). Possession as the Origin of Property. *University of Chicago Law Review*, 52(1). <https://chicagounbound.uchicago.edu/uclrev/vol52/iss1/2>
- Rubino, E. C., & Pienaar, E. F. (2017). Applying a conceptual framework to rhinoceros conservation on private lands in South Africa. *Endangered Species Research*, 34, 89–102. <https://doi.org/10.3354/esr00844>
- Rubino, E. C., & Pienaar, E. F. (2018). Understanding South African private landowner decisions to manage rhinoceroses. *Human Dimensions of Wildlife*, 23(2), 160–175. <https://doi.org/10.1080/10871209.2018.1402971>
- Sanderson, E. W., Redford, K. H., Weber, B., Aune, K., Baldes, D., Berger, J., Carter, D., Curtin, C., Derr, J., Dobrott, S., Fearn, E., Fleener, C., Forrest, S., Gerlach, C., Gates, C. C., Gross, J. E., Gogan, P., Grassel, S., Hilty, J. A., ... Stephenson, B. (2008). The Ecological Future of the North American Bison: Conceiving Long-Term, Large-Scale Conservation of Wildlife. *Conservation Biology*, 22(2), 252–266. <https://doi.org/10.1111/j.1523-1739.2008.00899.x>
- Schlager, E., & Ostrom, E. (1992). Property-Rights Regimes and Natural Resources: A Conceptual Analysis. *Land Economics*, 68(3), 249–262. JSTOR. <https://doi.org/10.2307/3146375>
- Scott, A. (1955). The Fishery: The Objectives of Sole Ownership. *Journal of Political Economy*, 63(2), 116–124.
- Searle, J. R. (2005). What is an institution? *Journal of Institutional Economics*, 1(1), 1–22. Cambridge Core. <https://doi.org/10.1017/S1744137405000020>
- Shogren, J. F., Tschirhart, J., Anderson, T., Ando, A. W., Beissinger, S. R., Brookshire, D., Jr., G. M. B., Coursey, D., Innes, R., Meyer, S. M., & Polasky, S. (1999). Why Economics Matters for Endangered Species Protection. *Conservation Biology*, 13(6), 1257–1261.
- Sikor, T., He, J., & Lestrelin, G. (2017). Property Rights Regimes and Natural Resources: A Conceptual Analysis Revisited. *World Development*, 93(Supplement C), 337–349. <https://doi.org/10.1016/j.worlddev.2016.12.032>
- Sills, E. O., & Jones, K. (2018). Chapter 9 - Causal inference in environmental conservation: The role of institutions. In P. Dasgupta, S. K. Pattanayak, & V. K. Smith (Eds.), *Handbook of Environmental Economics* (Vol. 4, pp. 395–437). Elsevier. <https://doi.org/10.1016/bs.hesenv.2018.09.001>

- Skonhofs, A. (1999). On the Optimal Exploitation of Terrestrial Animal Species. *Environmental and Resource Economics*, 13(1), 45–57.  
<https://doi.org/10.1023/A:1008261206811>
- Smith, V. L., & Wilson, B. J. (2019). *Humanomics: Moral Sentiments and the Wealth of Nations for the Twenty-First Century*. Cambridge University Press.
- Spash, C. L., & Hache, F. (2021). The Dasgupta Review deconstructed: An exposé of biodiversity economics. *Globalizations*, 0(0), 1–24.  
<https://doi.org/10.1080/14747731.2021.1929007>
- Stolton, S., Redford, K. H., & Dudley, N. (2014). *The Futures of Privately Protected Areas: Developing capacity for a protected planet*. IUCN.
- Swanson, T. M. (1994). The Economics of Extinction Revisited and Revised: A Generalised Framework for the Analysis of the Problems of Endangered Species and Biodiversity Losses. *Oxford Economic Papers*, 46, 800–821.
- Swanson, T. M., & Barbier, E. (1992). *Economics for the Wilds: Wildlife, Diversity, and Development*. Island Press.
- Swanson, T., Mourato, S., Swierzbinski, J., & Kontoleon, A. (2002). Conflicts in conservation: The many values of the black rhinoceros. In D. Pearce, C. Pearce, & C. Palmer (Eds.), *Valuing the environment in developing countries: Case studies* (pp. 169–205). Edward Elgar Publishing.
- ’t Sas-Rolfes, M. (1990). *Privatizing the rhino industry*. Free Market Foundation.  
[http://www.rhinosourcecenter.com/index.php?s=1&act=refs&CODE=ref\\_detail&id=1165243100](http://www.rhinosourcecenter.com/index.php?s=1&act=refs&CODE=ref_detail&id=1165243100)
- ’t Sas-Rolfes, M. (1995). *Rhinos: Conservation, Economics, and Trade-offs*. IEA Environmental Unit. <https://iea.org.uk/publications/research/rhinos-conservation-economics-and-trade-offs>
- ’t Sas-Rolfes, M. (2000). Assessing CITES: Four Case Studies. In J. Hutton & B. Dickson (Eds.), *Endangered Species, Threatened Convention* (pp. 69–87). Earthscan Publications Ltd.
- ’t Sas-Rolfes, M. (2017). African wildlife conservation and the evolution of hunting institutions. *Environmental Research Letters*, 12(11), 115007.
- ’t Sas-Rolfes, M., Emslie, R., Adcock, K., & Knight, M. (2022). Legal hunting for conservation of highly threatened species: The case of African rhinos. *Conservation Letters*, 15(3), e12877. <https://doi.org/10.1111/conl.12877>

- 't Sas-Rolfes, M., & Fitzgerald, T. (2013). Can a Legal Horn Trade Save Rhinos? *PERC Research Paper*, 13–6. [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2288892](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2288892)
- 't Sas-Rolfes, M., & Gooden, J. (2023). *A conflict of visions: Ideas shaping wildlife trade policy toward African megafauna*. Pre-print. <https://doi.org/10.31235/osf.io/bzse5>
- 't Sas-Rolfes, M., & Hiller, C. (2021). *Literature Review: Assessment of the Impact of Trade Restrictions and Other Policies on Wildlife Conservation and Community Wildlife Stewardship in Southern Africa*. USAID. <https://bridgebiointegration.net/mission-projects/vukanow/resources/trade-restrictions-low-res-spreads-final.pdf>
- Taylor, M. S. (2011). Buffalo Hunt: International Trade and the Virtual Extinction of the North American Bison. *American Economic Review*, 101(7), 3162–3195. <https://doi.org/10.1257/aer.101.7.3162>
- Taylor, W. A., Lindsey, P. A., Nicholson, S. K., Relton, C., & Davies-Mostert, H. T. (2020). Jobs, game meat and profits: The benefits of wildlife ranching on marginal lands in South Africa. *Biological Conservation*, 245, 108561. <https://doi.org/10.1016/j.biocon.2020.108561>
- The Oxford Handbook of Value Theory. (2015). In I. Hirose & J. Olson (Eds.), *The Oxford Handbook of Value Theory*. Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780199959303.001.0001>
- Tisdell, C. (2004). Property rights in non-captive wildlife and biodiversity conservation. *International Journal of Global Environmental Issues*, 4(4), 195–208. <https://doi.org/10.1504/IJGENVI.2004.006050>
- Tober, J. (1981). *Who Owns the Wild Life?: Political Economy of Conservation in Nineteenth-century America: 37 (Contributions in Economics & Economic History): The ... Of Conservation in Nineteenth-Century America*. Praeger.
- Underwood, F. M., Burn, R. W., & Milliken, T. (2013). Dissecting the Illegal Ivory Trade: An Analysis of Ivory Seizures Data. *PLOS ONE*, 8(10), e76539. <https://doi.org/10.1371/journal.pone.0076539>
- UNEP. (2019). *Effectiveness of policy interventions relating to the illegal and unsustainable wildlife trade* [Policy Brief]. United Nations Environment Programme. <http://www.unenvironment.org/resources/policy-and-strategy/effectiveness-policy-interventions-relating-illegal-and-unsustainable>
- Van Kooten, G. C. (2008). Protecting the African elephant: A dynamic bioeconomic model of ivory trade. *Biological Conservation*, 141(2008), 2012–2022.
- Vatn, A. (2006). *Institutions and the Environment*. Edward Elgar Publishing.

- Veríssimo, D., MacMillan, D. C., & Smith, R. J. (2011). Toward a systematic approach for identifying conservation flagships. *Conservation Letters*, 4(1), 1–8.  
<https://doi.org/10.1111/j.1755-263X.2010.00151.x>
- Vigne, L., & Martin, E. B. (2018). *Illegal Rhino Horn Trade in Eastern Asia Still Threatens Kruger's Rhinos*. The Aspinall Foundation.  
<https://www.aspinallfoundation.org/media/3936/rhinos-of-kruger-for-online-for-amos-1.pdf>
- Vucetich, J. A., Bruskotter, J. T., & Nelson, M. P. (2015). Evaluating whether nature's intrinsic value is an axiom of or anathema to conservation. *Conservation Biology*, 29(2), 321–332. <https://doi.org/10.1111/cobi.12464>
- Walker, B., Holling, C. S., Carpenter, S., & Kinzig, A. (2004). Resilience, Adaptability and Transformability in Social–ecological Systems. *Ecology and Society*, 9(2).  
<https://doi.org/10.5751/ES-00650-090205>
- Wanyonyi, E. W. (2012). Mobilizing Resources for Wildlife Conservation in Kenya beyond the 21st Century. *The George Wright Forum*, 29(1), 118–125.
- Weiss, U. (2019). The Regressive Effect of Legal Uncertainty. *Journal of Dispute Resolution*, 2019, 149.
- Western, D. (1987). Africa's elephants and rhinos: Flagships in crisis. *Trends in Ecology & Evolution*, 2(11), 343–346. [https://doi.org/10.1016/0169-5347\(87\)90112-1](https://doi.org/10.1016/0169-5347(87)90112-1)
- Western, D., & Vigne, L. (1985). The deteriorating status of African rhinos. *Oryx*, 19(4), 215–220. Cambridge Core. <https://doi.org/10.1017/S0030605300025643>
- Williamson, O. E. (1998). Transaction Cost Economics: How It Works; Where It is Headed. *De Economist*, 146(1), 23–58. <https://doi.org/10.1023/A:1003263908567>
- Williamson, O. E. (2000). The New Institutional Economics: Taking Stock, Looking Ahead. *Journal of Economic Literature*, 38(3), 595–613.
- Wilson, B. J. (2020). *The Property Species: Mine, Yours, and the Human Mind*. Oxford University Press.
- Zimbabwe Parks & Wildlife. (2019). *Status of Rhinos in Zimbabwe* (CoP18 Doc. 83.1 Annex 4). CITES. <https://www.cites.org/sites/default/files/eng/cop/18/doc/E-CoP18-083-01.pdf>
- Zschokke, S., Armbruster, G. F. J., Ursenbacher, S., & Baur, B. (2011). Genetic differences between the two remaining wild populations of the endangered Indian rhinoceros (*Rhinoceros unicornis*). *Biological Conservation*, 144(11), 2702–2709.  
<https://doi.org/10.1016/j.biocon.2011.07.031>

## 8.10 Supplementary information

### S1: Theoretical Framework

#### Institutions

We define institutions as ‘systems of established and embedded social rules that structure social interactions’ (Hodgson, 2006: 18). More than rules alone, institutions are specifically rules that people are motivated to (and actually do) follow (Guala, 2016). Institutions can shape human behaviour via economic incentives (North, 1990).

In recent decades institutional theory has played a resurgent role in social sciences and several different approaches and positions have developed (Peters, 2019; Vatn, 2006). Following Ostrom (1990), we view such variants as largely complementary. Following Vatn (2006), we further accept that individual humans both influence and are influenced by institutions, and that institutions may be viewed as both static (rules in place) and dynamic, given that they can change in response to evolving social norms (Platteau, 2000; Aoki, 2007). Institutions vary in ‘strength’ (i.e., effectiveness), which may be assessed with reference to two dimensions: i) extent of compliance, and ii) durability (Levitsky & Murillo, 2009).

Institutions may be informal (as in customs and established social norms) or formal (as in written laws enforced by the state), and act as constraints on human behaviour (North, 1991; Lauth, 2015). However, the distinction between informal and formal institutions is somewhat ambiguous and the relationship between them may vary from reinforcement to competition (Hodgson, 2006; Lauth, 2015). Furthermore, institutions not only constrain certain human behaviours but also enable others (Hodgson, 2006; Bromley, 2009). Institutions build upon other institutions, with language forming a base institution upon which all others are built (Searle, 2005). They exist within and across prototypical domains of exchange, i.e., social, political, organizational, and economic (Aoki, 2007). Rhino conservation is influenced by institutions across all four of these domains.

#### Property

Across disciplines, a substantial literature examines the nature, purpose, and evolution of property, providing varying interpretations and some confusion regarding the term ‘property rights’ (Hodgson, 2015; Cole & Ostrom, 2012). Nonetheless, there is widespread agreement that property is a universal human custom with moral weight (see Wilson, 2020; Curry et al., 2021). In essence, property is the concept of ‘mine and yours’ in relation to an asset. Various scholars claim that the notion of property—and ownership thereof—emerges from possession (or occupancy), which refers to the *de facto* (physical) control of a resource (Rose, 1985; Hoffmann, 2013; Hare et al. 2016). However, whereas possession describes a relationship between an individual and an asset, property describes a relationship between individuals with respect to an asset (Fabbri et al., 2021). Property entails a social agreement over rights, benefits, and duties (Hodgson, 2009) and property rights may be loosely defined as the rules

governing ownership in a society (Harris et al., 2020) with the implication that a property ‘right’ constitutes a socially recognized claim in respect of an asset.

Scholars note a further distinction between the core intuition of having property in a thing (as formalised by the legal concept of *in rem*) and associated secondary elements, i.e., the typical constituent characteristics of ownership such as secure tenure and beneficial use (Wilson, 2020; Merrill and Smith, 2001). At least eleven such elements (nine benefits and two duties) have been identified in relation to land ownership (Honoré, 1961; Cole & Ostrom, 2012), several of which can be contractually assigned to different parties as separable legal rights, or otherwise simply constrained by law. Economic scholarship has largely focused on these secondary elements of property (Arruñada, 2012), positing a property right paradigm based on divisible ‘bundles’ of use rights and introducing the notion of ‘strength’ of ownership (Alchian & Demsetz, 1973), which aligns with the claim of commons governance scholars that resource ownership ‘comes in shades and degrees’ (Fennell, 2011) and that the ability to benefit (i.e., ‘access’) also matters (Ribot & Peluso, 2003). As with the strength of institutions in general, property ownership strength may be assessed in terms of compliance and durability, and more specifically according to the four variable dimensions of: i) clarity of allocation, ii) security from trespass (or unauthorised use), iii) alienability, and iv) credibility of persistence (Harris et al., 2020).

Whereas legal scholars typically confine their definition of property rights to laws that are recognized and enforced by the state, i.e., as formal institutions (Deakin et al., 2017), others argue for recognition of informal property rights, noting that in some cases emergent and customary forms of property under self-governance compete with or even supplant formal property rights, especially when the state is weak (Barzel, 1989; Murtazashvili & Murtazashvili, 2016). Such debates highlight the vital role of an external enforcer in determining the strength of ownership by influencing the four variable dimensions indicated in the previous paragraph. We propose that ‘strong ownership’ implies an enforceable *in rem* claim with relatively unfettered secondary beneficial rights, and that weakness emerges to the extent that these are compromised.

### **Prices**

Voluntary exchanges of assets typically involve the use of prices as a metric of exchange value. Prices are expressed in terms of money, an institution that one scholar has claimed to be ‘the most universal and most efficient system of mutual trust ever devised’ (Harari, 2011, 180). Money is both an informal and formal institution and may be used for transactions in products for which there is possession but no legally enforceable property rights, such as in the illegal trade of poached or stolen rhino horn. Using money as a medium of exchange and indicative measure of value, the price system can provide both i) information about relative scarcity to diverse actors and ii) economic incentives to guide their action (Hayek, 1945). Market prices, determined through competitive processes between buyers and sellers, are ‘crude but often effective indicators of error or success’ (Hodgson, 2015: 145).

The relationship between market prices and values is a complex and contested topic, with varying views among scholars and a rich philosophical literature on the concept of ‘value’ (e.g., Kellert, 1996; Hirose & Olson, 2015; Brosch & Sander, 2015). Conventional economists assert that market prices may diverge from the true ‘economic value’ of assets, the latter reflecting the preferences of actors as indicated by their willingness to pay for them. Such divergences are typically greater in the presence of asymmetries in information and market power and often associated with mismatches between private and social costs and benefits (so-called ‘externalities’); they can result from weak property institutions and certain types of state intervention (e.g., subsidies). Purely private goods under private property regimes with strong supporting market institutions in competitive markets are the most likely to beget prices that guide human behaviour toward their socially optimal provision.

Selling prices for live rhinos and trophy hunts matter at least because they provide rhino owners with a source of income to finance rhino management and protection.

## **S2: Analytic methods**

We employed two different forms of comparative institutional analysis (Cole, 2013; Lueck, 2018), which sets out to determine how the effect of institutions differs over space or time. Comparisons over space typically are done between distinct jurisdictions or geographies and lend themselves to the application of natural experiments (Dunning, 2012) in which observations of one or more discretely sampled areas act as a treatment and one or more others as a control. Natural experiments have two disadvantages, namely i) that the extent and nature of the treatment (having typically occurred historically) is not always entirely clear, and ii) that it is difficult to remove the effects of potentially confounding variables (Craig et al., 2017).

For comparisons over time, process tracing provides a technique to establish causal inference and test alternative hypotheses, using one or more of the four tests outlined in Table 18, overleaf (also, see Collier, 2011). These techniques, notably hoop tests, were analytically applied to evaluate the performance of varying institutional arrangements for rhino conservation.

**Table 18. Process tracing tests for causal inference**

		SUFFICIENT FOR AFFIRMING CAUSAL INFERENCE	
		No	Yes
NECESSARY FOR AFFIRMING CAUSAL INFERENCE	No	<b>1. Straw-in-the-Wind</b>	<b>3. Smoking-gun</b>
		<b>Pass:</b> Hypothesis is relevant but not confirmed; rival hypothesis is <i>slightly</i> weakened	<b>Pass:</b> Hypothesis is confirmed; rival hypothesis is <i>substantially</i> weakened
	<b>Fail:</b> Hypothesis is not eliminated but slightly weakened; rival hypothesis is <i>slightly</i> strengthened	<b>Fail:</b> Hypothesis is not eliminated but somewhat weakened; rival hypothesis is somewhat strengthened	
	Yes	<b>2. Hoop</b>	<b>4. Doubly Decisive</b>
<b>Pass:</b> Hypothesis is relevant but not confirmed; rival hypothesis is <i>somewhat</i> weakened		<b>Pass:</b> Hypothesis is confirmed; rival hypothesis is <i>eliminated</i>	
		<b>Fail:</b> Hypothesis is eliminated; rival hypothesis is <i>somewhat</i> strengthened	<b>Fail:</b> Hypothesis eliminated but somewhat weakened; rival hypothesis is <i>substantially</i> strengthened

Adapted from Collier (2011)

### **S3: Data**

Data sources and treatments for the tables and figures in the main text are listed below:

#### **Figure 2**

Continental rhino population data from the official IUCN African Rhino Specialist Group and Red List database.

#### **Figure 3**

Rhino poaching data by country from Knight (2020: 23; Table 1)

#### **Table 18**

Population data for 2017 from Emslie et al. (2019: 2; Table 1)

#### **Figure 4**

African rhino numbers by country from Emslie (2020a; 2020b) – see 't Sas-Rolfes et al. (2022) Supplementary Material, for further details.

#### **Figure 5**

South African rhino population and poaching data from IUCN African Rhino Specialist Group. See Table 19, below, for all data sets.

#### **Figure 6**

All data points are drawn from Tables 19 and 20, below.

**Table 19** contains data on South African rhino population and poaching trends. The poaching index is calculated as a percentage x100 of the total of live rhinos at year end plus those lost.

**Table 20** contains price data for southern white rhinos in South Africa. From 1986 onwards, only auction prices are reflected; prior to that, subsidized list prices are shown. Live prices were assembled from the widest range of sources available for each year. In years for which multiple, non-overlapping sources existed, mean prices were used, weighting as appropriate. Full details of this data-set are available from the lead author on request. South African rand (ZAR) prices have been converted using annual USD exchange rates (source: World Bank). USD prices have been deflated using the same rates used by 't Sas-Rolfes et al. (2022) and trophy prices are from the same source.

The trophy premium is calculated as the percentage proportion of the trophy price to the live price minus 100 (to reflect the actual premium).

For live and trophy prices, as well as the adjusted trophy premium, we have used the three-year moving average to filter out noise from random fluctuations and provide a clearer indication of trends.

**Table 19. Rhino poaching numbers**

Year	SA SWR numbers	SA BR numbers	Total numbers poached	Poaching index
1980	2,793	644		
1981	2,898	646		
1982	3,006	652		
1983	3,118	653	4	10.60
1984	3,234	657	5	12.83
1985	3,511	640	4	9.63
1986	3,811	618	6	13.53
1987	4,137	606	4	8.43
1988	4,350	654	4	7.99
1989	4,573	702	4	7.58
1990	4,809	757	8	14.35
1991	5,057	818	5	8.50
1992	5,297	799	15	24.55
1993	6,376	814	13	18.05
1994	6,727	840	26	34.24
1995	7,095	898	10	12.50
1996	7,493	940	2	2.37
1997	7,913	946	4	4.51
1998	8,785	973	8	8.19
1999	9,754	996	10	9.29
2000	10,353	1,041	7	6.14
2001	10,988	1,074	6	4.97
2002	10,760	1,134	23	19.30
2003	10,536	1,187	19	16.18
2004	11,936	1,269	8	6.05
2005	13,521	1,360	15	10.07
2006	14,833	1,576	36	21.89
2007	16,273	1,690	13	7.23
2008	17,074	1,793	83	43.80
2009	17,915	1,863	122	61.31
2010	18,796	1,924	333	158.17
2011	18,953	1,876	448	210.56
2012	19,830	1,818	668	299.34
2013	19,217	1,841	1004	455.08
2014	18,623	1,844	1215	560.37
2015	18,047	1,858	1175	557.40
2016	16,792	1,961	1054	532.14
2017	15,625	2,046	1028	549.76
2018		1,932	769	

**Table 20. Rhino price data**

Year	Live SWR price ZAR	ZAR/USD rate	Live price USD	Deflator	Live USD adjusted	Moving average	Trophy price USD	Moving average	Trophy premium %age	Adjusted moving average
1980	900	0.78	<b>1,156</b>	3.3604	3,883		23,997		618	
1981	1,000	0.88	<b>1,139</b>	3.0507	3,476		20,784		598	
<b>1982</b>	1,100	1.09	<b>1,009</b>	2.8658	2,892	3,417	18,628	21,136	644	520
<b>1983</b>	2,300	1.12	<b>2,054</b>	2.7816	5,713	4,027	17,674	19,029	309	417
<b>1984</b>	3,500	1.48	<b>2,365</b>	2.6586	6,288	4,964	15,101	17,134	240	298
<b>1985</b>	4,300	2.24	<b>1,920</b>	2.5759	4,946	5,649	21,287	18,021	430	227
<b>1986</b>	10,167	3.29	<b>3,093</b>	2.5267	7,815	6,349	21,881	19,423	280	217
<b>1987</b>	14,780	2.70	<b>5,470</b>	2.4338	13,312	8,691	25,207	22,792	189	200
<b>1988</b>	34,714	2.27	<b>15,272</b>	2.3392	35,725	18,951	40,936	29,341	115	95
<b>1989</b>	48,732	2.62	<b>18,600</b>	2.2290	41,459	30,165	81,734	49,292	197	67
<b>1990</b>	48,524	2.59	<b>18,735</b>	2.1150	39,625	38,936	65,794	62,821	166	59
<b>1991</b>	44,188	2.76	<b>16,010</b>	2.0307	32,511	37,865	61,936	69,821	191	85
<b>1992</b>	29,230	2.85	<b>10,256</b>	1.9702	20,207	30,781	56,152	61,294	278	111
<b>1993</b>	28,350	3.27	<b>8,670</b>	1.9133	16,588	23,102	43,049	53,712	260	143
<b>1994</b>	32,770	3.55	<b>9,231</b>	1.8648	17,214	18,003	29,195	42,799	170	136
<b>1995</b>	40,667	3.63	<b>11,203</b>	1.8137	20,319	18,040	47,361	39,868	233	121
<b>1996</b>	44,491	4.30	<b>10,347</b>	1.7653	18,266	18,599	46,098	40,885	252	118
<b>1997</b>	69,333	4.61	<b>15,040</b>	1.7240	25,928	21,504	45,018	46,159	174	120
<b>1998</b>	98,813	5.53	<b>17,869</b>	1.6974	30,332	24,842	42,436	44,517	140	89
<b>1999</b>	127,130	6.12	<b>20,773</b>	1.6592	34,466	30,242	41,479	42,978	120	45
<b>2000</b>	176,801	6.95	<b>25,439</b>	1.6068	40,875	35,224	48,612	44,176	119	26
<b>2001</b>	169,300	8.63	<b>19,618</b>	1.5613	30,630	35,324	48,401	46,164	158	32
<b>2002</b>	192,383	10.52	<b>18,287</b>	1.5395	28,153	33,220	46,209	47,741	164	47
<b>2003</b>	148,133	7.56	<b>19,594</b>	1.5045	29,480	29,421	43,677	46,096	148	57
<b>2004</b>	135,912	4.17	<b>32,582</b>	1.4646	47,720	35,118	38,922	42,936	82	31
<b>2005</b>	107,555	6.22	<b>17,284</b>	1.4176	24,501	33,900	41,542	41,380	170	33
<b>2006</b>	133,965	5.71	<b>23,479</b>	1.3734	32,247	34,823	40,908	40,457	127	26
<b>2007</b>	228,108	6.28	<b>36,298</b>	1.3347	48,446	35,065	42,710	41,720	88	28
<b>2008</b>	270,713	7.35	<b>36,828</b>	1.2854	47,340	42,678	70,029	51,216	148	21
<b>2009</b>	221,591	7.39	<b>29,982</b>	1.2904	38,690	44,826	56,399	56,379	146	27
<b>2010</b>	227,189	6.13	<b>37,036</b>	1.2682	46,969	44,333	75,710	67,379	161	52
<b>2011</b>	224,175	7.05	<b>31,776</b>	1.2305	39,100	41,586	104,431	78,847	267	91
<b>2012</b>	242,589	8.86	<b>27,391</b>	1.2058	33,029	39,699	102,496	94,212	310	146
<b>2013</b>	364,316	10.85	<b>33,577</b>	1.1885	39,906	37,345	86,464	97,797	217	165
<b>2014</b>	333,698	9.33	<b>35,771</b>	1.1696	41,838	38,258	92,464	93,808	221	149
<b>2015</b>	490,937	12.76	<b>38,478</b>	1.1675	44,925	42,223	92,928	90,619	207	115
<b>2016</b>	403,450	14.71	<b>27,428</b>	1.1533	31,633	39,465	85,364	90,252	270	133
<b>2017</b>	414,697	13.32	<b>31,125</b>	1.1297	35,161	37,239	93,985	90,759	267	148
<b>2018</b>	346,310	13.23	<b>26,168</b>	1.1015	28,824	31,873	88,208	89,186	306	181

## References specific to supplementary material

- Aoki, M. (2007). Endogenizing institutions and institutional changes. *Journal of Institutional Economics*, 3(1), 1–31. Cambridge Core. <https://doi.org/10.1017/S1744137406000531>
- Barzel, Y. (1989). *Economic Analysis of Property Rights*. Cambridge University Press.
- Bromley, D. W. (2009). *Sufficient Reason: Volitional Pragmatism and the Meaning of Economic Institutions*. Princeton University Press.
- Brosch, T., & Sander, D. (Eds.). (2015). *Handbook of Value: Perspectives from Economics, Neuroscience, Philosophy, Psychology and Sociology*. Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780198716600.001.0001>
- Cole, D. H. (2013). The Varieties of Comparative Institutional Analysis Symposium Issue: 30 Years of Comparative Institutional Analysis: A Celebration of Neil Komesar. *Wisconsin Law Review*, 2013(2), 383–410.
- Craig, P., Katikireddi, S. V., Leyland, A., & Popham, F. (2017). Natural Experiments: An Overview of Methods, Approaches, and Contributions to Public Health Intervention Research. *Annual Review of Public Health*, 38(1), 39–56. <https://doi.org/10.1146/annurev-publhealth-031816-044327>
- Collier, D. (2011). Understanding Process Tracing. *PS: Political Science & Politics*, 44(4), 823–830. <https://doi.org/10.1017/S1049096511001429>
- Curry, O. S., Alfano, M., Brandt, M. J., & Pelican, C. (2021). Moral Molecules: Morality as a Combinatorial System. *Review of Philosophy and Psychology*. <https://doi.org/10.1007/s13164-021-00540-x>
- Deakin, S., Gindis, D., Hodgson, G. M., Huang, K., & Pistor, K. (2017). Legal institutionalism: Capitalism and the constitutive role of law. *Journal of Comparative Economics*, 45(1), 188–200. <https://doi.org/10.1016/j.jce.2016.04.005>
- Dunning, T. (2012). *Natural Experiments in the Social Sciences: A Design-Based Approach* (New edition). Cambridge University Press.
- Guala, F. (2016). *Understanding Institutions: The Science and Philosophy of Living Together* (1st edition). Princeton University Press.
- Harari, Y. N. (2014). *Sapiens: A Brief History of Humankind*. Harvill Secker.
- Hare, D., Reeve, H. K., & Blossey, B. (2016). Evolutionary routes to stable ownership. *Journal of Evolutionary Biology*, 29(6), 1178–1188. <https://doi.org/10.1111/jeb.12859>

- Hoffmann, S. (2013). Property, possession and natural resource management: Towards a conceptual clarification. *Journal of Institutional Economics*, 9(1), 39–60.  
<https://doi.org/10.1017/S1744137412000264>
- Honoré, A. M. (1961), ‘Ownership’, in Guest, G. Anthony (ed.), *Oxford Essays in Jurisprudence*, Oxford: Oxford University Press, pp. 107–147. Reprinted in the *Journal of Institutional Economics*, 9(2): 227–255.
- Kellert, S. R. (1996). *The Value of Life: Biological Diversity and Human Society*. Island Press.
- Lueck, D. (2018). The Comparative Institutions Approach to Wildlife Governance. *Texas A&M Law Review*, 6, 147.
- Merrill, T. W., & Smith, H. E. (2001). What Happened to Property in Law and Economics Essay. *Yale Law Journal*, 111(2), 357–398.
- Murtazashvili, I., & Murtazashvili, J. (2016). The origins of private property rights: States or customary organizations? *Journal of Institutional Economics*, 12(1), 105–128.  
<https://doi.org/10.1017/S1744137415000065>
- North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press.
- Peters, B. G. (2019). *Institutional Theory in Political Science, Fourth Edition: The New Institutionalism* (4th edition). Edward Elgar Publishing Ltd.
- Ribot, J. C., & Peluso, N. L. (2003). A Theory of Access\*. *Rural Sociology*, 68(2), 153–181.  
<https://doi.org/10.1111/j.1549-0831.2003.tb00133.x>
- Rose, C. (1985). Possession as the Origin of Property. *University of Chicago Law Review*, 52(1). <https://chicagounbound.uchicago.edu/uclrev/vol52/iss1/2>
- Searle, J. R. (2005). What is an institution? *Journal of Institutional Economics*, 1(1), 1–22. Cambridge Core. <https://doi.org/10.1017/S1744137405000020>
- The Oxford Handbook of Value Theory. (2015). In I. Hirose & J. Olson (Eds.), *The Oxford Handbook of Value Theory*. Oxford University Press.  
<https://doi.org/10.1093/oxfordhb/9780199959303.001.0001>
- Wilson, B. J. (2020). *The Property Species: Mine, Yours, and the Human Mind*. Oxford University Press.

## 9 Discussion

The overall research question for this thesis asked how interacting institutions shape wildlife trade policy and conservation outcomes for African megafauna. By applying and fusing various analytical frameworks within the broad interdisciplinary remit of institutional theory to case study data, I have shed light on this question. From the first study we learn that selective combinations of cognitive and normative ideational elements fuse to form influential overarching policy narratives in relation to wildlife trade. These stories, complete with victims, villains, heroes, and morals, frame the perceived problem to be solved in different ways. One of the narratives (Global Control) is congruent with CITES, the other two (Decentralized Conservation and Animal Protection) are in partial conflict with its centralized regulatory logic, as well as each other.

The second study demonstrates that the CITES rules both entrench the hegemonic interests of powerful state and non-state actors and tend to establish a binary logic toward wildlife trade restrictions, either favouring or opposing them, with limited flexibility. The structural mechanism of the CITES regime is further vulnerable to being influenced in the direction of trade prohibition by supporters of the Animal Protection narrative, who oppose the physical commodification of wildlife and invoke arguments that legal trade facilitates illegal trade and that banning all trade is therefore an appropriate precautionary approach. Well-resourced international coalitions supporting such views may speculatively attack niche actors with trade interests at smaller scales, which are typically less resourced and networked, and naïve to political lobbying. Whereas the coalitions can lobby multiple state actors for support to win votes, the niche actors must rely on their own governments to defend them, while also addressing domestic factions that might oppose them.

Seen in a broader context, the second study results demonstrate that CITES does not deal effectively with heterogeneity—of either actors or situational factors—and its largely blanket approaches to trade policy have resulted in free-rider problems and mission creep, allowing animal welfare and remote domestic concerns to spill over onto what many believe should represent an inclusive species conservation treaty that enables the principle of sustainable use. Instead, experience relating to the case study species suggest that sustainable use is shunned in favour of an unintended trade-restrictive interpretation of the precautionary principle.

The third study indirectly contemplates the significance of the increasingly restrictive trading regime by examining a robust historical data set on African rhino conservation performance, spanning some five decades (since the inception of CITES) across multiple jurisdictions with varying institutional arrangements, some dominated by state actors and others providing more heterogeneity. Institutional economic theory and property attribute frameworks suggest that that jurisdictions with greater domestic institutional diversity, including meaningful participation of non-state actors, will perform better at rhino conservation, and the results confirm this. The results further show limited evidence that trade restrictions have benefitted rhino conservation overall (and only at great added economic cost) but that the thoughtful devolution of beneficial rights has demonstrated starkly contrasting positive results.

Viewed against the results of the first and second studies, the results of the third study demonstrate the clear tensions between competing ideologies, framed by the formal institutions of a hegemonic international regime, and potentially discordant outcomes at local scales. Seen together, the results hint at a theory of how international wildlife trade policy and

governance has evolved. In the next section I sketch out the elements of a nascent theory, but first I relate my overall findings to some broader contextual observations.

Whereas cognitive and normative ideas, especially framed within policy narratives, are clearly powerful and influential, they ought to be seen in the context in which they originate. There are striking parallels between Schrad's (2010) analysis of the spread of ideas relating to the alcohol prohibition drive and those relating to wildlife trade regulation: both originated in the context of Western, and especially US, hegemony; accordingly, such ideas are likely to reflect those cultural values more than others. The Animal Protection movement that opposes physical wildlife commodification has clear roots in Western, wealthy, and urbanized society. As Epstein (2004: 148) has remarked in relation to the notion of animal rights 'those altruistic sentiments are the indulgence of the rich and secure,' a view that aligns with the recently popularized notion of 'luxury beliefs' (Henderson, 2024), which are seen as ideas that confer status on the privileged at little cost to them while inflicting costs on the less privileged.

Similarly, the more conventional regulatory approach to wildlife trade, sceptical of 'market hunting' and embedded in the public protectionist paradigm that informs both the US Endangered Species Act and CITES, also has its roots in US environmental philosophy, despite internal tensions between preservationist and utilitarian factions. The continuing role of Western hegemony is also reflected in the results of the first two studies, which illustrate how an ethically contentious but traditional practice such as recreational hunting for trophies has managed to prevail under severe pressure from animal protectionists, whereas the trade of accumulated surplus stockpiled products such as elephant ivory, rhino horn, and (recently) lion skeletons has not, possibly because the latter are mostly sought by non-Western consumers with less political power.

The hegemonic concern, which plays out at a global geopolitical scale, has been repeatedly highlighted by scholars of political ecology (e.g., Duffy, 2013; 2022; Massé & Margulies, 2020; Massé et al., 2020), especially given more recent trends for wildlife trade policy enforcement to precipitate violent conflict in developing countries. Conservationists have afforded this issue relatively less attention, although an awareness of the importance of engaging local communities and other relevant and previously excluded stakeholders, previously highlighted in the 1990s, is starting to re-emerge (see Challender & MacMillan, 2014; Biggs et al., 2017; Cooney et al., 2021).

To summarize, the results of the first two studies reflect global institutional realities but the results of the third reflect the more tangible local realities of what institutional elements might be needed at those local scales to ensure the successful conservation of African megafauna. The current global wildlife trade policy and governance regime is characterised by various forms of institutional frictions and mismatch (both horizontal and vertical), calling for more attention to be focused on institutional reform to better accommodate heterogeneity in the system and to ameliorate points of conflict that drain resources and potentially lead to perverse effects. A healthy future for Africa's megafauna populations surviving in functional open ecological systems may depend on this.

## **9.1 Toward a theory of global wildlife trade policy evolution**

Synthesizing the insights from my research points toward a nascent theory of the evolution of wildlife trade policy and governance. This theory builds on an earlier study that evaluated developments in South African lion and rhino hunting policy through a lens of evolutionary

institutional economics ('t Sas-Rolfes, 2017) but embraces a broader suite of institutional approaches. It views wildlife trade policy within the context of a complex-adaptive social-ecological system and therefore comprises an open systems approach and combines elements of both the IAD framework and SES framework, as proposed by Cole et al. (2019). At the core of the system is the global wildlife trade regime, shaped by CITES, which frames the problem and solution, albeit somewhat ambiguously. Inputs to the system include human action and both biophysical and institutional factors, which the system modulates to generate potentially modified outputs of the same factors, which then feed back into the system.

Because CITES is somewhat episodic in nature, the system acts in pulses. Critically, the feedback paths may be self-reinforcing in certain situations, creating path dependence, which may or may not result in positive outcomes for conservation. Scholars have identified negative feedback processes, such as the anthropogenic Allee effect (Courchamp et al., 2006), and the potential for reinforcing 'lock-in' that requires 'severe incentives' to escape (Khalil, 2013). This theory is consistent with a historical institutionalist perspective and includes ideas, influenced by circumstance and hegemony, as critical actor inputs. Analysing the role of the CITES Convention in this way provides new insight into the overall functioning of the wildlife trade regime and points toward potential new fruitful avenues of inquiry.

## **9.2 Contribution, limitations, and future research avenues**

My contribution to the literature extended beyond the three applications of institutional theory, via novel combinations of analytical frameworks, to the issue of wildlife trade policy and governance. My parallel research contributions in search of evidence added to several disciplinary literatures, as indicated in Appendix 2 of this thesis document. However, my research has certain limitations. The case study species, although very dominant on trade

policy agendas, are not necessarily representative of all wildlife trade. Whereas activist coalitions were also seen to promote trade-restrictive approaches to various other charismatic African species during the study period (e.g., pangolins, giraffes, and hippos) my findings may not be generalisable to a vast number of smaller and less charismatic animal and plant species, nor to marine species, and certain aspects should therefore be treated with caution. Similarly, South Africa represents a somewhat unique jurisdiction, albeit with internal tensions that appear to mirror global ones, but the findings within one particular institutional environment cannot necessarily be extrapolated to others. As a final limitation, my unique personal positionality within this issue may have led to findings that may not be replicable, although I tried to mitigate this as far as possible through the collaborative triangulation methods I described.

In addition to potential further research avenues identified by each individual study, I note two general issues that I believe warrant attention. The first, already alluded to by Challender et al. (2022) is the misspecification of ‘trade’ as a phenomenon in conservation science. I encountered many instances in which ‘trade’ was assigned responsibility for an outcome, whereas it only acted as an intermediating variable. This problem has infiltrated CITES itself and leads to the second fruitful area of future research, namely the property right implications of applying the precautionary principle in a way that views trade as an unambiguous threat. Shifting the burden of proof in the CITES context has implications for rights, both sovereign and local, and this remains an under-researched phenomenon that connects with the hegemonic observations of the first two studies and the role of decentralization-driven incentives for conservation in my final study. The concept of wildlife as ‘property’ remains under-researched.

## 10 Conclusion

My research set out to examine the causes and consequences of international wildlife trade policy conflict in relation to African megafauna, grounded in the conviction that if these dynamic processes could be better understood, they could be addressed and at least somewhat resolved, for the benefit of conserving the species concerned. My literature review of the evolution of wildlife trade policy and global conservation governance revealed varying perspectives on the effectiveness of the current regime. It also revealed varying interpretations of effectiveness and what constituted acceptable evidence to conduct such evaluations. These varying perspectives informed my initially flexible and philosophically pragmatist approach to the research, which evolved as I engaged in participatory processes and adjusted my engagement iteratively and reflexively.

My first study led me to examine the role of ideational influences in shaping policy, inspired by previous work on the international prohibitionist movement against alcohol (Schrad, 2010). Through this work I came to understand the landscape of ideas, from cognitive to normative, but in observing and recording policy debates and dialogues, I noticed how these two types of ideas would frequently be conflated through narrative elements that revealed assumptions about who constituted good actors and bad actors, and what actions were considered acceptable. I identified three overarching and somewhat conflicting policy narratives, one ‘top-down’ (Global Control), one ‘bottom-up’ (Decentralized Conservation), and a third Animal Protection narrative that foregrounded the interests of individual wild animals and protecting them from harm. I also observed that the actors who identified most closely with the Animal Protection narrative were more likely to ally themselves with those who supported Global Control, strategically employing this approach to achieve global policy change.

My next study further examined the data and evidence accumulated during my five years of participatory research, this time focusing on actor strategies, and using techniques of institutional diagnostics, including dynamic analysis, and guided by the IAD framework to gain a better understanding of how the rule structure of CITES shapes and frames wildlife policy discourse. My analysis revealed that the CITES regime is vulnerable to being gamed by special interest groups and that actors opposed to trade can speculatively and selectively attack niche trading interests with the aim of suppressing them through restrictive policy, with the ultimate aim of possibly listing all species on CITES Appendix I. Indeed, there have suggestions that all species should be placed on Appendix I with the burden of proof placed on those who wish to trade (see Couzens, 2013a; 2013b). However, the empirical evidence suggests that without widespread social legitimacy, such an approach could be potentially disastrous, stoking resistance from disenfranchised local actors, leading to further conflict and illegal activity. The perverse effects of trade restrictions appear too easily justified through application of the precautionary principle in the face of uncertainty about the workings of complex systems.

My third study took advantage of access to a comprehensive time series data set relating to rhino conservation and enabled me to compare the outcomes of two different policy approaches aligned with the previously identified narratives. Global Control is aligned with centralization, which includes trade restrictions, in contrast with decentralization. Conducting a series of analyses using natural experiments and process tracing methods to test hypotheses, I reached the conclusion that countries that employed some measure of decentralization generated greater conservation success than those that did not. Non-state actors have played a critical role in conserving rhinos. This result suggests that further centralization measures should be approached with caution, but my analysis also suggested that the likely optimal

extent of decentralization will vary between species (as it appears to between black and white rhino), depending on certain characteristics and value profiles associated with more public (as opposed to private) property rights.

This research suggests that the best way forward is to improve our understanding of these complex systems, on a case-by-case basis. Trade restrictions are a blunt tool and the CITES dual Appendix system appears to stoke and entrench a form of polarizing tribal conflict. A key recommendation would be to investigate whether this system could be improved to move Parties closer toward compromise and collaboration.

This journey has taken me eight and a half years, during which I gained an enormous amount of cross-disciplinary academic insight and practical knowledge and experience of policy processes. It has been enlightening and exhilarating. It has also taught me to be more reflexive and open-minded and to consider the widely varying perspectives of others and understand what framing influences have led them there. My journey is not over yet, and I look forward to the next chapter.

## Bibliography

- Abensperg-Traun, M. (2009). CITES, sustainable use of wild species and incentive-driven conservation in developing countries, with an emphasis on southern Africa. *Biological Conservation*, 142(5), 948–963. <https://doi.org/10.1016/j.biocon.2008.12.034>
- Abercrombie, N. (2020). *Commodification and Its Discontents* (1st edition). Polity.
- Acemoglu, D., & Johnson, S. (2005). Unbundling Institutions. *Journal of Political Economy*, 113(5), 949–995.
- Adam, R. (2014). *Elephant Treaties*. University Press of New England.
- Adams, W. M. (2004). *Against Extinction: The Story of Conservation*. Earthscan.
- Adams, W. M., & Hutton, J. (2007). People, parks and poverty: Political ecology and biodiversity conservation. *Conservation and Society*, 5(2), 147–183.
- Agrawal, A., Brandhorst, S., Jain, M., Liao, C., Pradhan, N., & Solomon, D. (2022). From environmental governance to governance for sustainability. *One Earth*, 5(6), 615–621. <https://doi.org/10.1016/j.oneear.2022.05.014>
- Agrawal, A., & Ribot, J. (1999). Accountability in Decentralization: A Framework with South Asian and West African Cases. *The Journal of Developing Areas*, 33(4), 473–502. JSTOR.
- Alchian, A. A., & Demsetz, H. (1973). The Property Right Paradigm. *The Journal of Economic History*, 33(1), 16–27. JSTOR.
- Aldred, J. (2006). Incommensurability and Monetary Valuation. *Land Economics*, 82(2), 141–161. <https://doi.org/10.3368/le.82.2.141>
- Aldrich, J. H. (2014). *Interdisciplinarity: Its Role In A Discipline-based Academy*. Oxford University Press.
- Aligica, P. D. (2013). *Institutional Diversity and Political Economy: The Ostroms and Beyond* (1st edition). Oxford University Press.

- Aligica, P. D., & Boettke, P. J. (2009). *Challenging Institutional Analysis and Development: The Bloomington School* (1st edition). Routledge.
- Allen, C. M., & Edwards, S. R. (1995). The sustainable-use debate: Observations from IUCN. *Oryx*, 29(2), 92–98. <https://doi.org/10.1017/S0030605300020950>
- Amano, T., Székely, T., Sandel, B., Nagy, S., Mundkur, T., Langendoen, T., Blanco, D., Soykan, C. U., & Sutherland, W. J. (2018). Successful conservation of global waterbird populations depends on effective governance. *Nature*, 553(7687), Article 7687. <https://doi.org/10.1038/nature25139>
- Amin, R., Thomas, K., Emslie, R. H., Foose, T. J., & Strien, N. V. (2006). An overview of the conservation status of and threats to rhinoceros species in the wild. *International Zoo Yearbook*, 40(1), 96–117. <https://doi.org/10.1111/j.1748-1090.2006.00096.x>
- Anderies, J., Janssen, M., & Ostrom, E. (2004). A Framework to Analyze the Robustness of Social-ecological Systems from an Institutional Perspective. *Ecology and Society*, 9(1). <https://doi.org/10.5751/ES-00610-090118>
- Anderson, T. L., & Libecap, G. D. (2014). *Environmental Markets: A Property Rights Approach*. Cambridge University Press.
- Ando, A. W., & Langpap, C. (2018). The Economics of Species Conservation. *Annual Review of Resource Economics*, 10(1), 445–467. <https://doi.org/10.1146/annurev-resource-100517-022921>
- Aoki, M. (2007). Endogenizing institutions and institutional changes. *Journal of Institutional Economics*, 3(1), 1–31. Cambridge Core. <https://doi.org/10.1017/S1744137406000531>
- Armitage, D., Loë, R. de, & Plummer, R. (2012). Environmental governance and its implications for conservation practice. *Conservation Letters*, 5(4), 245–255. <https://doi.org/10.1111/j.1755-263X.2012.00238.x>

- Arruñada, B. (2012). Property as an economic concept: Reconciling legal and economic conceptions of property rights in a Coasean framework. *International Review of Economics*, 59(2), 121–144. <https://doi.org/10.1007/s12232-012-0150-4>
- Ayling, J. (2013). What Sustains Wildlife Crime? Rhino Horn Trading and the Resilience of Criminal Networks. *Journal of International Wildlife Law & Policy*, 16(1), 57–80. <https://doi.org/10.1080/13880292.2013.764776>
- Baakman, K. (2011). *Testing Times: The Effectiveness of Five International Biodiversity-Related Conventions*. Wolf Legal Publishers. <https://pure.uvt.nl/ws/portalfiles/portal/1352555/Baakman>
- Bacon, M. (2013). *Pragmatism: An Introduction* (1st edition). Polity.
- Baker, J. E. (1999). A substantive theory of the relative efficiency of environmental treaty compliance strategies: The case of cites. *Journal of International Wildlife Law & Policy*, 2(1), 1–45. <https://doi.org/10.1080/13880299909353918>
- Baker, S. E., Cain, R., Kesteren, F. van, Zommers, Z. A., D’Cruze, N., & Macdonald, D. W. (2013). Rough Trade: Animal Welfare in the Global Wildlife Trade. *BioScience*, 63(12), 928–938. <https://doi.org/10.1525/bio.2013.63.12.6>
- Baldwin, E., Chen, T., & Cole, D. (2019). Institutional analysis for new public governance scholars. *Public Management Review*, 21(6), 890–917. <https://doi.org/10.1080/14719037.2018.1538427>
- Barbier, E. B., Burgess, J. C., Swanson, T. M., & Pearce, D. W. (1990). *Elephants, Economics and Ivory*. Earthscan.
- Barbier, E. B., & Schulz, C.-E. (1997). Wildlife, Biodiversity and Trade. *Environment and Development Economics*, 2(02), 145–172. <https://doi.org/10.1017/S1355770X97000144>
- Barichievy, C., Altwegg, R., Balfour, D., Brett, R., Gordon, C., Henry, D. A. W., Jeffries, G., Khayale, C., Wanyama, H., & Withers, O. (2021). A demographic model to support an

- impact financing mechanism for black rhino metapopulations. *Biological Conservation*, 257, 109073. <https://doi.org/10.1016/j.biocon.2021.109073>
- Barichievy, C., Munro, L., Clinning, G., Whittington-Jones, B., & Masterson, G. (2017). Do armed field-rangers deter rhino poachers? An empirical analysis. *Biological Conservation*, 209(Supplement C), 554–560. <https://doi.org/10.1016/j.biocon.2017.03.017>
- Barrett, S. (2003). *Environment and statecraft: The strategy of environmental treaty-making*. Oxford University Press.
- Barry, A., Born, G., & Weszkalnys, G. (2008). Logics of interdisciplinarity. *Economy and Society*, 37(1), 20–49. <https://doi.org/10.1080/03085140701760841>
- Barzel, Y. (1989). *Economic Analysis of Property Rights*. Cambridge University Press.
- Bauer, H., Chapron, G., Nowell, K., Henschel, P., Funston, P., Hunter, L. T. B., Macdonald, D. W., & Packer, C. (2015). Lion (*Panthera leo*) populations are declining rapidly across Africa, except in intensively managed areas. *Proceedings of the National Academy of Sciences*, 112(48), 14894–14899. <https://doi.org/10.1073/pnas.1500664112>
- Bauer, H., Nowell, K., Sillero-Zubiri, C., & Macdonald, D. W. (2018). Lions in the modern arena of CITES. *Conservation Letters*, 11(5), e12444. <https://doi.org/10.1111/conl.12444>
- Bauer, H., Packer, C., Funston, P. F., Henschel, P., & Nowell, K. (2016). *Panthera leo*. *The IUCN Red List of Threatened Species*. <https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T15951A107265605.en>
- Beach, D., & Pedersen, R. B. (2019). *Process-Tracing Methods: Foundations and Guidelines* (2nd edition). University of Michigan Press.
- Beckert, J., & Dewey, M. (2017). *The Architecture of Illegal Markets: Towards an Economic Sociology of Illegality in the Economy*. Oxford University Press.

- Béland, D. (2009). Ideas, institutions, and policy change. *Journal of European Public Policy*, 16(5), 701–718. <https://doi.org/10.1080/13501760902983382>
- Béland, D. (2019). Narrative stories, institutional rules, and the politics of pension policy in Canada and the United States. *Policy and Society*, 38(3), 356–372. <https://doi.org/10.1080/14494035.2019.1644071>
- Bennett, A., & Checkel, J. T. (Eds.). (2014). *Process Tracing: From Metaphor to Analytic Tool*. Cambridge University Press.
- Bennett, N. J., Roth, R., Klain, S. C., Chan, K., Christie, P., Clark, D. A., Cullman, G., Curran, D., Durbin, T. J., Epstein, G., Greenberg, A., Nelson, M. P., Sandlos, J., Stedman, R., Teel, T. L., Thomas, R., Veríssimo, D., & Wyborn, C. (2017). Conservation social science: Understanding and integrating human dimensions to improve conservation. *Biological Conservation*, 205, 93–108. <https://doi.org/10.1016/j.biocon.2016.10.006>
- Bergstrom, T. (1990). On the Economics of Crime and Confiscation. *The Journal of Economic Perspectives*, 4(3), 171–178.
- Bernauer, T. (1995). The Effect of International Environmental Institutions: How We Might Learn More. *International Organization*, 49(2), 351–377. JSTOR.
- Betsill, M., & Corell, E. (2008). *NGO Diplomacy: The Influence of Nongovernmental Organizations in International Environmental Negotiations* (Illustrated edition). MIT Press.
- Biermann, F., Abbott, K., Andresen, S., Bäckstrand, K., Bernstein, S., Betsill, M. M., Bulkeley, H., Cashore, B., Clapp, J., Folke, C., Gupta, A., Gupta, J., Haas, P. M., Jordan, A., Kanie, N., Kluvánková-Oravská, T., Lebel, L., Liverman, D., Meadowcroft, J., ... Zondervan, R. (2012). Transforming governance and institutions for global sustainability: Key insights from the Earth System Governance Project. *Current Opinion*

in *Environmental Sustainability*, 4(1), 51–60.

<https://doi.org/10.1016/j.cosust.2012.01.014>

Biermann, F., Betsill, M. M., Gupta, J., Kanie, N., Lebel, L., Liverman, D., Schroeder, H., Siebenhüner, B., & Zondervan, R. (2010). Earth system governance: A research framework. *International Environmental Agreements: Politics, Law and Economics*, 10(4), 277–298. <https://doi.org/10.1007/s10784-010-9137-3>

Biggs, D. (2016). Track the impact of Kenya's ivory burn. *Nature*, 534(7606), 179–179. <https://doi.org/10.1038/534179a>

Biggs, D., Cooney, R., Roe, D., Dublin, H. T., Allan, J. R., Challender, D. W. S., & Skinner, D. (2017). Developing a theory of change for a community-based response to illegal wildlife trade. *Conservation Biology*, 31(1), 5–12. <https://doi.org/10.1111/cobi.12796>

Biggs, D., Courchamp, F., Martin, R., & Possingham, H. P. (2013). Legal Trade of Africa's Rhino Horns. *Science*, 339(6123), 1038–1039. <https://doi.org/10.1126/science.1229998>

Biggs, D., Holden, M. H., Braczkowski, A., Cook, C. N., Milner-Gulland, E. J., Phelps, J., Scholes, R. J., Smith, R. J., Underwood, F. M., Adams, V. M., Allan, J., Brink, H., Cooney, R., Gao, Y., Hutton, J., Macdonald-Madden, E., Maron, M., Redford, K. H., Sutherland, W. J., & Possingham, H. P. (2017). Breaking the deadlock on ivory. *Science*, 358(6369), 1378–1381. <https://doi.org/10.1126/science.aan5215>

Boardman, R. (1981). *International Organization and the Conservation of Nature*. Macmillan.

Bogers, M., Biermann, F., Kalfagianni, A., Kim, R. E., Treep, J., & de Vos, M. G. (2022). The impact of the Sustainable Development Goals on a network of 276 international organizations. *Global Environmental Change*, 76, 102567. <https://doi.org/10.1016/j.gloenvcha.2022.102567>

- Bonner, R. (1993). *At The Hand Of Man: Peril and Hope for Africa's Wildlife*. Alfred A. Knopf.
- Borrini-Feyerabend, G., & Hill, R. (2015). Governance for the Conservation of Nature. In G. L. Worboys, M. Lockwood, A. Kothari, S. Feary, & I. Pulsford (Eds.), *Protected Area Governance and Management* (pp. 169–206). ANU Press.  
<https://www.jstor.org/stable/j.ctt1657v5d.14>
- Bowman, M. (2013). A Tale of Two CITES: Divergent Perspectives upon the Effectiveness of the Wildlife Trade Convention. *Review of European, Comparative & International Environmental Law*, 22(3), 228–238. <https://doi.org/10.1111/reel.12049>
- Bradshaw, K. (2018). Animal Property Rights. *University of Colorado Law Review*, 89, 809.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*, 11(4), 589–597.  
<https://doi.org/10.1080/2159676X.2019.1628806>
- Braun, V., Clarke, V., Hayfield, N., & Terry, G. (2019). Thematic Analysis. In P. Liamputtong (Ed.), *Handbook of Research Methods in Health Social Sciences* (pp. 843–860). Springer. [https://doi.org/10.1007/978-981-10-5251-4\\_103](https://doi.org/10.1007/978-981-10-5251-4_103)
- Brennan, A. J., & Kalsi, J. K. (2015). Elephant poaching & ivory trafficking problems in Sub-Saharan Africa: An application of O'Hara's principles of political economy. *Ecological Economics*, 120, 312–337. <https://doi.org/10.1016/j.ecolecon.2015.08.013>
- Brister, E. (2016). Disciplinary capture and epistemological obstacles to interdisciplinary research: Lessons from central African conservation disputes. *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences*, 56, 82–91. <https://doi.org/10.1016/j.shpsc.2015.11.001>

- Brockington, D., & Duffy, R. (2011). *Capitalism and Conservation*. John Wiley & Sons.
- Bromley, D. W. (1989). Property relations and economic development: The other land reform. *World Development*, 17(6), 867–877. [https://doi.org/10.1016/0305-750X\(89\)90008-9](https://doi.org/10.1016/0305-750X(89)90008-9)
- Bromley, D. W. (2009). *Sufficient Reason: Volitional Pragmatism and the Meaning of Economic Institutions*. Princeton University Press.
- Brosch, T., & Sander, D. (Eds.). (2015). *Handbook of Value: Perspectives from Economics, Neuroscience, Philosophy, Psychology and Sociology*. Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780198716600.001.0001>
- Brown, G., & Layton, D. F. (2001). A market solution for preserving biodiversity: The black rhino. In J. F. Shogren & J. Tschirhart (Eds.), *Protecting Endangered Species in the United States Biological Needs, Political Realities, Economic Choices*. Cambridge: Cambridge University Press. [http://books.google.co.uk/books?hl=en&lr=&id=yplhM5Dqh10C&oi=fnd&pg=PA32&dq=brown+layton+rhino&ots=MeojVkrJRX&sig=y\\_je2nrXC3NfeS65bvbnlseegHk](http://books.google.co.uk/books?hl=en&lr=&id=yplhM5Dqh10C&oi=fnd&pg=PA32&dq=brown+layton+rhino&ots=MeojVkrJRX&sig=y_je2nrXC3NfeS65bvbnlseegHk)
- Bryant, J. M. (2004). An Evolutionary Social Science? A Skeptic's Brief, Theoretical and Substantive. *Philosophy of the Social Sciences*, 34(4), 451–492. <https://doi.org/10.1177/0048393104269196>
- Bryman, A. (2016). *Social Research Methods* (5th edition). OUP Oxford.
- Bulte, E. H., & van Kooten, G. C. (1996). A note on ivory trade and elephant conservation. *Environment and Development Economics*, 1(04), 433–443. <https://doi.org/10.1017/S1355770X00000796>
- Burch, S., Gupta, A., Inoue, C. Y. A., Kalfagianni, A., Persson, Å., Gerlak, A. K., Ishii, A., Patterson, J., Pickering, J., Scobie, M., Van der Heijden, J., Vervoort, J., Adler, C., Bloomfield, M., Djalante, R., Dryzek, J., Galaz, V., Gordon, C., Harmon, R., ...

- Zondervan, R. (2019). New directions in earth system governance research. *Earth System Governance*, 1, 100006. <https://doi.org/10.1016/j.esg.2019.100006>
- Busetto, L., Wick, W., & Gumbinger, C. (2020). How to use and assess qualitative research methods. *Neurological Research and Practice*, 2(1), 14. <https://doi.org/10.1186/s42466-020-00059-z>
- Callicott, J. B. (1990). Whither Conservation Ethics? *Conservation Biology*, 4(1), 15–20. <https://doi.org/10.1111/j.1523-1739.1990.tb00261.x>
- Campbell, J. L. (1998). Institutional analysis and the role of ideas in political economy. *Theory and Society*, 27(3), 377–409. <https://doi.org/10.1023/A:1006871114987>
- Campbell, J. L. (2004). *Institutional Change and Globalization*. Princeton University Press.
- Capra, F., & Luisi, P. L. (2016). *The Systems View of Life: A Unifying Vision* (Reprint edition). Cambridge University Press.
- Carey, J. E. (1999). Improving the Efficacy of Cities by Providing the Proper Incentives to Protect Endangered Species Notes. *Washington University Law Quarterly*, 77(4), 1291–1322.
- Carstensen, M. B. (2015). Conceptualising Ideational Novelty: A Relational Approach: Conceptualising Ideational Novelty. *The British Journal of Politics & International Relations*, 17(2), 284–297. <https://doi.org/10.1111/1467-856X.12030>
- Carstensen, M. B., & Schmidt, V. A. (2016). Power through, over and in ideas: Conceptualizing ideational power in discursive institutionalism. *Journal of European Public Policy*, 23(3), 318–337. <https://doi.org/10.1080/13501763.2015.1115534>
- Cartwright, N., & Hardie, J. (2012). *Evidence-Based Policy: A Practical Guide to Doing It Better*. Oxford University Press.

- Challender, D., 't Sas-Rolfes, M., Broad, S., & Milner-Gulland, E. J. (n.d.). *A theory of change to improve conservation outcomes through CITES*.  
[osf.io/preprints/socarxiv/gjs38](https://osf.io/preprints/socarxiv/gjs38)
- Challender, D. W. S., Brockington, D., Hinsley, A., Hoffmann, M., Kolby, J. E., Massé, F., Natusch, D. J. D., Oldfield, T. E. E., Outhwaite, W., 't Sas-Rolfes, M., & Milner-Gulland, E. j. (2022). Mischaracterizing wildlife trade and its impacts may mislead policy processes. *Conservation Letters*, *15*(1), e12832.  
<https://doi.org/10.1111/conl.12832>
- Challender, D. W. S., Harrop, S. R., & MacMillan, D. C. (2015). Towards informed and multi-faceted wildlife trade interventions. *Global Ecology and Conservation*, *3*, 129–148. <https://doi.org/10.1016/j.gecco.2014.11.010>
- Challender, D. W. S., & MacMillan, D. C. (2014). Poaching is more than an Enforcement Problem. *Conservation Letters*, *7*(5), 484–494. <https://doi.org/10.1111/conl.12082>
- Challender, D. W. S., & MacMillan, D. C. (2019). Investigating the Influence of Non-state Actors on Amendments to the CITES Appendices. *Journal of International Wildlife Law & Policy*, *22*(2), 90–114. <https://doi.org/10.1080/13880292.2019.1638549>
- Chambers, W. B. (2008). *Interlinkages and the Effectiveness of Multilateral Environmental Agreements*. United Nations University Press.
- Chanyandura, A., Muposhi, V. K., Gandiwa, E., & Muboko, N. (2021). An analysis of threats, strategies, and opportunities for African rhinoceros conservation. *Ecology and Evolution*, *11*(11), 5892–5910. <https://doi.org/10.1002/ece3.7536>
- Chapman, L. A., & White, P. C. L. (2020a). Stakeholder perspectives on the value and challenges of private rhinoceros ownership in South Africa. *Human Dimensions of Wildlife*, *25*(2), 187–197. <https://doi.org/10.1080/10871209.2020.1697838>

- Chapman, L. A., & White, P. C. L. (2020b). The future of private rhino ownership in South Africa. *Wildlife Research*, 47(6), 441–447. <https://doi.org/10.1071/WR20013>
- Charmaz, K. (2013). *Constructing Grounded Theory* (Second edition). SAGE Publications Ltd.
- Charnovitz, S. (1994). Encouraging Environmental Cooperation Through the Pelly Amendment. *The Journal of Environment & Development*, 3(1), 3–28. <https://doi.org/10.1177/107049659400300102>
- Chen, F., & 't Sas-Rolfes, M. (2021). Theoretical analysis of a simple permit system for selling synthetic wildlife goods. *Ecological Economics*, 180, 106873. <https://doi.org/10.1016/j.ecolecon.2020.106873>
- Cheung, H., Mazerolle, L., Possingham, H. P., & Biggs, D. (2021). Rhino horn use by consumers of traditional Chinese medicine in China. *Conservation Science and Practice*, 3(5), e365. <https://doi.org/10.1111/csp2.365>
- Child, B. (2012). The sustainable use approach could save South Africa's rhinos. *South African Journal of Science*, 108(7–8), 21–25.
- Child, B., Musengezi, J., Parent, G. D., & Child, G. F. T. (2012). The economics and institutional economics of wildlife on private land in Africa. *Pastoralism: Research, Policy and Practice*, 2(1), 18. <https://doi.org/10.1186/2041-7136-2-18>
- Child, M. F., Peel, M. J. S., Smit, I. P. J., & Sutherland, W. J. (2013). Quantifying the effects of diverse private protected area management systems on ecosystem properties in a savannah biome, South Africa. *Oryx*, 47(1), 29–40. <https://doi.org/10.1017/S0030605312000038>
- Child, M. F., Selier, S. A. J., Radloff, F. G. T., Taylor, W. A., Hoffmann, M., Nel, L., Power, R. J., Birss, C., Okes, N. C., Peel, M. J., Mallon, D., & Davies-Mostert, H. (2019). A

- framework to measure the wildness of managed large vertebrate populations. *Conservation Biology*, 33(5), 1106–1119. <https://doi.org/10.1111/cobi.13299>
- Chimes, L. C., Beytell, P., Muntifering, J. R., Kötting, B., & Neville, V. (2022). Effects of dehorning on population productivity in four Namibia sub-populations of black rhinoceros (*Diceros bicornis bicornis*). *European Journal of Wildlife Research*, 68(5), 58. <https://doi.org/10.1007/s10344-022-01607-5>
- CITES. (1973). *CITES CoP1 E01 – Opening speeches*. <https://cites.org/sites/default/files/eng/cop/01/E01-Opening-speeches.pdf>
- CITES. (2013). *Rules of Procedure of the Conference of the Parties (as amended at the 16th meeting, Bangkok, 2013)*. CITES/UNEP. <https://cites.org/sites/default/files/eng/cop/E16-Rules.pdf>
- CITES. (2019a). *Eighteenth meeting of the Conference of the Parties: Summary record of the fourth session for Committee I, 19 August 2019: 14h05—16h50*. [https://cites.org/sites/default/files/eng/cop/18/Com\\_I/SR/E-CoP18-Com-I-Rec-04-R1.pdf](https://cites.org/sites/default/files/eng/cop/18/Com_I/SR/E-CoP18-Com-I-Rec-04-R1.pdf)
- CITES. (2019b). *Eighteenth meeting of the Conference of the Parties: Summary record of the second plenary session, 27 August 2019: 09h15—11h30*. <https://cites.org/sites/default/files/eng/cop/18/Plen/SR/E-CoP18-Plen-Rec-02-R2.pdf>
- CITES. (2019c). *Res. Conf. 18.3, CITES Strategic Vision: 2021–2030*. [https://cites.org/sites/default/files/document/E-Res-18-03\\_0.pdf](https://cites.org/sites/default/files/document/E-Res-18-03_0.pdf)
- Clark, C. W. (1973). The Economics of Overexploitation. *Science*, 181(4100), 630–634.
- Clark, S. G. (2002). *The Policy Process: A Practical Guide for Natural Resources Professionals*. Yale University Press. <https://www.jstor.org/stable/j.ctt32bt8g>
- Clark, W. R. (1998). Agents and Structures: Two Views of Preferences, Two Views of Institutions. *International Studies Quarterly*, 42(2), 245–270.

- Clements, H. S., Balfour, D., & Di Minin, E. (2023). Importance of private and communal lands to sustainable conservation of Africa's rhinoceroses. *Frontiers in Ecology and the Environment*, 21(3), 140–147. <https://doi.org/10.1002/fee.2593>
- Clements, H. S., Knight, M., Jones, P., & Balfour, D. (2020). Private rhino conservation: Diverse strategies adopted in response to the poaching crisis. *Conservation Letters*, 13(6), e12741. <https://doi.org/10.1111/conl.12741>
- Coase, R. H. (1960). The Problem of Social Cost. *Journal of Law & Economics*, 3, 1.
- Colander, D., Holt, R., & Rosser, B. (2004). The changing face of mainstream economics. *Review of Political Economy*, 16(4), 485–499. <https://doi.org/10.1080/0953825042000256702>
- Colding, J., & Barthel, S. (2019). Exploring the social-ecological systems discourse 20 years later. *Ecology and Society*, 24(1). <https://www.jstor.org/stable/26796920>
- Cole, D., Epstein, G., & McGinnis, M. (2019). The Utility of Combining the IAD and SES Frameworks. *International Journal of the Commons*, 13(1), 244–275. <https://doi.org/10.18352/ijc.864>
- Cole, D. H. (2013). The Varieties of Comparative Institutional Analysis Symposium Issue: 30 Years of Comparative Institutional Analysis: A Celebration of Neil Komesar. *Wisconsin Law Review*, 2013(2), 383–410.
- Cole, D. H., & Ostrom, E. (Eds.). (2012). *Property in Land and Other Resources*. Lincoln Institute of Land Policy.
- Collier, D. (2011). Understanding Process Tracing. *PS: Political Science & Politics*, 44(4), 823–830. <https://doi.org/10.1017/S1049096511001429>
- Collins, A., Fraser, G., & Snowball, J. (2016). Issues and concerns in developing regulated markets for endangered species products: The case of rhinoceros horns. *Cambridge Journal of Economics*, 40(6), 1669–1686. <https://doi.org/10.1093/cje/bev076>

- Cooney, R., Challender, D. W. S., Broad, S., Roe, D., & Natusch, D. J. D. (2021). Think Before You Act: Improving the Conservation Outcomes of CITES Listing Decisions. *Frontiers in Ecology and Evolution*, 9. <https://doi.org/10.3389/fevo.2021.631556>
- Cooney, R., Kasterine, A., MacMillan, D., Milledge, S., Nossal, K., Roe, D., & 't Sas-Rolfes, M. (2015). *The trade in wildlife: A framework to improve biodiversity and livelihood outcomes*. International Trade Centre. [http://www.intracen.org/uploadedFiles/intracenorg/Content/Publications/2014-2015-76\\_Low%20Res%20PDF\\_Trade%20in%20Wildlife\(4\).pdf](http://www.intracen.org/uploadedFiles/intracenorg/Content/Publications/2014-2015-76_Low%20Res%20PDF_Trade%20in%20Wildlife(4).pdf)
- Cornish, F., Breton, N., Moreno-Tabarez, U., Delgado, J., Rua, M., de-Graft Aikins, A., & Hodgetts, D. (2023). Participatory action research. *Nature Reviews Methods Primers*, 3(1), 1–14. <https://doi.org/10.1038/s43586-023-00214-1>
- Courchamp, F., Angulo, E., Rivalan, P., Hall, R. J., Signoret, L., Bull, L., & Meinard, Y. (2006). Rarity Value and Species Extinction: The Anthropogenic Allee Effect. *PLoS Biology*, 4(12), e415. <https://doi.org/10.1371/journal.pbio.0040415>
- Couzens, E. (2013a). CITES at Forty: Never Too Late to Make Lifestyle Changes. *RECIEL*, 22(3), 311–323.
- Couzens, E. (2013b). *Whales and Elephants in International Conservation Law and Politics: A Comparative Study* (1st edition). Routledge.
- Craig, P., Katikireddi, S. V., Leyland, A., & Popham, F. (2017). Natural Experiments: An Overview of Methods, Approaches, and Contributions to Public Health Intervention Research. *Annual Review of Public Health*, 38(1), 39–56. <https://doi.org/10.1146/annurev-publhealth-031816-044327>
- Crawford, S. E. S., & Ostrom, E. (1995). A Grammar of Institutions. *The American Political Science Review*, 89(3), 582–600. <https://doi.org/10.2307/2082975>

- Creswell, J. W. (2013). *Research Design (International Student Edition): Qualitative, Quantitative, and Mixed Methods Approaches* (Fourth edition). SAGE Publications, Inc.
- Curlier, M., & Andresen, S. (2002). International Trade in Endangered Species: The CITES Regime. In E. L. Miles, S. Andresen, E. M. Carlin, J. B. Skjaereth, & A. Underdal (Eds.), *Environmental Regime Effectiveness: Confronting Theory with Evidence* (pp. 357–378). MIT Press.
- Curry, O. S., Alfano, M., Brandt, M. J., & Pelican, C. (2021). Moral Molecules: Morality as a Combinatorial System. *Review of Philosophy and Psychology*.  
<https://doi.org/10.1007/s13164-021-00540-x>
- Czarniawska, B. (2004). *Narratives in Social Science Research* (First edition). SAGE Publications Ltd.
- Dang Vu, H. N., & Nielsen, M. R. (2018). Understanding utilitarian and hedonic values determining the demand for rhino horn in Vietnam. *Human Dimensions of Wildlife*, 23(5), 417–432. <https://doi.org/10.1080/10871209.2018.1449038>
- Dasgupta, P. (2021). *The Economics of Biodiversity: The Dasgupta Review*. HM Treasury.
- D’Cruze, N., Green, J., Elwin, A., & Schmidt-Burbach, J. (2020). Trading Tactics: Time to Rethink the Global Trade in Wildlife. *Animals*, 10(12), Article 12.  
<https://doi.org/10.3390/ani10122456>
- Deakin, S., Gindis, D., Hodgson, G. M., Huang, K., & Pistor, K. (2017). Legal institutionalism: Capitalism and the constitutive role of law. *Journal of Comparative Economics*, 45(1), 188–200. <https://doi.org/10.1016/j.jce.2016.04.005>
- Demsetz, H. (1967). Toward a Theory of Property Rights. *The American Economic Review*, 57(2), 347–359. <https://doi.org/10.2307/1821637>
- Demsetz, H. (2011). The Problem of Social Cost: What Problem? A Critique of the Reasoning of A.C. Pigou and R.H. Coase. *Review of Law & Economics*, 7(1), 1–13.

- Derkley, T., Biggs, D., Holden, M., & Phillips, C. (2019). A framework to evaluate animal welfare implications of policies on rhino horn trade. *Biological Conservation*, 235, 236–249. <https://doi.org/10.1016/j.biocon.2019.05.004>
- DeWalt, K. M., & DeWalt, B. R. (2010). *Participant Observation: A Guide for Fieldworkers* (2nd edition). AltaMira Press.
- DFFE / South African Department of Forestry, Fisheries, and the Environment. (2016). *South Africa's position on a motion to terminate the hunting of captive-bred lions and other predators*.  
[https://www.environment.gov.za/mediarelease/SA%25E2%2580%2599sposition\\_to\\_terminate\\_huntingcaptivebredlions](https://www.environment.gov.za/mediarelease/SA%25E2%2580%2599sposition_to_terminate_huntingcaptivebredlions)
- DFFE / South African Department of Forestry, Fisheries, and the Environment. (2020a). *High-Level Panel Report – For Submission to the Minister of Environment, Forestry and Fisheries*. [https://www.environment.gov.za/sites/default/files/reports/2020-12-22\\_high-levelpanel\\_report.pdf](https://www.environment.gov.za/sites/default/files/reports/2020-12-22_high-levelpanel_report.pdf)
- DFFE / South African Department of Forestry, Fisheries, and the Environment. (2020b, March 27). Department of Environmental Affairs: Notice 221 of 2020. *Government Gazette: Republic of South Africa*, 657(43173), 3.
- Di Minin, E., Clements, H. S., Correia, R. A., Cortés-Capano, G., Fink, C., Haukka, A., Hausmann, A., Kulkarni, R., & Bradshaw, C. J. A. (2021). Consequences of recreational hunting for biodiversity conservation and livelihoods. *One Earth*, 4(2), 238–253.  
<https://doi.org/10.1016/j.oneear.2021.01.014>
- Di Minin, E., 't Sas-Rolfes, M., Selier, J., Louis, M., & Bradshaw, C. J. A. (2022). Dismantling the poachernomics of the illegal wildlife trade. *Biological Conservation*, 265, 109418. <https://doi.org/10.1016/j.biocon.2021.109418>

- Díaz, S., Settele, J., Brondízio, E. S., Ngo, H. T., Agard, J., Arneth, A., Balvanera, P., Brauman, K. A., Butchart, S. H. M., Chan, K. M. A., Garibaldi, L. A., Ichii, K., Liu, J., Subramanian, S. M., Midgley, G. F., Miloslavich, P., Molnár, Z., Obura, D., Pfaff, A., ... Zayas, C. N. (2019). Pervasive human-driven decline of life on Earth points to the need for transformative change. *Science*, *366*(6471). <https://doi.org/10.1126/science.aax3100>
- Dickson, B. (1999). The Precautionary Principle in CITES: A Critical Assessment. *Natural Resources Journal*, *39*(2), 211–228. JSTOR.
- Dickson, B. (2003). What is the Goal of Regulating Wildlife Trade? Is Regulation a Good Way to Achieve this Goal? In *The Trade in Wildlife: Regulation for Conservation* (pp. 23–32). Earthscan.
- DiMaggio, P. (1998). The New Institutionalisms: Avenues of Collaboration. *Journal of Institutional and Theoretical Economics (JITE) / Zeitschrift Für Die Gesamte Staatswissenschaft*, *154*(4), 696–705.
- Do, Q.-T., Levchenko, A. A., Ma, L., Blanc, J., Dublin, H., & Milliken, T. (2020). The Price Elasticity of African Elephant Poaching. *The World Bank Economic Review*, *35*(3), 545–562. <https://doi.org/10.1093/wber/lhaa008>
- Doak, D. F., Bakker, V. J., Goldstein, B. E., & Hale, B. (2014). What is the future of conservation? *Trends in Ecology & Evolution*, *29*(2), 77–81.
- Douglas-Hamilton, I., & Douglas-Hamilton, O. (1993). *Battle for the Elephants by Iain Douglas-Hamilton*. Doubleday.
- Dublin, H. T., Milliken, T., & Barnes, R. F. W. (1995). *Four Years After the CITES Ban: Illegal Killing of Elephants, Ivory Trade and Stockpiles*. IUCN.
- Dubois, A., & Gadde, L.-E. (2002). Systematic combining: An abductive approach to case research. *Journal of Business Research*, *55*(7), 553–560. [https://doi.org/10.1016/S0148-2963\(00\)00195-8](https://doi.org/10.1016/S0148-2963(00)00195-8)

- Duffy, R. (2013). Global Environmental Governance and North—South Dynamics: The Case of the Cites. *Environment and Planning C: Government and Policy*, 31(2), 222–239.  
<https://doi.org/10.1068/c1105>
- Duffy, R. (2022). *Security and Conservation: The Politics of the Illegal Wildlife Trade*. Yale University Press.
- Duffy, R., Massé, F., Smidt, E., Marijnen, E., Büscher, B., Verweijen, J., Ramutsindela, M., Simlai, T., Joanny, L., & Lunstrum, E. (2019). Why we must question the militarisation of conservation. *Biological Conservation*, 232, 66–73.  
<https://doi.org/10.1016/j.biocon.2019.01.013>
- Dunning, T. (2012). *Natural Experiments in the Social Sciences: A Design-Based Approach* (New edition). Cambridge University Press.
- Einhorn, J. (2001). The World Bank’s Mission Creep. *Foreign Affairs*, 80(5), 22–35. JSTOR.  
<https://doi.org/10.2307/20050248>
- Elliott, L. (2017). Cooperation on Transnational Environmental Crime: Institutional Complexity Matters. *Review of European, Comparative & International Environmental Law*, 26(2), 107–117. <https://doi.org/10.1111/reel.12202>
- Ellis, B. (1994). Game Conservation in Zululand 1824-1947: Changing Perspectives. *Natalia*, 23/24, 27–44.
- Emslie, R. (2020a). *Ceratotherium simum*. *The IUCN Red List of Threatened Species*.  
<https://dx.doi.org/10.2305/IUCN.UK.2020-1.RLTS.T4185A45813880.en>
- Emslie, R. (2020b). *Diceros bicornis*. *The IUCN Red List of Threatened Species*.  
<https://dx.doi.org/10.2305/IUCN.UK.2020-1.RLTS.T6557A152728945.en>
- Emslie, R., & Brooks, M. (1999). *African rhino: Status survey and conservation action plan*. IUCN. <https://portals.iucn.org/library/node/7613>

Emslie, R. H., Milledge, S., Brooks, M., van Strien, N. J., & Dublin, H. T. (2007). *African and Asian Rhinoceroses – Status, Conservation and Trade. A report from the IUCN Species Survival Commission (IUCN SSC) African and Asian Rhino Specialist Groups and TRAFFIC to the CITES Secretariat pursuant to Decisions 13.23-25 taken at the 13th meeting of the Conference of the Parties, and further deliberations at the 53rd and 54th meetings of the Standing Committee (CoP14 Doc. 54 Annex 1)*. CITES.

<https://cites.org/sites/default/files/eng/cop/14/doc/E14-54.pdf>

Emslie, R. H., Milliken, T., Talukdar, B., Burgess, G., Adcock, K., Balfour, D., & Knight, M. H. (2019). *African and Asian Rhinoceroses – Status, Conservation and Trade. A report from the IUCN Species Survival Commission (IUCN SSC) African and Asian Rhino Specialist Groups and TRAFFIC to the CITES Secretariat pursuant to Resolution Conf. 9.14 (Rev. CoP17) (CoP18 Doc. 83.1 Annex 2)*. CITES.

<https://www.cites.org/sites/default/files/eng/cop/18/doc/E-CoP18-083-01.pdf>

Epstein, C. (2006). The Making of Global Environmental Norms: Endangered Species Protection. *Global Environmental Politics*, 6(2), 32–54.

<https://doi.org/10.1162/glep.2006.6.2.32>

Epstein, G., Pittman, J., Alexander, S. M., Berdej, S., Dyck, T., Kreitmair, U., Rathwell, K. J., Villamayor-Tomas, S., Vogt, J., & Armitage, D. (2015). Institutional fit and the sustainability of social–ecological systems. *Current Opinion in Environmental Sustainability*, 14, 34–40. <https://doi.org/10.1016/j.cosust.2015.03.005>

Epstein, R. A. (2004). Animals as Objects, or Subjects, of Rights. In C. R. Sunstein & M. C. Nussbaum (Eds.), *Animal Rights: Current Debates and New Directions* (pp. 143–161). Oxford University Press.

<http://www.oxfordscholarship.com/view/10.1093/acprof:oso/9780195305104.001.0001/acprof-9780195305104>

- Escobar-Pemberthy, N., & Ivanova, M. (2020). Implementation of Multilateral Environmental Agreements: Rationale and Design of the Environmental Conventions Index. *Sustainability*, 12(17), Article 17. <https://doi.org/10.3390/su12177098>
- Fabbri, M., Rizzolli, M., & Maruotti, A. (2021). Possession is Nine-Tenths of the Law: Possession, property, and coordination in a Hawk–Dove Experiment. *Journal of Institutional Economics*, 17(2), 267–288. <https://doi.org/10.1017/S1744137420000442>
- Fama, E. F., & Jensen, M. C. (1983). Agency Problems and Residual Claims. *The Journal of Law & Economics*, 26(2), 327–349.
- Farah, N., & Boyce, J. R. (2019). Elephants and mammoths: The effect of an imperfect legal substitute on illegal activity. *Environment and Development Economics*, 24(3), 225–251. <https://doi.org/10.1017/S1355770X18000554>
- Favre, D. (1993). Debate within the CITES Community: What Direction for the Future. *Natural Resources Journal*, 33, 875–918.
- Fennell, L. (2011). Ostrom’s Law: Property rights in the commons. *International Journal of the Commons*, 5(1), Article 1. <https://doi.org/10.18352/ijc.252>
- Ferreira, S. M., & Dziba, L. (2021). Where are rhinos safest? *South African Journal of Science*, 117(9/10), Article 9/10. <https://doi.org/10.17159/sajs.2021/11300>
- Ferreira, S. M., Ellis, S., Burgess, G., Baruch-Mordo, S., Talukdar, B., & Knight, M. H. (2022). *African and Asian rhinoceroses—Status, Conservation and Trade: A report from the IUCN Species Survival Commission (IUCN/SSC) African and Asian Rhino Specialist Groups and TRAFFIC to the CITES Secretariat pursuant to Resolution Conf. 9.14 (Rev. CoP17) (CoP19 Doc. 75 (Rev.1) Annex 4)*. CITES Secretariat. <https://cites.org/sites/default/files/eng/cop/18/doc/E-CoP18-083-01.pdf>

- Fine, G. A. (2019). Moral Cultures, Reputation Work, and the Politics of Scandal. *Annual Review of Sociology*, 45(1), 247–264. <https://doi.org/10.1146/annurev-soc-073018-022649>
- Fischer, C. (2004). The complex interactions of markets for endangered species products. *Journal of Environmental Economics and Management*, 48(2), 926–953. <https://doi.org/10.1016/j.jeem.2003.12.003>
- Fischer, C. (2010). Does Trade Help or Hinder the Conservation of Natural Resources? *Review of Environmental Economics and Policy*, 4(1), 103–121. <https://doi.org/10.1093/reep/rep023>
- Flyvbjerg, B. (2006). Five Misunderstandings About Case-Study Research. *Qualitative Inquiry*, 12(2), 219–245. <https://doi.org/10.1177/1077800405284363>
- Folke, C., Biggs, R., Norström, A., Reyers, B., & Rockström, J. (2016). Social-ecological resilience and biosphere-based sustainability science. *Ecology and Society*, 21(3). <https://doi.org/10.5751/ES-08748-210341>
- Francione, G. L. (1995). *Animals, Property, and the Law*. Temple University Press.
- Frank, E. G., & Wilcove, D. S. (2019). Long delays in banning trade in threatened species. *Science*, 363(6428), 686–688. <https://doi.org/10.1126/science.aav4013>
- Freeman, A. M. (1993). Nonuse values in natural resource damage assessment. In R. J. Kopp & V. K. Smith (Eds.), *Valuing Natural Assets: The Economics of Natural Resource Damage Assessment*. Resources for the Future.
- Freese, C. (1998). *Wild Species as Commodities: Managing Markets And Ecosystems For Sustainability* (1 edition). Island Press.
- Freese, C. H., Aune, K. E., Boyd, D. P., Derr, J. N., Forrest, S. C., Cormack Gates, C., Gogan, P. J. P., Grassel, S. M., Halbert, N. D., Kunkel, K., & Redford, K. H. (2007). Second

- chance for the plains bison. *Biological Conservation*, 136(2), 175–184.  
<https://doi.org/10.1016/j.biocon.2006.11.019>
- Freese, P. C. H. (Ed.). (1997). *Harvesting Wild Species: Implications for Biodiversity Conservation*. The Johns Hopkins University Press.
- Frey, F. W. (1985). The Problem of Actor Designation in Political Analysis. *Comparative Politics*, 17(2), 127–152. <https://doi.org/10.2307/421726>
- Friedman, K., Braccini, M., Bjerregaard-Walsh, M., Bonfil, R., Bradshaw, C. J. A., Brouwer, S., Campbell, I., Coelho, R., Cortés, E., Dimmlich, W., Frisk, M. G., Kingma, I., Phillips, S. R. M., O’Criodain, C., Parker, D., Shephard, S., Tovar-Ávila, J., & Yokawa, K. (n.d.). Informing CITES Parties: Strengthening science-based decision-making when listing marine species. *Fish and Fisheries*, 0(0). <https://doi.org/10.1111/faf.12411>
- Fusch, P., & Ness, L. (2015). Are We There Yet? Data Saturation in Qualitative Research. *The Qualitative Report*, 20(9), 1408–1416. <https://doi.org/10.46743/2160-3715/2015.2281>
- Gaffney, A. C. B., & Evensen, D. (2019). Addressing the Elephant in the Room: Learning from CITES CoP17. *Global Environmental Politics*, 20(1), 3–10.  
[https://doi.org/10.1162/glep\\_a\\_00537](https://doi.org/10.1162/glep_a_00537)
- Gao, Y., Stoner, K. J., Lee, A. T. L., & Clark, S. G. (2016). Rhino horn trade in China: An analysis of the art and antiques market. *Biological Conservation*, 201, 343–347.  
<https://doi.org/10.1016/j.biocon.2016.08.001>
- Gehring, T., & Ruffing, E. (2008). When Arguments Prevail Over Power: The CITES Procedure for the Listing of Endangered Species. *Global Environmental Politics*, 8(2), 123–148.
- Geist, V. (1994). Wildlife conservation as wealth. *Nature*, 368(6471), 491–492.  
<https://doi.org/10.1038/368491a0>

- Geldmann, J., Barnes, M., Coad, L., Craigie, I. D., Hockings, M., & Burgess, N. D. (2013). Effectiveness of terrestrial protected areas in reducing habitat loss and population declines. *Biological Conservation*, *161*, 230–238.
- Gerring, J. (2016). *Case Study Research: Principles and Practices* (2nd edition). Cambridge University Press.
- Glennon, M. J. (1990). Has International Law Failed the Elephant? *American Journal of International Law*, *84*(1), 1–43.
- Gobush, K. S., Edwards, C. T. T., Balfour, D., Wittemyer, G., Maisels, F., & Taylor, R. D. (2022). *Loxodonta africana*. *The IUCN Red List of Threatened Species*.  
<https://dx.doi.org/10.2305/IUCN.UK.2022-2.RLTS.T181008073A223031019.en>
- Gobush, K. S., Edwards, C. T. T., Maisels, F., Wittemyer, G., Balfour, D., & Taylor, R. D. (2021). *Loxodonta cyclotis*. *The IUCN Red List of Threatened Species*.  
<https://dx.doi.org/10.2305/IUCN.UK.2021-1.RLTS.T181007989A204404464.en>
- Golding, J. (2017). Policy critics and policy survivors: Who are they and how do they contribute to a department policy role typology? *Discourse: Studies in the Cultural Politics of Education*, *38*(6), 923–936. <https://doi.org/10.1080/01596306.2016.1183589>
- Gooden, J., & Grenyer, R. (2019). The psychological appeal of owning private land for conservation. *Conservation Biology*, *33*(2), 339–350. <https://doi.org/10.1111/cobi.13215>
- Gooden, J. L. (2019). Cultivating identity through private land conservation. *People and Nature*, *1*(3), 362–375. <https://doi.org/10.1002/pan3.32>
- Gooden, J., & ‘t Sas-Rolfes, M. (2020). A review of critical perspectives on private land conservation in academic literature. *Ambio*, *49*(5), 1019–1034.  
<https://doi.org/10.1007/s13280-019-01258-y>
- Gordon, H. S. (1954). The Economic Theory of a Common-Property Resource: The Fishery. *Journal of Political Economy*, *62*(2), 124–142.

- Grant, E. by W., & Wilson, G. K. (Eds.). (2014). *The Consequences of the Global Financial Crisis: The Rhetoric of Reform and Regulation*. Oxford University Press.
- Greene, J. D. (2014). Beyond Point-and-Shoot Morality: Why Cognitive (Neuro)Science Matters for Ethics. *Ethics*, 124(4), 695–726. <https://doi.org/10.1086/675875>
- Gregory, R., & Long, G. (2009). Using Structured Decision Making to Help Implement a Precautionary Approach to Endangered Species Management. *Risk Analysis*, 29(4), 518–532. <https://doi.org/10.1111/j.1539-6924.2008.01182.x>
- Greif, A. (2005). Commitment, Coercion, and Markets: The Nature and Dynamics of Institutions Supporting Exchange. In C. Menard & M. M. Shirley (Eds.), *Handbook of New Institutional Economics* (pp. 727–786). Springer US. [https://doi.org/10.1007/0-387-25092-1\\_29](https://doi.org/10.1007/0-387-25092-1_29)
- Guala, F. (2016). *Understanding Institutions: The Science and Philosophy of Living Together* (1st edition). Princeton University Press.
- Gunningham, N., & Sinclair, D. (2017). Smart regulation. In P. Drahos (Ed.), *Regulatory Theory* (pp. 133–148). ANU Press; JSTOR. [www.jstor.org/stable/j.ctt1q1crtm.16](http://www.jstor.org/stable/j.ctt1q1crtm.16)
- Haas, P. M., Keohane, R. O., & Levy, M. A. (Eds.). (1993). *Institutions for the Earth: Sources of Effective International Environmental Protection*. MIT Press.
- Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review*, 108(4), 814–834. <https://doi.org/10.1037/0033-295x.108.4.814>
- Haidt, J. (2008). Morality. *Perspectives on Psychological Science*, 3(1), 65–72.
- Hall, P. A. (Ed.). (1989). *The Political Power of Economic Ideas: Keynesianism across Nations*. Princeton University Press.

- Hall, P. A., & Taylor, R. C. R. (1996). Political Science and the Three New Institutionalisms\*. *Political Studies*, 44(5), 936–957. <https://doi.org/10.1111/j.1467-9248.1996.tb00343.x>
- Hall-Martin, A., du Toit, J. G., Hitchens, P. M., & Knight, M. H. (2009). *An exert of the 2008 survey of white rhinoceros, Ceratotherium simum simum, on private land in South Africa: Report to WWF-African Rhino Programme*. WWF South Africa. [http://www.rhinosourcecenter.com/pdf\\_files/146/1465289401.pdf](http://www.rhinosourcecenter.com/pdf_files/146/1465289401.pdf)
- Hanley, N., Sheremet, O., Bozzola, M., & MacMillan, D. C. (2018). The Allure of the Illegal: Choice Modeling of Rhino Horn Demand in Vietnam. *Conservation Letters*, 11(3), e12417. <https://doi.org/10.1111/conl.12417>
- Hanna, S., & Musinghe, M. (1995). *Property rights and the environment*. The World Bank. <https://doi.org/10.1596/0-8213-3415-8>
- Harari, Y. N. (2014). *Sapiens: A Brief History of Humankind*. Harvill Secker.
- Hare, D., Reeve, H. K., & Blossey, B. (2016). Evolutionary routes to stable ownership. *Journal of Evolutionary Biology*, 29(6), 1178–1188. <https://doi.org/10.1111/jeb.12859>
- Harfoot, M., Glaser, S. A. M., Tittensor, D. P., Britten, G. L., McLardy, C., Malsch, K., & Burgess, N. D. (2018). Unveiling the patterns and trends in 40 years of global trade in CITES-listed wildlife. *Biological Conservation*, 223, 47–57. <https://doi.org/10.1016/j.biocon.2018.04.017>
- Harris, C., Cai, M., Murtazashvili, I., & Murtazashvili, J. B. (2020). The Origins and Consequences of Property Rights: Austrian, Public Choice, and Institutional Economics Perspectives. *Elements in Austrian Economics*. <https://doi.org/10.1017/9781108979122>
- Hart, A. G., Cooney, R., Dickman, A., Hare, D., Jonga, C., Johnson, P. K., Louis, M. P., Lubilo, R., Roe, D., Semcer, C., & Somerville, K. (2020). Threats posed to conservation

by media misinformation. *Conservation Biology*, 34(6), 1333–1334.

<https://doi.org/10.1111/cobi.13605>

Harvard Law Review. (2001). The Cites Fort Lauderdale Criteria: The Uses and Limits of Science in International Conservation Decisionmaking. *Harvard Law Review*, 114(6), 1769.

Harvey, R., Alden, C., & Wu, Y.-S. (2017). Speculating a Fire Sale: Options for Chinese Authorities in Implementing a Domestic Ivory Trade Ban. *Ecological Economics*, 141, 22–31. <https://doi.org/10.1016/j.ecolecon.2017.05.017>

Hayek, F. A. (1945). The Use of Knowledge in Society. *The American Economic Review*, 35(4), 519–530. <https://doi.org/10.2307/1809376>

Heckathorn, D. D. (1997). Respondent-Driven Sampling: A New Approach to the Study of Hidden Populations\*. *Social Problems*, 44(2), 174–199. <https://doi.org/10.2307/3096941>

Heim, J., & Böcher, M. (2016). CITES and Science: Using the RIU Model to Analyze Institutionalized Scientific Policy Advice in Germany for the Case of Ivory Trade. *Journal of International Wildlife Law & Policy*, 19(2), 159–175. <https://doi.org/10.1080/13880292.2016.1167475>

Helm, D., & Hepburn, C. (2012). The economic analysis of biodiversity: An assessment. *Oxford Review of Economic Policy*, 28(1), 1–21. JSTOR.

Heltberg, R. (2001). Impact of the ivory trade ban on poaching incentives: A numerical example. *Ecological Economics*, 36(2), 189–195. [https://doi.org/10.1016/S0921-8009\(00\)00234-2](https://doi.org/10.1016/S0921-8009(00)00234-2)

Henderson, R. (2024). *Troubled: A Memoir of Foster Care, Family, and Social Class*. Gallery Books.

Hepworth, R. (1998). The Independent review of CITES. *Journal of International Wildlife Law & Policy*, 1(3), 412–432. <https://doi.org/10.1080/13880299809353911>

- Hill, P. J. (2014). Are All Commons Tragedies? The Case of Bison in the Nineteenth Century. *The Independent Review*, 18(4), 485–502.
- Hiller, C., & 't Sas-Rolfes, M. (2024). Systematic review of the impact of restrictive wildlife trade measures on conservation of iconic species in southern Africa. *Conservation Biology*, n/a(n/a), e14262. <https://doi.org/10.1111/cobi.14262>
- Hillman Smith, K. (1981). African rhinoceros survey and conservation. *WWF Yearbook 1980-1981*, 309–313.
- Hinsley, A., & 't Sas-Rolfes, M. (2020). Wild assumptions? Questioning simplistic narratives about consumer preferences for wildlife products. *People and Nature*, 2(4), 972–979. <https://doi.org/10.1002/pan3.10099>
- Hirose, I., & Olson, J. (2015). *The Oxford Handbook of Value Theory*. Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780199959303.001.0001>
- Hodgson, G. M. (1998). The approach of institutional economics. *Journal of Economic Literature*, 36(1), 166–192.
- Hodgson, G. M. (2006). What Are Institutions? *Journal of Economic Issues*, 40(1), 1–25. <https://doi.org/10.1080/00213624.2006.11506879>
- Hodgson, G. M. (2007). Evolutionary and Institutional Economics as the New Mainstream? *Evolutionary and Institutional Economics Review*, 4(1), 7–25. <https://doi.org/10.14441/eier.4.7>
- Hodgson, G. M. (2009). On the Institutional Foundations of Law: The Insufficiency of Custom and Private Ordering. *Journal of Economic Issues*, 43(1), 143–166. <https://doi.org/10.2753/JEI0021-3624430107>
- Hodgson, G. M. (2015). Much of the ‘economics of property rights’ devalues property and legal rights. *Journal of Institutional Economics*, 11(4), 683–709. <https://doi.org/10.1017/S1744137414000630>

- Hodgson, G. M., & Knudsen, T. (2011). Generalized Darwinism and Evolutionary Economics: From Ontology to Theory. *Biological Theory*, 6(4), 326–337.  
<https://doi.org/10.1007/s13752-012-0043-5>
- Hoffmann, S. (2013). Property, possession and natural resource management: Towards a conceptual clarification. *Journal of Institutional Economics*, 9(1), 39–60.  
<https://doi.org/10.1017/S1744137412000264>
- Holling, C. S. (1978). *Adaptive Environmental Assessment and Management*. The Blackburn Press.
- Hoyt, J. A. (1994). *Animals in Peril: How 'Sustainable Use' is Wiping Out the World's Wildlife*. Avery.
- Hsiang, S., & Sekar, N. (2016). *Does Legalization Reduce Black Market Activity? Evidence from a Global Ivory Experiment and Elephant Poaching Data* (w22314). National Bureau of Economic Research. <https://doi.org/10.3386/w22314>
- Hübschle, A. (2016). Security coordination in an illegal market: The transnational trade in rhinoceros horn. *Politikon*, 43(2), 193–214.  
<https://doi.org/10.1080/02589346.2016.1201377>
- Hübschle, A. M. (2017). The social economy of rhino poaching: Of economic freedom fighters, professional hunters and marginalized local people. *Current Sociology*, 65(3), 427–447. <https://doi.org/10.1177/0011392116673210>
- Hübschle, A., & Shearing, C. (2018). *Ending wildlife trafficking: Local communities as change agents*. The Global Initiative Against Transnational Organized Crime.  
<https://globalinitiative.net/analysis/ending-wildlife-trafficking/>
- Hughes, G. R. (2001). The Natal Parks Board Experience in South Africa. In T. L. Anderson & A. James (Eds.), *The Politics and Economics of Park Management* (pp. 31–41). Rowman & Littlefield.

- Hulme, M. (2009). *Why we disagree about climate change: Understanding controversy, inaction and opportunity*. Cambridge University Press.
- Hutton, J., Adams, W. M., & Murombedzi, J. C. (2005). Back to the Barriers? Changing Narratives in Biodiversity Conservation. *Forum for Development Studies*, 32(2), 341–370. <https://doi.org/10.1080/08039410.2005.9666319>
- Hutton, J., & Dickson, B. (2000). *Endangered Species, Threatened Convention: The Past, Present and Future of CITES, the Convention on International Trade in Endangered Species of Wild Fauna and Flora*. Earthscan Publications Ltd.
- Hutton, J. M., & Leader-Williams, N. (2003). Sustainable use and incentive-driven conservation: Realigning human and conservation interests. *Oryx*, 37(02). <https://doi.org/10.1017/S0030605303000395>
- IPBES. (2019). *Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. (E. S. Brondizio, J. Settele, S. Díaz, & H. T. Ngo, Eds.). IPBES secretariat. <https://doi.org/10.5281/zenodo.3553579>
- IUCN. (2019, October 9). *IUCN sets the record straight on a 2017 trophy hunting opinion*. <https://www.iucn.org/news/secretariat/201910/iucn-sets-record-straight-a-2017-trophy-hunting-opinion>
- IUCN, T. W. C. U., UNEP, & WWF. (2013). *Caring for the Earth: A Strategy for Sustainable Living*. Routledge.
- Janssens, B., & Trouwborst, A. (2018). Rhinoceros Conservation and International Law: The Role of Wildlife Treaties in Averting Megaherbivore Extinction. *Journal of International Wildlife Law & Policy*, 21(2–3), 146–189. <https://doi.org/10.1080/13880292.2018.1483300>

- Jeffries, G., Withers, O., Barichievy, C., & Gordon, C. (2019). The Rhino Impact Investment Project—A new, outcomes-based finance mechanism for selected AfRSG-rated ‘Key’ black rhino populations. *Pachyderm*, 60, 88–95.
- Jepson, P. (2018). Recoverable Earth: A twenty-first century environmental narrative. *Ambio*, 1–8. <https://doi.org/10.1007/s13280-018-1065-4>
- Jepson, P., & Ladle, R. J. (2010). *Conservation: A Beginner’s Guide*. Oneworld Publications.
- Jepson, P., Schepers, F., & Helmer, W. (2018). Governing with nature: A European perspective on putting rewilding principles into practice. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 373(1761), 20170434. <https://doi.org/10.1098/rstb.2017.0434>
- Jepson, P., & Whittaker, R. J. (2002). Histories of Protected Areas: Internationalisation of Conservationist Values and their Adoption in the Netherlands Indies (Indonesia). *Environment and History*, 8(2), 129–172. <https://doi.org/10.3197/096734002129342620>
- Jolles, J. W., King, A. J., & Killen, S. S. (2020). The Role of Individual Heterogeneity in Collective Animal Behaviour. *Trends in Ecology & Evolution*, 35(3), 278–291. <https://doi.org/10.1016/j.tree.2019.11.001>
- Jones, M., McBeth, M., & Shanahan, E. (2014). Introducing the Narrative Policy Framework. In M. Jones, E. Shanahan, & M. McBeth (Eds.), *The Science of Stories: Applications of the Narrative Policy Framework in Public Policy Analysis* (1st ed. 2014 edition, pp. 1–25). Palgrave Macmillan.
- Juerges, N., Leahy, J., & Newig, J. (2020). A typology of actors and their strategies in multi-scale governance of wind turbine conflict within forests. *Land Use Policy*, 96, 104691. <https://doi.org/10.1016/j.landusepol.2020.104691>

- Justus, J., Colyvan, M., Regan, H., & Maguire, L. (2009). Buying into conservation: Intrinsic versus instrumental value. *Trends in Ecology & Evolution*, *24*(4), 187–191.  
<http://dx.doi.org/10.1016/j.tree.2008.11.011>
- Kahan, D. M., Peters, E., Wittlin, M., Slovic, P., Ouellette, L. L., Braman, D., & Mandel, G. (2012). The polarizing impact of science literacy and numeracy on perceived climate change risks. *Nature Climate Change*, *2*(10), Article 10.  
<https://doi.org/10.1038/nclimate1547>
- Karesh, W. B., Cook, R. A., Bennett, E. L., & Newcomb, J. (2005). Wildlife Trade and Global Disease Emergence. *Emerging Infectious Diseases*, *11*(7), 1000–1002.  
<https://doi.org/10.3201/eid1107.050194>
- Kawulich, B. B. (2005). Participant Observation as a Data Collection Method. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, *6*(2), Article 2.  
<https://doi.org/10.17169/fqs-6.2.466>
- Kellert, S. R. (1996). *The Value of Life: Biological Diversity and Human Society*. Island Press.
- Keohane, R. O. (1984). *After Hegemony: Cooperation and Discord in the World Political Economy* (Revised edition). Princeton University Press.
- Khalil, E. L. (2013). Lock-in institutions and efficiency. *Journal of Economic Behavior & Organization*, *88*, 27–36. <https://doi.org/10.1016/j.jebo.2011.10.017>
- Knegtering, E., Hendrickx, L., Van Der Windt, H. J., & Uiterkamp, A. J. M. S. (2002). Effects of Species' Characteristics on Nongovernmental Organizations' Attitudes toward Species Conservation Policy. *Environment and Behavior*, *34*(3), 378–400.  
<https://doi.org/10.1177/0013916502034003006>
- Knight, M. (2020). African Rhino Specialist Group report / Rapport du Groupe de Spécialistes du Rhinocéros d'Afrique. *Pachyderm*, *61*, 23–42.

- Kosloff, L. H., & Trexler, M. C. (1987a). The Convention on International Trade in Endangered Species: Enforcement Theory and Practice in the United States. *Boston University International Law Journal*, 5(2), 327–362.
- Kosloff, L. H., & Trexler, M. C. (1987b). The Convention on International Trade in Endangered Species: No Carrot, but Where's the Stick Comment. *Environmental Law Reporter News & Analysis*, 17(7), 10222–10237.
- Krasner, S. D. (1983). *International Regimes*. Cornell University Press.
- Kremer, M., & Morcom, C. (2000). Elephants. *The American Economic Review*, 90(1), 212–234.
- Kreuter, U. P., & Simmons, R. T. (1995). Economics, Politics and Controversy over African Elephant Conservation. In M. M. R. Freeman & U. P. Kreuter (Eds.), *Elephants and Whales: Resources for Whom?* (1st edition, pp. 39–58). Gordon.
- Kriebel, D., Tickner, J., Epstein, P., Lemons, J., Levins, R., Loechler, E. L., Quinn, M., Rudel, R., Schettler, T., & Stoto, M. (2001). The Precautionary Principle in Environmental Science. *Environmental Health Perspectives*, 109(9), 871–876.  
<https://doi.org/10.2307/3454986>
- Krieps, C. (1996). Sustainable Use of Endangered Species under CITES: Is It a Sustainable Alternative? *University of Pennsylvania Journal of International Law*, 17(1), 461.
- Krieps, C. L. (1996). Sustainable Use of Endangered Species Under Cites: Is It a Sustainable Alternative? *U.Pa.J.Int'lEcon.L.*, 17(1), 461–504.
- Krutilla, J. V. (1967). Conservation Reconsidered. *The American Economic Review*, 57(4), 777–786.
- Kuiper, T., Altwegg, R., Beale, C., Carroll, T., Dublin, H. T., Hauenstein, S., Kshatriya, M., Schwarz, C., Thouless, C. R., Royle, A., & Milner-Gulland, E. J. (2023). Drivers and facilitators of the illegal killing of elephants across 64 African sites. *Proceedings of the*

*Royal Society B: Biological Sciences*, 290(1990), 20222270.

<https://doi.org/10.1098/rspb.2022.2270>

- Kuunal, S., Mair, L., Pattison, Z., & McGowan, P. J. K. (2020). Identifying opportunities for improving the coherence of global agreements for species conservation. *Conservation Science and Practice*, 2(12), e294. <https://doi.org/10.1111/csp2.294>
- Lanchberry, J. (2006). The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): Responding to Calls for Action from Other Nature Conservation Regimes. In S. Oberthür & T. Gehring (Eds.), *Institutional Interaction in Global Environmental Governance: Synergy and Conflict among International and EU Policies* (pp. 157–179). MIT Press.
- Lara, A. (2015). *Rationality and complexity in the work of Elinor Ostrom* (2). 9(2), Article 2. <https://doi.org/10.18352/ijc.468>
- LaRocco, A. A., & Mogende, E. (2022). Fall from grace or back down to earth? Conservation and political conflict in Africa’s “miracle” state. *Environment and Planning E: Nature and Space*, 25148486221101553. <https://doi.org/10.1177/25148486221101553>
- Larson, A. M., & Soto, F. (2008). Decentralization of Natural Resource Governance Regimes. *Annual Review of Environment and Resources*, 33(1), 213–239. <https://doi.org/10.1146/annurev.envIRON.33.020607.095522>
- Lauth, H.-J. (2015). Formal and Informal Institutions. In J. Gandhi & R. Ruiz-Rufino (Eds.), *Routledge Handbook of Comparative Political Institutions* (pp. 56–69). Taylor & Francis Group. <http://ebookcentral.proquest.com/lib/oxford/detail.action?docID=2011232>
- Leader-Williams, N. (1992). *World trade in rhino horn: A review*. TRAFFIC. <https://policycommons.net/artifacts/1373802/the-world-trade-in-rhino-horn/1988033/>

- Leader-Williams, N. (2003). Regulation and protection: Successes and failures in rhinoceros—Case study. In S. Oldfield (Ed.), *The Trade in Wildlife: Regulation for Conservation* (illustrated edition). Earthscan Ltd.
- Leader-Williams, N., Milledge, S., Adcock, K., Brooks, M., Conway, A., Knight, M., Mainka, S., Martin, E. B., & Teferi, T. (2005). Trophy Hunting of Black Rhino *Diceros bicornis*: Proposals to Ensure Its Future Sustainability. *Journal of International Wildlife Law & Policy*, 8(1), 1–11. <https://doi.org/10.1080/13880290590913705>
- Lélé, S., & Norgaard, R. B. (2005). Practicing Interdisciplinarity. *BioScience*, 55(11), 967–975. [https://doi.org/10.1641/0006-3568\(2005\)055\[0967:PI\]2.0.CO;2](https://doi.org/10.1641/0006-3568(2005)055[0967:PI]2.0.CO;2)
- Lemos, M. C., & Agrawal, A. (2006). Environmental Governance. *Annual Review of Environment and Resources*, 31(1), 297–325. <https://doi.org/10.1146/annurev.energy.31.042605.135621>
- Levin, S., Xepapadeas, T., Crépin, A.-S., Norberg, J., Zeeuw, A. de, Folke, C., Hughes, T., Arrow, K., Barrett, S., Daily, G., Ehrlich, P., Kautsky, N., Mäler, K.-G., Polasky, S., Troell, M., Vincent, J. R., & Walker, B. (2013). Social-ecological systems as complex adaptive systems: Modeling and policy implications. *Environment and Development Economics*, 18(2), 111–132. <https://doi.org/10.1017/S1355770X12000460>
- Levitsky, S., & Murillo, M. V. (2009). Variation in Institutional Strength. *Annual Review of Political Science*, 12(1), 115–133. <https://doi.org/10.1146/annurev.polisci.11.091106.121756>
- Liljebblad, J. (2014). *The Convention on International Trade of Endangered Species: Local Authority and International Policy*. Quid Pro LLC.
- Lindsey, P. A., Miller, J. R. B., Petracca, L. S., Coad, L., Dickman, A. J., Fitzgerald, K. H., Flyman, M. V., Funston, P. J., Henschel, P., Kasiki, S., Knights, K., Loveridge, A. J., Macdonald, D. W., Mandisodza-Chikerema, R. L., Nazerali, S., Plumptre, A. J., Stevens,

- R., Zyl, H. W. V., & Hunter, L. T. B. (2018). More than \$1 billion needed annually to secure Africa's protected areas with lions. *Proceedings of the National Academy of Sciences*, 201805048. <https://doi.org/10.1073/pnas.1805048115>
- Lindsey, P., Allan, J., Brehony, P., Dickman, A., Robson, A., Begg, C., Bhammar, H., Blanken, L., Breuer, T., Fitzgerald, K., Flyman, M., Gandiwa, P., Giva, N., Kaelo, D., Nampindo, S., Nyambe, N., Steiner, K., Parker, A., Roe, D., ... Tyrrell, P. (2020). Conserving Africa's wildlife and wildlands through the COVID-19 crisis and beyond. *Nature Ecology & Evolution*, 4, 1300–1310. <https://doi.org/10.1038/s41559-020-1275-6>
- Linklater, W. L., & Shrader, A. M. (2017). Rhino Management Challenges: Spatial and Social Ecology for Habitat and Population Management. In J. P. G. M. Cromsigt, S. Archibald, & N. Owen-Smith (Eds.), *Conserving Africa's Mega-Diversity in the Anthropocene: The Hluhluwe-iMfolozi Park Story* (pp. 265–285). Cambridge University Press. <https://doi.org/10.1017/9781139382793>
- Liu, S., Westbury, M. V., Dussex, N., Mitchell, K. J., Sinding, M.-H. S., Heintzman, P. D., Duchêne, D. A., Kapp, J. D., von Seth, J., Heiniger, H., Sánchez-Barreiro, F., Margaryan, A., André-Olsen, R., De Cahsan, B., Meng, G., Yang, C., Chen, L., van der Valk, T., Moodley, Y., ... Gilbert, M. T. P. (2021). Ancient and modern genomes unravel the evolutionary history of the rhinoceros family. *Cell*. <https://doi.org/10.1016/j.cell.2021.07.032>
- Lopes, A. A. (2015). Organized Crimes Against Nature: Elephants in Southern Africa. *Natural Resource Modeling*, 28(1), 86–107. <https://doi.org/10.1111/nrm.12058>
- Lord, C. G., Ross, L., & Lepper, M. R. (1979). Biased assimilation and attitude polarization: The effects of prior theories on subsequently considered evidence. *Journal of Personality and Social Psychology*, 37(11), 2098–2109. <https://doi.org/10.1037/0022-3514.37.11.2098>

- Lorimer, J. (2012). Multinatural geographies for the Anthropocene. *Progress in Human Geography*, 36(5), 593–612. <https://doi.org/10.1177/0309132511435352>
- Lorimer, J. (2015). *Wildlife in the Anthropocene: Conservation after Nature* (Illustrated edition). Univ Of Minnesota Press.
- Ludwig, D., Hilborn, R., & Waters, C. (1993). Uncertainty, Resource Exploitation, and Conservation: Lessons from History. *Science*, 260(5104), 17–36.
- Lueck, D. (2002). The Extermination and Conservation of the American Bison. *The Journal of Legal Studies*, 31(S2), S609–S652. <https://doi.org/10.1086/340410>
- Lueck, D. (2018). The Comparative Institutions Approach to Wildlife Governance. *Texas A&M Law Review*, 6, 147.
- Lueck, D., & Miceli, T. J. (2007). Chapter 3 Property Law. In A. M. Polinsky & S. Shavell (Eds.), *Handbook of Law and Economics* (Vol. 1, pp. 183–257). Elsevier. [https://doi.org/10.1016/S1574-0730\(07\)01003-1](https://doi.org/10.1016/S1574-0730(07)01003-1)
- Lueck, D., & Torrens, G. (2020). Property rights and domestication. *Journal of Institutional Economics*, 16(2), 199–215. Cambridge Core. <https://doi.org/10.1017/S1744137419000390>
- Lunstrum, E., & Givá, N. (2020). What drives commercial poaching? From poverty to economic inequality. *Biological Conservation*, 245, 108505. <https://doi.org/10.1016/j.biocon.2020.108505>
- Lyster, S. (1985). *International Wildlife Law: An Analysis of International Treaties concerned with the Conservation of Wildlife*. Cambridge University Press.
- Ma, Y., Li, Y., Li, Y., & Zhang, W. (2019). Study on sumatran rhinoceros based on ecological game model. *IOP Conference Series: Earth and Environmental Science*, 295(2), 012032. <https://doi.org/10.1088/1755-1315/295/2/012032>

- Macdonald, D. W. (2019). Mammal Conservation: Old Problems, New Perspectives, Transdisciplinarity, and the Coming of Age of Conservation Geopolitics. *Annual Review of Environment and Resources*, 44(1), 61–88. <https://doi.org/10.1146/annurev-environ-101718-033039>
- Macdonald, D. W., Harrington, L. A., Moorhouse, T. P., & D’Cruze, N. (2021). Trading Animal Lives: Ten Tricky Issues on the Road to Protecting Commodified Wild Animals. *BioScience*, biab035. <https://doi.org/10.1093/biosci/biab035>
- Maciejewski, K., De Vos, A., Cumming, G. S., Moore, C., & Biggs, D. (2015). Cross-scale feedbacks and scale mismatches as influences on cultural services and the resilience of protected areas. *Ecological Applications*, 25(1), 11–23. JSTOR.
- MacKenzie, J. M. (1997). *The Empire of Nature: Hunting, Conservation and British Imperialism (Studies in Imperialism): 7*. Manchester University Press.
- Mahajan, S. L., Jagadish, A., Glew, L., Ahmadiya, G., Becker, H., Fidler, R. Y., Jeha, L., Mills, M., Cox, C., DeMello, N., Harborne, A. R., Masuda, Y. J., McKinnon, M. C., Painter, M., Wilkie, D., & Mascia, M. B. (2021). A theory-based framework for understanding the establishment, persistence, and diffusion of community-based conservation. *Conservation Science and Practice*, 3(1), e299. <https://doi.org/10.1111/csp2.299>
- Mahoney, S. P., Krausman, P., & Weir, J. N. (2015). Challenges for conservation and sustainable use in North America. *International Journal of Environmental Studies*, 72(5), 879–886. <https://doi.org/10.1080/00207233.2015.1073475>
- Manfredo, M. J., Teel, T. L., Don Carlos, A. W., Sullivan, L., Bright, A. D., Dietsch, A. M., Bruskotter, J., & Fulton, D. (2020). The changing sociocultural context of wildlife conservation. *Conservation Biology*, 34(6), 1549–1559. <https://doi.org/10.1111/cobi.13493>

- March, J. G., & Olsen, J. P. (1983). The New Institutionalism: Organizational Factors in Political Life. *American Political Science Review*, 78(3), 734–749.  
<https://doi.org/10.2307/1961840>
- Martin, E. B. (1979). *The international trade in rhinoceros products*. WWF/ IUCN.  
[http://www.rhinosourcecenter.com/pdf\\_files/128/1283899526.pdf](http://www.rhinosourcecenter.com/pdf_files/128/1283899526.pdf)
- Martin, E. B., & Martin, C. (1983). *Run, Rhino, Run* (First Edition). Chatto & Windus.
- Mason, C. F., Bulte, E. H., & Horan, R. D. (2012). Banking on extinction: Endangered species and speculation. *Oxford Review of Economic Policy*, 28(1), 180–192.  
<https://doi.org/10.1093/oxrep/grs006>
- Massé, F., Dickinson, H., Margulies, J., Joanny, L., Lappe-Osthege, T., & Duffy, R. (2020). Conservation and crime convergence? Situating the 2018 London Illegal Wildlife Trade Conference. *Journal of Political Ecology*, 27(1), 23–42.  
<https://doi.org/10.2458/v27i1.23543>
- Massé, F., & Margulies, J. D. (2020). The geopolitical ecology of conservation: The emergence of illegal wildlife trade as national security interest and the re-shaping of US foreign conservation assistance. *World Development*, 132, 104958.  
<https://doi.org/10.1016/j.worlddev.2020.104958>
- Masters, R. D. (1982). Is Sociobiology Reactionary? The Political Implications of Inclusive-Fitness Theory. *The Quarterly Review of Biology*, 57(3), 275–292.
- Matthews, P. (1996). Problems Related to the Convention on the International Trade in Endangered Species. *International and Comparative Law Quarterly*, 45(02), 421–431.
- Mbaiwa, J. E. (2018). Effects of the safari hunting tourism ban on rural livelihoods and wildlife conservation in Northern Botswana. *South African Geographical Journal*, 100(1), 41–61. <https://doi.org/10.1080/03736245.2017.1299639>

- McGinnis, M., & Ostrom, E. (2014). Social-ecological system framework: Initial changes and continuing challenges. *Ecology and Society*, 19(2). <https://doi.org/10.5751/ES-06387-190230>
- McGowan, J., Beaumont, L. J., Smith, R. J., Chauvenet, A. L. M., Harcourt, R., Atkinson, S. C., Mittermeier, J. C., Esperon-Rodriguez, M., Baumgartner, J. B., Beattie, A., Dudaniec, R. Y., Grenyer, R., Nipperess, D. A., Stow, A., & Possingham, H. P. (2020). Conservation prioritization can resolve the flagship species conundrum. *Nature Communications*, 11(1), Article 1. <https://doi.org/10.1038/s41467-020-14554-z>
- McMillan, J. (2016). Market Institutions. In *The New Palgrave Dictionary of Economics* (pp. 1–4). Palgrave Macmillan UK. [https://doi.org/10.1057/978-1-349-95121-5\\_2398-1](https://doi.org/10.1057/978-1-349-95121-5_2398-1)
- McMurray, C. A. (2009). Wildlife Trafficking: U.S. Efforts to Tackle a Global Crisis. *Natural Resources & Environment*, 23(3), 16–18.
- McOmber, E. M. (2001). Problems in Enforcement of the Convention on International Trade in Endangered Species Note. *Brooklyn Journal of International Law*, 27(2), 673–702.
- McPherson, M., & Nieswiadomy, Ml. (2000). African elephants: The effect of property rights and political stability. *Contemporary Economic Policy*, 18(1), 14–26. <https://doi.org/10.1111/j.1465-7287.2000.tb00002.x>
- McShane, K. (2007). Anthropocentrism vs. Nonanthropocentrism: Why Should We Care? *Environmental Values*, 16(2), 169–185. JSTOR.
- Mechling, J. (1991). Homo Narrans across the Disciplines. *Western Folklore*, 50(1), 41–51. <https://doi.org/10.2307/1499396>
- Menon, V., & Tiwari, S. Kr. (2019). Population status of Asian elephants *Elephas maximus* and key threats. *International Zoo Yearbook*, 53(1), 17–30. <https://doi.org/10.1111/izy.12247>

- Merrill, T. W., & Smith, H. E. (2001). What Happened to Property in Law and Economics Essay. *Yale Law Journal*, 111(2), 357–398.
- Meyer, J. W., Frank, D. J., Hironaka, A., Schofer, E., & Tuma, N. B. (1997). The Structuring of a World Environmental Regime, 1870–1990. *International Organization*, 51(4), 623–651. <https://doi.org/10.1162/002081897550474>
- Miles, E. L., Andresen, S., Carlin, E. M., Skjaereth, J. B., & Underdal, A. (2002). *Environmental Regime Effectiveness: Confronting Theory with Evidence*. MIT Press.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed). Sage Publications.  
<http://catdir.loc.gov/catdir/enhancements/fy0655/93041204-t.html>
- Milliken, T., & Shaw, J. (2012). *The South Africa-Viet Nam Rhino Horn Trade Nexus: A Deadly Combination of Institutional Lapses, Corrupt Wildlife Industry Professionals and Asian Crime Syndicates*. <http://www.traffic.org/species-reports/traffic-species-mammals66.pdf>.
- Milner-Gulland, E. J. (2018). Documenting and tackling the illegal wildlife trade: Change and continuity over 40 years. *Oryx*, 52(4), 597–598.  
<https://doi.org/10.1017/S0030605318001047>
- Minteer, B. (2011). *Refounding Environmental Ethics: Pragmatism, Principle, and Practice*. Temple University Press.
- Miteva, D. A., Pattanayak, S. K., & Ferraro, P. J. (2012). Evaluation of biodiversity policy instruments: What works and what doesn't? *Oxford Review of Economic Policy*, 28(1), 69–92. <https://doi.org/10.1093/oxrep/grs009>
- Murtazashvili, I., & Murtazashvili, J. (2016). The origins of private property rights: States or customary organizations? *Journal of Institutional Economics*, 12(1), 105–128.  
<https://doi.org/10.1017/S1744137415000065>

- Nadelmann, E. A. (1990). Global Prohibition Regimes: The Evolution of Norms in International Society. *International Organization*, 44(4), 479–526.
- Naidoo, R., Weaver, L. C., Diggle, R. W., Matongo, G., Stuart-Hill, G., & Thouless, C. (2016). Complementary benefits of tourism and hunting to communal conservancies in Namibia. *Conservation Biology*, 30(3), 628–638. <https://doi.org/10.1111/cobi.12643>
- Natusch, D. J. D., Aust, P. W., & Shine, R. (2021). The perils of flawed science in wildlife trade literature. *Conservation Biology*, 35(5), 1396–1404. <https://doi.org/10.1111/cobi.13716>
- Norberg, J. (2004). Biodiversity and ecosystem functioning: A complex adaptive systems approach. *Limnology and Oceanography*, 49(4part2), 1269–1277. [https://doi.org/10.4319/lo.2004.49.4\\_part\\_2.1269](https://doi.org/10.4319/lo.2004.49.4_part_2.1269)
- North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press.
- North, D. C. (1991). Institutions. *The Journal of Economic Perspectives*, 5(1), 97–112.
- Norton, B. G. (1986). Conservation and Preservation: A Conceptual Rehabilitation. *Environmental Ethics*, 8(3), 195–220. <https://doi.org/10.5840/enviroethics1986832>
- Norton, B. G. (2005). *Sustainability: A Philosophy of Adaptive Ecosystem Management* (New edition edition). University of Chicago Press.
- Norton, B. G. (2015). *Sustainable Values, Sustainable Change: A Guide to Environmental Decision Making* (1 edition). University of Chicago Press.
- Nowell, K., & Ling, X. (2007). *Taming the tiger trade: China's markets for wild and captive tiger products since the 1993 domestic trade ban*. TRAFFIC East Asia.
- Noy, C. (2008). Sampling Knowledge: The Hermeneutics of Snowball Sampling in Qualitative Research. *International Journal of Social Research Methodology*, 11(4), 327–344. <https://doi.org/10.1080/13645570701401305>

- Oberthür, S., & Gehring, T. (Eds.). (2006). *Institutional Interaction in Global Environmental Governance: Synergy and Conflict among International and EU Policies*. MIT Press.
- Oldfield, S. (Ed.). (2003). *The Trade in Wildlife: Regulation for Conservation*. Earthscan.
- O'Neill, J. (2017). Pluralism and incommensurability. In C. L. Spash (Ed.), *Routledge Handbook of Ecological Economics: Nature and Society* (1st edition, pp. 227–236). Routledge.
- Onwuegbuzie, A. J., & Leech, N. L. (2007). Sampling Designs in Qualitative Research: Making the Sampling Process More Public. *Qualitative Report*, 12(2), 238–254.
- Orenstein, R. I., Freyer, D., Lieberman, S., Lyman, E., Reeve, R., Sanerib, T., & Schubert, D. J. (2022). Commentary: Think Before You Act: Improving the Conservation Outcomes of CITES Listing Decisions. *Frontiers in Ecology and Evolution*, 10.  
<https://www.frontiersin.org/article/10.3389/fevo.2022.889234>
- Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press.
- Ostrom, E. (2005). *Understanding Institutional Diversity*. Princeton University Press.
- Ostrom, E. (2007). A diagnostic approach for going beyond panaceas. *Proceedings of the National Academy of Sciences*, 104(39), 15181–15187.  
<https://doi.org/10.1073/pnas.0702288104>
- Ostrom, E. (2009). A General Framework for Analyzing Sustainability of Social-Ecological Systems. *Science*, 325(5939), 419–422. <https://doi.org/10.1126/science.1172133>
- Ostrom, E. (2010). Beyond Markets and States: Polycentric Governance of Complex Economic Systems. *The American Economic Review*, 100(3), 641–672.  
<https://doi.org/10.2307/27871226>
- Ostrom, E. (2011). Background on the Institutional Analysis and Development Framework. *Policy Studies Journal*, 39(1), 7–27. <https://doi.org/10.1111/j.1541-0072.2010.00394.x>

- Ostrom, E., & Cox, M. (2010). Moving beyond panaceas: A multi-tiered diagnostic approach for social-ecological analysis. *Environmental Conservation*, 37(4), 451–463.  
<https://doi.org/10.1017/S0376892910000834>
- Pahl-Wostl, C. (2017). An Evolutionary Perspective on Water Governance: From Understanding to Transformation. *Water Resources Management*, 31(10), 2917–2932.  
<https://doi.org/10.1007/s11269-017-1727-1>
- Pascual, U., Adams, W. M., Díaz, S., Lele, S., Mace, G. M., & Turnhout, E. (2021). Biodiversity and the challenge of pluralism. *Nature Sustainability*, 1–6.  
<https://doi.org/10.1038/s41893-021-00694-7>
- Patton, M. Q. (2015). *Qualitative Research & Evaluation Methods: Integrating Theory and Practice* (Fourth Edition edition). SAGE Publications, Inc.
- Pernetta, A. P. (2014). A disappearing drylands icon? White rhinoceros conservation and the need for public–private partnerships. *Biodiversity*, 15(2–3), 231–233.  
<https://doi.org/10.1080/14888386.2014.931248>
- Peters, B. G. (2019). *Institutional Theory in Political Science, Fourth Edition: The New Institutionalism* (4th edition). Edward Elgar Publishing Ltd.
- Peterson, M. N., & Nelson, M. P. (2017). Why the North American Model of Wildlife Conservation is Problematic for Modern Wildlife Management. *Human Dimensions of Wildlife*, 22(1), 43–54. <https://doi.org/10.1080/10871209.2016.1234009>
- Petersson, M., & Stoett, P. (2022). Lessons learnt in global biodiversity governance. *International Environmental Agreements: Politics, Law and Economics*, 22(2), 333–352.  
<https://doi.org/10.1007/s10784-022-09565-8>
- Pienaar, D. J., Hall-Martin, A. J., & Hitchens, P. M. (1991). Horn growth rates of free-ranging white and black rhinoceros. *Koedoe*, 34(2), 97–105.
- Pinker, S. (2002). *The Blank Slate: The Modern Denial of Human Nature*. Viking.

- Platteau, J.-P. (2000). *Institutions, Social Norms and Economic Development*. Routledge.
- Player, I. (2013). *The White Rhino Saga*. Jonathan Ball.
- Poole, J. H., & Thomsen, J. B. (1989). Elephant are not beetles: Implications of the ivory trade for the survival of the African elephant. *Oryx*, 23(4), 188–198.  
<https://doi.org/10.1017/S0030605300023012>
- Princen, T. (1994). The ivory trade ban: NGOs and international conservation. In T. Princen & M. Finger (Eds.), *Environmental NGOs in World Politics: Linking the Local and the Global* (pp. 121–159). Routledge.
- Princen, T., & Finger, M. (1994). *Environmental NGOs in World Politics: Linking the Local and the Global*. Routledge.
- Ramírez, R., & Wilkinson, A. (2016). *Strategic Reframing: The Oxford Scenario Planning Approach*. Oxford University Press.
- Ramp, D., & Bekoff, M. (2015). Compassion as a Practical and Evolved Ethic for Conservation. *BioScience*, 65(3), 323–327. <https://doi.org/10.1093/biosci/biu223>
- Reason, P., & Bradbury, H. (2013). *The Sage Handbook of Action Research: Participative Inquiry And Practice* (Second edition). Sage Publications Ltd.
- Redford, K. H., Amato, G., Baillie, J., Beldomenico, P., Bennett, E. L., Clum, N., Cook, R., Fonseca, G., Hedges, S., Launay, F., Lieberman, S., Mace, G. M., Murayama, A., Putnam, A., Robinson, J. G., Rosenbaum, H., Sanderson, E. W., Stuart, S. N., Thomas, P., & Thorbjarnarson, J. (2011). What Does It Mean to Successfully Conserve a (Vertebrate) Species? *BioScience*, 61(1), 39–48. <https://doi.org/10.1525/bio.2011.61.1.9>
- Redpath, S. M., Gutiérrez, R. J., Wood, K. A., & Young, J. C. (Eds.). (2015). *Conflicts in Conservation: Navigating Towards Solutions* (Illustrated edition). Cambridge University Press.

- Redpath, S. M., Young, J., Evely, A., Adams, W. M., Sutherland, W. J., Whitehouse, A., Amar, A., Lambert, R. A., Linnell, J. D. C., Watt, A., & Gutiérrez, R. J. (2013). Understanding and managing conservation conflicts. *Trends in Ecology & Evolution*, 28(2), 100–109. <https://doi.org/10.1016/j.tree.2012.08.021>
- Reeve, R. (2002). *Policing International Trade in Endangered Species: The CITES Treaty and Compliance*. Earthscan Ltd.
- Reeve, R. (2006). Wildlife trade, sanctions and compliance: Lessons from the CITES regime. *International Affairs*, 82(5), 881–897. <https://doi.org/10.1111/j.1468-2346.2006.00576.x>
- Ribot, J. C. (2004). *Waiting for Democracy: The Politics of Choice in Natural Resource Decentralization*. World Resources Institute.
- Ribot, J. C. (2007). Representation, Citizenship and the Public Domain in Democratic Decentralization. *Development*, 50(1), 43–49. <https://doi.org/10.1057/palgrave.development.1100335>
- Ribot, J. C., & Peluso, N. L. (2003). A Theory of Access\*. *Rural Sociology*, 68(2), 153–181. <https://doi.org/10.1111/j.1549-0831.2003.tb00133.x>
- Rieder, E., Larson, L. R., 't Sas-Rolfes, M., & Kopainsky, B. (2021). Using Participatory System Dynamics Modeling to Address Complex Conservation Problems: Tiger Farming as a Case Study. *Frontiers in Conservation Science*, 2, 61. <https://doi.org/10.3389/fcosc.2021.696615>
- Ripple, W. J., Chapron, G., López-Bao, J. V., Durant, S. M., Macdonald, D. W., Lindsey, P. A., Bennett, E. L., Beschta, R. L., Bruskotter, J. T., Campos-Arceiz, A., Corlett, R. T., Darimont, C. T., Dickman, A. J., Dirzo, R., Dublin, H. T., Estes, J. A., Everatt, K. T., Galetti, M., Goswami, V. R., ... Zhang, L. (2016). Saving the World's Terrestrial Megafauna. *BioScience*, 66(10), 807–812. <https://doi.org/10.1093/biosci/biw092>

- Ripple, W. J., Chapron, G., López-Bao, J. V., Durant, S. M., Macdonald, D. W., Lindsey, P. A., Bennett, E. L., Beschta, R. L., Bruskotter, J. T., Campos-Arceiz, A., Corlett, R. T., Darimont, C. T., Dickman, A. J., Dirzo, R., Dublin, H. T., Estes, J. A., Everatt, K. T., Galetti, M., Goswami, V. R., ... Zhang, L. (2017). Conserving the World's Megafauna and Biodiversity: The Fierce Urgency of Now. *BioScience*, 67(3), 197–200.  
<https://doi.org/10.1093/biosci/biw168>
- Ripple, W. J., Newsome, T. M., Wolf, C., Dirzo, R., Everatt, K. T., Galetti, M., Hayward, M. W., Kerley, G. I. H., Levi, T., Lindsey, P. A., Macdonald, D. W., Malhi, Y., Painter, L. E., Sandom, C. J., Terborgh, J., & Valkenburgh, B. V. (2015). Collapse of the world's largest herbivores. *Science Advances*, 1(4), e1400103.  
<https://doi.org/10.1126/sciadv.1400103>
- Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy Sciences*, 4(2), 155–169. <https://doi.org/10.1007/BF01405730>
- Rivalan, P., Delmas, V., Angulo, E., Bull, L. S., Hall, R. J., Courchamp, F., Rosser, A. M., & Leader-Williams, N. (2007). Can bans stimulate wildlife trade? *Nature*, 447(7144), Article 7144. <https://doi.org/10.1038/447529a>
- Robinson, J. G. (2011). Ethical pluralism, pragmatism, and sustainability in conservation practice. *Biological Conservation*, 144(3), 958–965.  
<https://doi.org/10.1016/j.biocon.2010.04.017>
- Roca, A. L., Georgiadis, N., Pecon-Slattery, J., & O'Brien, S. J. (2001). Genetic Evidence for Two Species of Elephant in Africa. *Science*, 293(5534), 1473–1477.  
<https://doi.org/10.1126/science.1059936>
- Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S., Lambin, E. F., Lenton, T. M., Scheffer, M., Folke, C., Schellnhuber, H. J., Nykvist, B., de Wit, C. A., Hughes, T., van der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P. K., Costanza, R., Svedin, U., ...

- Foley, J. A. (2009). A safe operating space for humanity. *Nature*, 461(7263), 472–475.  
<https://doi.org/10.1038/461472a>
- Roe, D., & Lee, T. M. (2021). Possible negative consequences of a wildlife trade ban. *Nature Sustainability*, 4(1), Article 1. <https://doi.org/10.1038/s41893-020-00676-1>
- Roe, E. (1994). *Narrative Policy Analysis: Theory and Practice*. Duke University Press.  
<https://doi.org/10.1215/9780822381891>
- Rose, C. (1985). Possession as the Origin of Property. *University of Chicago Law Review*, 52(1). <https://chicagounbound.uchicago.edu/uclrev/vol52/iss1/2>
- Rosenau, J. N., & Czempiel, E.-O. (Eds.). (1992). *Governance without Government: Order and Change in World Politics*. Cambridge University Press.  
<https://doi.org/10.1017/CBO9780511521775>
- Rubino, E. C., & Pienaar, E. F. (2017). Applying a conceptual framework to rhinoceros conservation on private lands in South Africa. *Endangered Species Research*, 34, 89–102. <https://doi.org/10.3354/esr00844>
- Rubino, E. C., & Pienaar, E. F. (2018). Understanding South African private landowner decisions to manage rhinoceroses. *Human Dimensions of Wildlife*, 23(2), 160–175.  
<https://doi.org/10.1080/10871209.2018.1402971>
- Sand, P. H. (1997). Whither CITES - The Evolution of a Treaty Regime in the Borderland of Trade and Environment. *European Journal of International Law*, 8(1), 29–58.
- Sand, P. H. (2001). A Century of Green Lessons: The Contribution of Nature Conservation Regimes to Global Governance. *International Environmental Agreements*, 1(1), 33–72.  
<https://doi.org/10.1023/A:1010113809755>
- Sand, P. H. (2016). Ed Couzens: Whales and elephants in international conservation law and politics: a comparative study. *International Environmental Agreements: Politics, Law and Economics*, 16(1), 161–164. <https://doi.org/10.1007/s10784-015-9282-9>

- Sand, P. H., & McGee, J. (2022). Lessons learnt from two decades of international environmental agreements: Law. *International Environmental Agreements: Politics, Law and Economics*, 22(2), 263–278. <https://doi.org/10.1007/s10784-022-09572-9>
- Sandbrook, C., Scales, I. R., Vira, B., & Adams, W. M. (2011). Value Plurality among Conservation Professionals. *Conservation Biology*, 25(2), 285–294. <https://doi.org/10.1111/j.1523-1739.2010.01592.x>
- Sanderson, E. W., Redford, K. H., Weber, B., Aune, K., Baldes, D., Berger, J., Carter, D., Curtin, C., Derr, J., Dobrott, S., Fearn, E., Fleener, C., Forrest, S., Gerlach, C., Gates, C. C., Gross, J. E., Gogan, P., Grassel, S., Hilty, J. A., ... Stephenson, B. (2008). The Ecological Future of the North American Bison: Conceiving Long-Term, Large-Scale Conservation of Wildlife. *Conservation Biology*, 22(2), 252–266. <https://doi.org/10.1111/j.1523-1739.2008.00899.x>
- Schlager, E., & Ostrom, E. (1992). Property-Rights Regimes and Natural Resources: A Conceptual Analysis. *Land Economics*, 68(3), 249–262. JSTOR. <https://doi.org/10.2307/3146375>
- Schlossberg, S., Chase, M. J., Gobush, K. S., Wasser, S. K., & Lindsay, K. (2020). State-space models reveal a continuing elephant poaching problem in most of Africa. *Scientific Reports*, 10(1), Article 1. <https://doi.org/10.1038/s41598-020-66906-w>
- Schmidt, V. A. (2008). Discursive Institutionalism: The Explanatory Power of Ideas and Discourse. *Annual Review of Political Science*, 11(1), 303–326. <https://doi.org/10.1146/annurev.polisci.11.060606.135342>
- Schouten, G., Vink, M., & Vellema, S. (2018). Institutional diagnostics for African food security: Approaches, methods and implications. *NJAS: Wageningen Journal of Life Sciences*, 84(1), 1–5. <https://doi.org/10.1016/j.njas.2017.11.002>

- Schrad, M. L. (2010). *The Political Power of Bad Ideas: Networks, Institutions, and the Global Prohibition Wave*. OUP USA.
- Scott, A. (1955). The Fishery: The Objectives of Sole Ownership. *Journal of Political Economy*, 63(2), 116–124.
- Scott, J. C. (1999). *Seeing like a State: How Certain Schemes to Improve the Human Condition Have Failed*. Yale University Press.
- Searle, J. R. (2005). What is an institution? *Journal of Institutional Economics*, 1(1), 1–22. Cambridge Core. <https://doi.org/10.1017/S1744137405000020>
- Sekar, N., Clark, W., Dobson, A., Coelho, P. C. F., Hannam, P. M., Hepworth, R., Hsiang, S., Kahumbu, P., Lee, P. C., Lindsay, K., Pereira, C. L., Wasser, S. K., & Nowak, K. (2018). Ivory crisis: Growing no-trade consensus. *Science*, 360(6386), 276. <https://doi.org/10.1126/science.aat1105>
- Shanahan, E. A., Jones, M. D., & McBeth, M. K. (2011). Policy Narratives and Policy Processes. *Policy Studies Journal*, 39(3), 535–561. <https://doi.org/10.1111/j.1541-0072.2011.00420.x>
- Shanahan, E. A., Jones, M. D., McBeth, M. K., & Radaelli, C. M. (2017). The Narrative Policy Framework. In C. M. Weible & P. A. Sabatier (Eds.), *Theories of the Policy Process* (4th edition, pp. 173–213). Routledge.
- Shogren, J. F., Tschirhart, J., Anderson, T., Ando, A. W., Beissinger, S. R., Brookshire, D., Jr., G. M. B., Coursey, D., Innes, R., Meyer, S. M., & Polasky, S. (1999). Why Economics Matters for Endangered Species Protection. *Conservation Biology*, 13(6), 1257–1261.
- Sikor, T., He, J., & Lestrelin, G. (2017). Property Rights Regimes and Natural Resources: A Conceptual Analysis Revisited. *World Development*, 93(Supplement C), 337–349. <https://doi.org/10.1016/j.worlddev.2016.12.032>

- Sills, E. O., & Jones, K. (2018). Chapter 9 - Causal inference in environmental conservation: The role of institutions. In P. Dasgupta, S. K. Pattanayak, & V. K. Smith (Eds.), *Handbook of Environmental Economics* (Vol. 4, pp. 395–437). Elsevier.  
<https://doi.org/10.1016/bs.hesenv.2018.09.001>
- Skonhoft, A. (1999). On the Optimal Exploitation of Terrestrial Animal Species. *Environmental and Resource Economics*, 13(1), 45–57.  
<https://doi.org/10.1023/A:1008261206811>
- Slovic, P. (1987). Perception of risk. *Science*, 236(4799), 280–285.  
<https://doi.org/10.1126/science.3563507>
- Smith, K. F., Behrens, M., Schloegel, L. M., Marano, N., Burgiel, S., & Daszak, P. (2009). Reducing the Risks of the Wildlife Trade. *Science*, 324(5927), 594–595.  
<https://doi.org/10.1126/science.1174460>
- Smith, V. L., & Wilson, B. J. (2019). *Humanomics: Moral Sentiments and the Wealth of Nations for the Twenty-First Century*. Cambridge University Press.
- Snidal, D. (1994). The Politics of Scope: Endogenous Actors, Heterogeneity and Institutions. *Journal of Theoretical Politics*, 6(4), 449–472.  
<https://doi.org/10.1177/0951692894006004003>
- Somerville, K. (2017). *Ivory: Power and Poaching in Africa* (1 edition). Hurst.
- Sowell, T. (1987). *A Conflict of Visions: Ideological Origins of Political Struggles*. William Morrow.
- Spash, C. L., & Hache, F. (2021). The Dasgupta Review deconstructed: An exposé of biodiversity economics. *Globalizations*, 0(0), 1–24.  
<https://doi.org/10.1080/14747731.2021.1929007>
- Spencer, A. R. (2019). *American Pragmatism: An Introduction* (1st edition). Polity.

- Srivastava, P., & Hopwood, N. (2009). A Practical Iterative Framework for Qualitative Data Analysis. *International Journal of Qualitative Methods*, 8(1), 76–84.  
<https://doi.org/10.1177/160940690900800107>
- Stein, A. A. (1982). Coordination and Collaboration: Regimes in an Anarchic World. *International Organization*, 36(2), 299–324.
- Stoddard, E. (2017, April 5). South Africa’s top court lifts ban on domestic sales in rhino horn. *Reuters*. <https://www.reuters.com/article/us-wildlife-rhinos-safrica-idUSKBN1771VP>
- Stoett, P. (2002). The International Regulation of Trade in Wildlife: Institutional and Normative Considerations. *International Environmental Agreements*, 2(2), 193–208.  
<https://doi.org/10.1023/A:1020942110468>
- Stolton, S., Redford, K. H., & Dudley, N. (2014). *The Futures of Privately Protected Areas: Developing capacity for a protected planet*. IUCN.
- Stuart, S. N., Al Dhaheri, S., Bennett, E. L., Biggs, D., Bignell, A., Byers, O., Cooney, R., Donaldson, J., Dublin, H. T., Eggermont, H., Engels, B., van Havre, B., Hoffmann, M., Horie, M., Hutton, J., Khosla, A., Launay, F., Lees, C., Mace, G. M., ... von Weissenberg, M. (2019). IUCN’s encounter with 007: Safeguarding consensus for conservation. *Oryx*, 53(4), 741–747. Cambridge Core.  
<https://doi.org/10.1017/S0030605317001557>
- Sugg, I. C., & Kreuter, U. P. (1994). *Elephants and Ivory: Lessons From the Trade Ban*. Institute of Economic Affairs.
- Swanson, T. (2001). Negotiating Effective International Environmental Agreements: Is an Objective Approach to Differential Treatment Possible? *International Environmental Agreements*, 1(1), 125–153. <https://doi.org/10.1023/A:1010109708847>

- Swanson, T., Bolton, P., & Manning, A. (1993). Regulating Endangered Species. *Economic Policy*, 8(16), 185–205. <https://doi.org/10.2307/1344571>
- Swanson, T. M. (1994a). The Economics of Extinction Revisited and Revised: A Generalised Framework for the Analysis of the Problems of Endangered Species and Biodiversity Losses. *Oxford Economic Papers*, 46, 800–821.
- Swanson, T. M. (1994b). *The International Regulation of Extinction*. Macmillan.
- Swanson, T. M. (1996). International Regulation for Environmental Protection: Learning from CITES. *Economic Affairs*, 16(5), 8–16. <https://doi.org/10.1111/j.1468-0270.1996.tb00562.x>
- Swanson, T. M., & Barbier, E. (1992). *Economics for the Wilds: Wildlife, Diversity, and Development*. Island Press.
- Swanson, T., Mourato, S., Swierzbinski, J., & Kontoleon, A. (2002). Conflicts in conservation: The many values of the black rhinoceros. In D. Pearce, C. Pearce, & C. Palmer (Eds.), *Valuing the environment in developing countries: Case studies* (pp. 169–205). Edward Elgar Publishing.
- 't Sas-Rolfes, M. (1990). *Privatizing the rhino industry*. Free Market Foundation. [http://www.rhinosourcecenter.com/index.php?s=1&act=refs&CODE=ref\\_detail&id=1165243100](http://www.rhinosourcecenter.com/index.php?s=1&act=refs&CODE=ref_detail&id=1165243100)
- 't Sas-Rolfes, M. (1995). *Rhinos: Conservation, Economics, and Trade-offs*. IEA Environmental Unit. <https://iea.org.uk/publications/research/rhinos-conservation-economics-and-trade-offs>
- 't Sas-Rolfes, M. (2000). Assessing CITES: Four Case Studies. In J. Hutton & B. Dickson (Eds.), *Endangered Species, Threatened Convention* (pp. 69–87). Earthscan Publications Ltd.

- 't Sas-Rolfes, M. (2016). Commodifying Wildlife. In D. Schmidtz (Ed.), *Philosophy: Environmental Ethics* (1 edition, pp. 185–219). Macmillan.
- 't Sas-Rolfes, M. (2017). African wildlife conservation and the evolution of hunting institutions. *Environmental Research Letters*, *12*(11), 115007.
- 't Sas-Rolfes, M., Challender, D., Hinsley, A., & Verissimo, D. (2019, August 16). *Effectiveness of policy interventions relating to the illegal and unsustainable wildlife trade*. UNEP - UN Environment Programme.  
<http://www.unenvironment.org/resources/policy-and-strategy/effectiveness-policy-interventions-relating-illegal-and-unsustainable>
- 't Sas-Rolfes, M., Challender, D. W. S., Hinsley, A., Verissimo, D., & Milner-Gulland, E. J. (2019a). Illegal Wildlife Trade: Patterns, Processes, and Governance. *Annual Review of Environment and Resources*, *44*(1), 201-228. <https://doi.org/10.1146/annurev-environ-101718-033253>
- 't Sas-Rolfes, M., Challender, D. W. S., Hinsley, A., Verissimo, D., & Milner-Gulland, E. J. (2019b). Illegal Wildlife Trade: Scale, Processes, and Governance. *Annual Review of Environment and Resources*, *44*(1), 201–228. <https://doi.org/10.1146/annurev-environ-101718-033253>
- 't Sas-Rolfes, M., & Emslie, R. (2024). African Rhino Conservation and the Interacting Influences of Property, Prices, and Policy. *Ecological Economics*, *220*, 108123.  
<https://doi.org/10.1016/j.ecolecon.2024.108123>
- 't Sas-Rolfes, M., Emslie, R., Adcock, K., & Knight, M. (2022). Legal hunting for conservation of highly threatened species: The case of African rhinos. *Conservation Letters*, *15*(3), e12877. <https://doi.org/10.1111/conl.12877>
- 't Sas-Rolfes, M., & Fitzgerald, T. (2013). Can a Legal Horn Trade Save Rhinos? *PERC Research Paper*, 13–6. [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2288892](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2288892)

- 't Sas-Rolfes, M., & Gooden, J. (2023). *A conflict of visions: Ideas shaping wildlife trade policy toward African megafauna*. <https://doi.org/10.31235/osf.io/bzse5>
- 't Sas-Rolfes, M., & Hiller, C. (2021). *Literature Review: Assessment of the Impact of Trade Restrictions and Other Policies on Wildlife Conservation and Community Wildlife Stewardship in Southern Africa*. USAID. DOI: [10.13140/RG.2.2.21779.28965](https://doi.org/10.13140/RG.2.2.21779.28965)
- 't Sas-Rolfes, M., Moyle, B., & Stiles, D. (2014). The complex policy issue of elephant ivory stockpile management. *Pachyderm*, 55, 62–77.
- Talbot, L. M. (1980). The World's Conservation Strategy. *Environmental Conservation*, 7(4), 259–268.
- Taylor, M. S. (2011). Buffalo Hunt: International Trade and the Virtual Extinction of the North American Bison. *American Economic Review*, 101(7), 3162–3195.  
<https://doi.org/10.1257/aer.101.7.3162>
- Taylor, W. A., Lindsey, P. A., Nicholson, S. K., Relton, C., & Davies-Mostert, H. T. (2020). Jobs, game meat and profits: The benefits of wildlife ranching on marginal lands in South Africa. *Biological Conservation*, 245, 108561.  
<https://doi.org/10.1016/j.biocon.2020.108561>
- Thompson, C. (2004). Co-producing CITES and the African Elephant. In S. Jasanoff (Ed.), *States of Knowledge: The Co-production of Science and the Social Order* (1st edition, pp. 67–86). Routledge.
- Timmermans, S., & Tavory, I. (2012). Theory Construction in Qualitative Research: From Grounded Theory to Abductive Analysis. *Sociological Theory*, 30(3), 167–186.  
<https://doi.org/10.1177/0735275112457914>
- Tisdell, C. (2004). Property rights in non-captive wildlife and biodiversity conservation. *International Journal of Global Environmental Issues*, 4(4), 195–208.  
<https://doi.org/10.1504/IJGENVI.2004.006050>

- Tober, J. (1981). *Who Owns the Wild Life?: Political Economy of Conservation in Nineteenth-century America: 37 (Contributions in Economics & Economic History): The ... Of Conservation in Nineteenth-Century America*. Praeger.
- Treves, A., Santiago-Ávila, F. J., & Lynn, W. S. (2019). Just preservation. *Biological Conservation*, 229, 134–141. <https://doi.org/10.1016/j.biocon.2018.11.018>
- Trouwborst, A., Blackmore, A., Boitani, L., Bowman, M., Caddell, R., Chapron, G., Cliquet, A., Couzens, E., Epstein, Y., Fernández-Galiano, E., Fleurke, F. M., Gardner, R., Hunter, L., Jacobsen, K., Krofel, M., Lewis, M., López-Bao, J. V., Macdonald, D., Redpath, S., ... Linnell, J. D. C. (2017). International Wildlife Law: Understanding and Enhancing Its Role in Conservation. *BioScience*, 67(9), 784–790. <https://doi.org/10.1093/biosci/bix086>
- Trouwborst, A., Loveridge, A. J., & Macdonald, D. W. (n.d.). Spotty Data: Managing International Leopard (*Panthera pardus*) Trophy Hunting Quotas Amidst Uncertainty. *Journal of Environmental Law*. <https://doi.org/10.1093/jel/eqz032>
- Underwood, F. M., Burn, R. W., & Milliken, T. (2013). Dissecting the Illegal Ivory Trade: An Analysis of Ivory Seizures Data. *PLOS ONE*, 8(10), e76539. <https://doi.org/10.1371/journal.pone.0076539>
- UNEP. (2019). *Effectiveness of policy interventions relating to the illegal and unsustainable wildlife trade* [Policy Brief]. United Nations Environment Programme. <http://www.unenvironment.org/resources/policy-and-strategy/effectiveness-policy-interventions-relating-illegal-and-unsustainable>
- Van Gorp, B. (2007). The Constructionist Approach to Framing: Bringing Culture Back In. *Journal of Communication*, 57(1), 60–78. <https://doi.org/10.1111/j.0021-9916.2007.00329.x>
- Van Kooten, G. C. (2008). Protecting the African elephant: A dynamic bioeconomic model of ivory trade. *Biological Conservation*, 141(2008), 2012–2022.

- Vatn, A. (2006). *Institutions and the Environment*. Edward Elgar Publishing.
- Velázquez Gomar, J. O. (2016). Environmental policy integration among multilateral environmental agreements: The case of biodiversity. *International Environmental Agreements: Politics, Law and Economics*, 16(4), 525–541.  
<https://doi.org/10.1007/s10784-014-9263-4>
- Velázquez Gomar, J. O., & Stringer, L. C. (2011). Moving Towards Sustainability? An Analysis of CITES' Conservation Policies. *Environmental Policy & Governance*, 21(4), 240–258. <https://doi.org/10.1002/eet.577>
- Velázquez Gomar, J. O., Stringer, L. C., & Paavola, J. (2014). Regime Complexes and National Policy Coherence: Experiences in the Biodiversity Cluster. *Global Governance*, 20(1), 119–145.
- Venturini, T. (2010). Diving in magma: How to explore controversies with actor-network theory. *Public Understanding of Science*, 19(3), 258–273.  
<https://doi.org/10.1177/0963662509102694>
- Venturini, T., & Munk, A. K. (2021). *Controversy Mapping: A Field Guide* (1st edition). Polity.
- Veríssimo, D., MacMillan, D. C., & Smith, R. J. (2011). Toward a systematic approach for identifying conservation flagships. *Conservation Letters*, 4(1), 1–8.  
<https://doi.org/10.1111/j.1755-263X.2010.00151.x>
- Vigne, L., & Martin, E. B. (2018). *Illegal Rhino Horn Trade in Eastern Asia Still Threatens Kruger's Rhinos*. The Aspinall Foundation.  
<https://www.aspinallfoundation.org/media/3936/rhinos-of-kruger-for-online-for-amos-1.pdf>

- Voronov, M., & Weber, K. (2020). People, Actors, and the Humanizing of Institutional Theory. *Journal of Management Studies*, 57(4), 873–884.  
<https://doi.org/10.1111/joms.12559>
- Vucetich, J. A., Bruskotter, J. T., & Nelson, M. P. (2015). Evaluating whether nature's intrinsic value is an axiom of or anathema to conservation. *Conservation Biology*, 29(2), 321–332. <https://doi.org/10.1111/cobi.12464>
- Walker, B., Holling, C. S., Carpenter, S., & Kinzig, A. (2004). Resilience, Adaptability and Transformability in Social–ecological Systems. *Ecology and Society*, 9(2).  
<https://doi.org/10.5751/ES-00650-090205>
- Walker, J. F. (2009). *Ivory's Ghosts: The White Gold of History and the Fate of Elephants*. Grove Press / Atlantic Monthly Press.
- Wandesforde-Smith, G. (2015). On the Life and Death of Wildlife Treaties. *Journal of International Wildlife Law & Policy*, 18(1), 84–96.  
<https://doi.org/10.1080/13880292.2015.1010913>
- Wandesforde-Smith, G. (2016). Looking for Law in All the Wrong Places? Dying Elephants, Evolving Treaties, and Empty Threats. *Journal of International Wildlife Law & Policy*, 19(4), 365–381. <https://doi.org/10.1080/13880292.2016.1248701>
- Wanyonyi, E. W. (2012). Mobilizing Resources for Wildlife Conservation in Kenya beyond the 21st Century. *The George Wright Forum*, 29(1), 118–125.
- Weible, C. M., & Sabatier, P. A. (2017). *Theories of the Policy Process* (4th edition). Routledge.
- Weiss, U. (2019). The Regressive Effect of Legal Uncertainty. *Journal of Dispute Resolution*, 2019, 149.
- Western, D. (1987). Africa's elephants and rhinos: Flagships in crisis. *Trends in Ecology & Evolution*, 2(11), 343–346. [https://doi.org/10.1016/0169-5347\(87\)90112-1](https://doi.org/10.1016/0169-5347(87)90112-1)

- Western, D., & Vigne, L. (1985). The deteriorating status of African rhinos. *Oryx*, 19(4), 215–220. Cambridge Core. <https://doi.org/10.1017/S0030605300025643>
- Wiersema, A. (2013). Uncertainty and Markets for Endangered Species under CITES. *Review of European, Comparative & International Environmental Law*, 22(3), 239–250. <https://doi.org/10.1111/reel.12047>
- Wiersema, A. (2015). Uncertainty, Precaution, and Adaptive Management in Wildlife Trade. *Michigan Journal of International Law*, 36(3), 375–424.
- Wiersema, A. (2016). Incomplete Bans and Uncertain Markets in Wildlife Trade. *University of Pennsylvania Asian Law Review*, 12, 65.
- Wijnstekers, W. (2018). *The Evolution of CITES: A reference to the Convention on International Trade in Endangered Species of Wild Fauna and Flora* (11th ed.). International Council for Game and Wildlife Conservation. [https://cites.org/sites/default/files/common/resources/The\\_Evolution\\_of\\_CITES\\_2018.pdf](https://cites.org/sites/default/files/common/resources/The_Evolution_of_CITES_2018.pdf)
- Williams, V. L., Coals, P. G., Bruyn, M. de, Naude, V. N., Dalton, D. L., & Kotzé, A. (2021). Monitoring compliance of CITES lion bone exports from South Africa. *PLOS ONE*, 16(4), e0249306. <https://doi.org/10.1371/journal.pone.0249306>
- Williams, V. L., & 't Sas-Rolfes, M. J. (2019). Born captive: A survey of the lion breeding, keeping and hunting industries in South Africa. *PLOS ONE*, 14(5), e0217409. <https://doi.org/10.1371/journal.pone.0217409>
- Williamson, O. E. (1998). Transaction Cost Economics: How It Works; Where It is Headed. *De Economist*, 146(1), 23–58. <https://doi.org/10.1023/A:1003263908567>
- Williamson, O. E. (2000). The New Institutional Economics: Taking Stock, Looking Ahead. *Journal of Economic Literature*, 38(3), 595–613.

- Wilson, B. J. (2020). *The Property Species: Mine, Yours, and the Human Mind*. Oxford University Press.
- Wittemyer, G., Northrup, J. M., Blanc, J., Douglas-Hamilton, I., Omondi, P., & Burnham, K. P. (2014). Illegal killing for ivory drives global decline in African elephants. *Proceedings of the National Academy of Sciences*, *111*(36), 13117–13121. <https://doi.org/10.1073/pnas.1403984111>
- Woldendorp, J., & Keman, H. (2010). Dynamic institutional analysis: Measuring corporatist intermediation. *Quality & Quantity*, *44*(2), 259–275. <https://doi.org/10.1007/s11135-008-9195-6>
- Wyatt, T. (2021). *Is CITES Protecting Wildlife?: Assessing Implementation and Compliance* (1st edition). Routledge.
- Young, O. (2011). Land use, environmental change, and sustainable development: The role of institutional diagnostics. *International Journal of the Commons*, *5*(1), Article 1. <https://doi.org/10.18352/ijc.244>
- Young, O. R. (1982). *Resource Regimes: Natural Resources and Social Institutions*. University of California Press.
- Young, O. R. (1986). International Regimes: Toward a New Theory of Institutions. *World Politics*, *39*(1), 104–122. JSTOR. <https://doi.org/10.2307/2010300>
- Young, O. R. (1989). *International Cooperation: Building Regimes for Natural Resources and the Environment*. Cornell University Press.
- Young, O. R. (1994). *International Governance: Protecting the Environment in a Stateless Society*. Cornell University Press.
- Young, O. R. (Ed.). (1999). *The Effectiveness of International Environmental Regimes: Causal Connections and Behavioral Mechanisms*. MIT Press.

- Young, O. R. (2002). *The Institutional Dimensions of Environmental Change: Fit, Interplay, and Scale*. MIT Press.
- Young, O. R. (2008). Building Regimes for Socioecological Systems: Institutional Diagnostics. In O. R. Young, L. A. King, & H. Schroeder (Eds.), *Institutions and Environmental Change: Principal Findings, Applications, and Research Frontiers* (First Edition, pp. 115–144). The MIT Press.
- Young, O. R. (2010). *Institutional Dynamics: Emergent Patterns in International Environmental Governance*. MIT Press.
- Young, O. R. (2017). *Governing Complex Systems: Social Capital for the Anthropocene*. MIT Press.
- Young, O. R. (2018). Research strategies to assess the effectiveness of international environmental regimes. *Nature Sustainability*, 1(9), Article 9.  
<https://doi.org/10.1038/s41893-018-0132-y>
- Young, S. (2003). Contemporary Issues of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Debate over Sustainable Use. *Colorado Journal of International Environmental Law and Policy*, 14, 167.
- Zimbabwe Parks & Wildlife. (2019). *Status of Rhinos in Zimbabwe* (CoP18 Doc. 83.1 Annex 4). CITES. <https://www.cites.org/sites/default/files/eng/cop/18/doc/E-CoP18-083-01.pdf>
- Zschokke, S., Armbruster, G. F. J., Ursenbacher, S., & Baur, B. (2011). Genetic differences between the two remaining wild populations of the endangered Indian rhinoceros (*Rhinoceros unicornis*). *Biological Conservation*, 144(11), 2702–2709.  
<https://doi.org/10.1016/j.biocon.2011.07.031>

## Appendices

### Appendix 1: List of key informant interviews

Person	Organisation	Position	Date	Location	Duration (mins)
Tom Milliken	TRAFFIC International	Species Programme Leader	2016-12-06	Harare, ZW	215
Holly Dublin	IUCN SSC African Elephant Specialist Group	Chair	2016-12-31	Cape Town, SA	82
Thea Carroll	Environment Ministry, South Africa	Deputy Director General	2017-05-03	Pretoria, SA	88
Malan Lindeque	Environment Ministry, Namibia	Permanent Secretary	2018-01-11	Windhoek, NA	134
John Hume	Platinum Rhino (breeding operation)	Owner	2018-03-02	Klerksdorp, SA	35
Simon Stuart	IUCN Species Survival Commission	Chair (former)	2018-06-29	Bath, UK	54
Cathy Dean	Save the Rhino International	CEO	2018-07-02	London, UK	80
Mary Rice	Environmental Investigation Agency	CEO	2018-08-16	London, UK	89
Mark Jones	Born Free Foundation	Head of Policy	2018-09-19	London, UK	60

Note: All signed consent forms are available on request

## Appendix 2: Additional work published during the course of my research

### Academic journal articles and book chapters

#### *As lead author:*

- 't Sas-Rolfes, M. (2016a). A Rebuttal to Harvey, R. (2016). 'Risks and Fallacies Associated with Promoting a Legalized Trade in Ivory' in *Politikon* 43(2): 215–229. *Politikon*, 43(3), 451–458. <https://doi.org/10.1080/02589346.2016.1241464>
- 't Sas-Rolfes, M. (2016b). Commodifying Wildlife. In D. Schmidt (Ed.), *Philosophy: Environmental Ethics* (1 edition, pp. 185–219). Macmillan.
- 't Sas-Rolfes, M. (2017). African wildlife conservation and the evolution of hunting institutions. *Environmental Research Letters*, 12(11), 115007.
- 't Sas-Rolfes, M., & Challender, D. W. S. (2020). Evaluating the impact of pangolin farming on conservation. In D. W. S. Challender, H. C. Nash, & C. Waterman (Eds.), *Pangolins: Science, society and conservation* (pp. 517–527). Academic Press.
- 't Sas-Rolfes, M., Challender, D. W. S., Hinsley, A., Veríssimo, D., & Milner-Gulland, E. J. (2019). Illegal Wildlife Trade: Scale, Processes, and Governance. *Annual Review of Environment and Resources*, 44(1), 201–228. <https://doi.org/10.1146/annurev-environ-101718-033253>
- 't Sas-Rolfes, M., Emslie, R., Adcock, K., & Knight, M. (2022). Legal hunting for conservation of highly threatened species: The case of African rhinos. *Conservation Letters*, 15(3), e12877. <https://doi.org/10.1111/conl.12877>

#### *As second author:*

- Challender, D. W. S., 't Sas-Rolfes, M., Ades, G. W. J., Chin, J. S. C., Ching-Min Sun, N., Chong, J. lian, Connelly, E., Hywood, L., Luz, S., Mohapatra, R. K., de Ornellas, P., Parker, K., Pietersen, D. W., Robertson, S. I., Semiadi, G., Shaw, D., Shepherd, C. R., Thomson, P., Wang, Y., ... Nash, H. C. (2019). Evaluating the feasibility of pangolin farming and its potential conservation impact. *Global Ecology and Conservation*, 20, e00714. <https://doi.org/10.1016/j.gecco.2019.e00714>
- Chen, F., & 't Sas-Rolfes, M. (2021). Theoretical analysis of a simple permit system for selling synthetic wildlife goods. *Ecological Economics*, 180, 106873. <https://doi.org/10.1016/j.ecolecon.2020.106873>
- Di Minin, E., 't Sas-Rolfes, M., Selier, J., Louis, M., & Bradshaw, C. J. A. (2022). Dismantling the poachernomics of the illegal wildlife trade. *Biological Conservation*, 265, 109418. <https://doi.org/10.1016/j.biocon.2021.109418>
- Gooden, J., & 't Sas-Rolfes, M. (2020). A review of critical perspectives on private land conservation in academic literature. *Ambio*, 49(5), 1019–1034. <https://doi.org/10.1007/s13280-019-01258-y>
- Hiller, C., & 't Sas-Rolfes, M. (2024). Systematic review of the impact of restrictive wildlife trade measures on conservation of iconic species in southern Africa. *Conservation Biology*, n/a(n/a), e14262. <https://doi.org/10.1111/cobi.14262>

- Hinsley, A., & 't Sas-Rolfes, M. (2020). Wild assumptions? Questioning simplistic narratives about consumer preferences for wildlife products. *People and Nature*, 2(4), 972–979. <https://doi.org/10.1002/pan3.10099>
- Verissimo, D., 't Sas-Rolfes, M., & Glikman, J. A. (2020). Influencing consumer demand is vital for tackling the illegal wildlife trade. *People and Nature*, 2(4), 872–876. <https://doi.org/10.1002/pan3.10171>
- Williams, V. L., & 't Sas-Rolfes, M. J. (2019). Born captive: A survey of the lion breeding, keeping and hunting industries in South Africa. *PLOS ONE*, 14(5), e0217409. <https://doi.org/10.1371/journal.pone.0217409>

***As contributing author:***

- Challender, D. W. S., Brockington, D., Hinsley, A., Hoffmann, M., Kolby, J. E., Massé, F., Natusch, D. J. D., Oldfield, T. E. E., 't Sas-Rolfes, M., & Milner-Gulland, E. J. (2022). Accurate characterization of wildlife trade and policy instruments: Reply to D’Cruze et al. (2022) and Frank and Wilcove (2022). *Conservation Letters*, 15(1), e12870. <https://doi.org/10.1111/conl.12870>
- Challender, D. W. S., Brockington, D., Hinsley, A., Hoffmann, M., Kolby, J. E., Massé, F., Natusch, D. J. D., Oldfield, T. E. E., Outhwaite, W., 't Sas-Rolfes, M., & Milner-Gulland, E. J. (2022). Mischaracterizing wildlife trade and its impacts may mislead policy processes. *Conservation Letters*, 15(1), e12832. <https://doi.org/10.1111/conl.12832>
- Coals, P., Burnham, D., Loveridge, A., Macdonald, D. W., 't Sas-Rolfes, M., Williams, V. L., & Vucetich, J. A. (2019). The Ethics of Human–Animal Relationships and Public Discourse: A Case Study of Lions Bred for Their Bones. *Animals*, 9(2), 52. <https://doi.org/10.3390/ani9020052>
- Dickman, A. J., Johnson, P. J., 't Sas-Rolfes, M., Minin, E. D., Loveridge, A. J., Good, C., Sibanda, L., Feber, R. E., Harrington, L. A., Mbizah, M., Cotterill, A., Burnham, D., & Macdonald, D. W. (2019). Is there an elephant in the room? A response to Batavia et al. *Conservation Letters*, 12(1), e12603. <https://doi.org/10.1111/conl.12603>
- Esmail, N., Wintle, B. C., 't Sas-Rolfes, M., Athanas, A., Beale, C. M., Bending, Z., Dai, R., Fabinyi, M., Gluszek, S., Haenlein, C., Harrington, L. A., Hinsley, A., Kariuki, K., Lam, J., Markus, M., Paudel, K., Shukhova, S., Sutherland, W. J., Verissimo, D., ... Milner-Gulland, E. J. (2020). Emerging illegal wildlife trade issues: A global horizon scan. *Conservation Letters*, 13(4), e12715. <https://doi.org/10.1111/conl.12715>
- Rieder, E., Larson, L. R., 't Sas-Rolfes, M., & Kopainsky, B. (2021). Using Participatory System Dynamics Modeling to Address Complex Conservation Problems: Tiger Farming as a Case Study. *Frontiers in Conservation Science*, 2, 61. <https://doi.org/10.3389/fcosc.2021.696615>
- Roe, D., Dickman, A., Kock, R., Milner-Gulland, E. J., Rihoy, E., & 't Sas-Rolfes, M. (2020). Beyond banning wildlife trade: COVID-19, conservation and development. *World Development*, 136, 105121. <https://doi.org/10.1016/j.worlddev.2020.105121>

- Taylor, A., Balfour, D., Brebner, D. K., Coetzee, R., Davies-Mostert, H., Lindsey, P. A., Shaw, J., & 't Sas-Rolfes, M. (2017). Sustainable rhino horn production at the pointy end of the rhino horn trade debate. *Biological Conservation*, 216(Supplement C), 60–68. <https://doi.org/10.1016/j.biocon.2017.10.004>
- Thomas-Walters, L., Morkel, B., Kubo, T., 't Sas Rolfes, M., Smith, R. J., & Verissimo, D. (2023). Understanding the Market Drivers Behind the Reduced Demand for Ivory Products in Japan. *Conservation & Society*, 21(1), Article 1. [https://doi.org/10.4103/cs.cs\\_155\\_21](https://doi.org/10.4103/cs.cs_155_21)

## Research report

- 't Sas-Rolfes, M., & Hiller, C. (2021). *Literature Review: Assessment of the Impact of Trade Restrictions and Other Policies on Wildlife Conservation and Community Wildlife Stewardship in Southern Africa*. USAID. <https://doi.org/10.13140/RG.2.2.21779.28965>

## Policy briefs

### *As lead author:*

- 't Sas-Rolfes, M., Challender, D., Hinsley, A., & Verissimo, D. (2019, August 16). *Effectiveness of policy interventions relating to the illegal and unsustainable wildlife trade*. UNEP - UN Environment Programme. <http://www.unenvironment.org/resources/policy-and-strategy/effectiveness-policy-interventions-relating-illegal-and-unsustainable>

### *As contributing author:*

- Esmail, N., Kuiper, T., 't Sas-Rolfes, M., Challender, D., & Hinsley, A. (2018, November 22). Whose voice counts in Illegal Wildlife Trade policy? Beyond London 2018. *Oxford Martin Programme on the Illegal Wildlife Trade*. <http://www.illegalwildlifetrade.net/2018/11/22/whose-voice-counts-in-illegal-wildlife-trade-policy-beyond-london-2018/>
- Milner-Gulland, E. J., Cugnieri, L., Hinsley, A., Phelps, J., 't Sas-Rolfes, M., & Verissimo, D. (2018). *Evidence to Action: Research to Address Illegal Wildlife Trade*. <https://doi.org/10.31235/osf.io/35ndz>

## **Appendix 3: Co-author contribution statements & acceptance letters**

### **Paper 1/Chapter 4: Jennifer Gooden contribution**

MtR conceived of the ideas.

MtR designed the methodology, with assistance from JG.

MtR collected the data.

MtR analysed the data.

MtR led the writing of the manuscript.

All authors contributed critically to the drafts and gave final approval for publication.

### **Paper 2/Chapter 6: Daniel Challender and Laurence Wainwright contributions**

MtR conceived of the ideas.

MtR designed the methodology, DC and LW provided input.

MtR collected the data; DC assisted with additional data.

MtR analysed the data, with some assistance from DC.

MtR led the writing of the manuscript.

All authors contributed critically to the drafts and gave final approval for publication.

### **Paper 3/Chapter 8: Richard Emslie contribution**

MtR conceived of the ideas.

MtR designed the methodology.

MtR and RE collected the data.

MtR analysed the data, with some assistance from RE.

MtR led the writing of the manuscript.

All authors contributed critically to the drafts and gave final approval for publication.

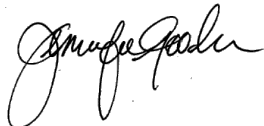
18 April 2023

Director of the Graduate School  
School of Geography and the Environment  
University of Oxford

To Whom It May Concern:

I hereby confirm that I co-authored a paper submitted for publication by Michael 't Sas-Rolfes as part of his thesis and further that my contribution to this paper was minor, consisting of assistance with methodology, critical revision of the manuscript prior to submission, and final approval for publication. The vast majority of the intellectual components and other work relating to this paper is that of Michael.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jennifer Gooden', written in a cursive style.

Jennifer Gooden  
Jennifer.gooden@gmail.com

# Department of **BIOLOGY**

---

Director of the Graduate School  
School of Geography and the Environment  
University of Oxford

20<sup>th</sup> April 2023

To Whom It May Concern:

I hereby confirm that I co-authored a paper on CITES and African megafauna submitted for publication by Michael 't Sas-Rolfes as part of his D.Phil. thesis and that my contribution to this paper was minor, consisting of some methodological assistance, provision of data, limited data analysis, and critical revision of the manuscript prior to submission. The vast majority of the intellectual components and other work relating to this paper is that of Michael.

Yours sincerely,



Dr Dan Challender

**DEPARTMENT OF BIOLOGY (MANSFIELD ROAD)**  
11a Mansfield Road  
Oxford, OX1 3SZ





19 April 2023

Director of the Graduate School  
School of Geography and the Environment  
University of Oxford

To Whom It May Concern:

I hereby confirm that I co-authored a paper submitted for publication by Michael 't Sas-Rolfes as part of his doctoral thesis and further that my contribution to this paper was minor, consisting of some methodological assistance, critical revision of the manuscript prior to submission, and final approval for publication. The vast majority of the intellectual components and other work relating to this paper is that of Michael.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Laurence Wainwright'.

**Dr Laurence Wainwright**  
Departmental Lecturer & Course Director  
School of Geography and the Environment  
University of Oxford

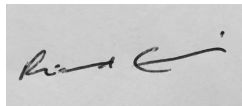
20 April 2023

Director of the Graduate School  
School of Geography and the Environment  
University of Oxford

To Whom It May Concern:

I hereby confirm that I co-authored a paper submitted for publication by Michael 't Sas-Rolfes as part of his thesis and further that my contribution to this paper was minor, consisting of some assistance with data collection and intermediary analysis, and critical revision of manuscript prior to submission. The vast majority of the intellectual components and other work relating to this paper is that of Michael.

Yours sincerely,

A handwritten signature in black ink on a light grey background. The signature appears to be 'Richard Emslie' written in a cursive style.

Richard H. Emslie  
rhemslic@gmail.com



Michael 't Sas-Rolfes <tsas.rolfes@gmail.com>

---

**People and Nature - Manuscript ID PAN-23-04-164**

1 message

---

**People and Nature** <onbehalfof@manuscriptcentral.com>

14 April 2023 at 10:03

Reply-To: editorial@people-and-nature.org

To: tsas.rolfes@gmail.com

Cc: tsas.rolfes@gmail.com, jennifer@biophiliafoundation.org

14-Apr-2023

This message is copied to all co-authors for information: please contact the Editorial Office as soon as possible if you disagree with being listed as a co-author for this manuscript.

Dear Michael 't Sas-Rolfes,

Your manuscript entitled "A conflict of visions: Ideas shaping wildlife trade policy toward African megafauna" by 't Sas-Rolfes, Michael; Gooden, Jennifer, has been successfully submitted online and is presently being given full consideration for publication in People and Nature.

Your manuscript ID is PAN-23-04-164.

Please mention the above manuscript ID in all future correspondence or when contacting the office for questions. If there are any changes in your contact details, particularly in your e-mail address, please log in to ScholarOne Manuscripts at <https://mc.manuscriptcentral.com/pan-besjournals> and edit your user information as appropriate.

You can also view the status of your manuscript at any time by checking your Author Centre after logging in to <https://mc.manuscriptcentral.com/pan-besjournals>.

Thank you for submitting your manuscript to People and Nature.

Best wishes,  
Milly Anderson

People and Nature  
[editorial@people-and-nature.org](mailto:editorial@people-and-nature.org)



Michael 't Sas-Rolfes &lt;tsas.rolfes@gmail.com&gt;

---

**EET-23-0148 successfully submitted**

---

**Editorial Office** <onbehalf@manuscriptcentral.com>

21 April 2023 at 01:22

Reply-To: eet.office@wiley.com

To: tsas.rolfes@gmail.com, michael.tsas-rolfes@ouce.ox.ac.uk

Cc: tsas.rolfes@gmail.com, michael.tsas-rolfes@ouce.ox.ac.uk, dan.challender@zoo.ox.ac.uk, laurence.wainwright@smithschool.ox.ac.uk

20-Apr-2023

Dear Mr 't Sas-Rolfes,

Your manuscript entitled "Playing the CITES game: Lessons on global conservation governance from African megafauna" has been successfully submitted online and is presently being given full consideration for publication in Environmental Policy and Governance.

Your manuscript number is EET-23-0148. Please mention this number in all future correspondence regarding this submission.

You can view the status of your manuscript at any time by checking your Author Center after logging into <https://mc.manuscriptcentral.com/eet>. If you have difficulty using this site, please click the 'Get Help Now' link at the top right corner of the site.

This journal offers a number of license options for published papers; information about this is available here: <https://authorservices.wiley.com/author-resources/Journal-Authors/licensing/index.html>. The submitting author has confirmed that all co-authors have the necessary rights to grant in the submission, including in light of each co-author's funder policies. If any author's funder has a policy that restricts which kinds of license they can sign, for example if the funder is a member of Coalition S, please make sure the submitting author is aware.

Thank you for submitting your manuscript to Environmental Policy and Governance.

Sincerely,  
Environmental Policy and Governance Editorial Office



Michael 't Sas-Rolfes &lt;tsas.rolfes@gmail.com&gt;

---

**ECOLEC-D-23-00720 - Confirming your submission to Ecological Economics**

1 message

---

**Ecological Economics** <em@editorialmanager.com>  
Reply-To: Ecological Economics <support@elsevier.com>  
To: Michael 't Sas-Rolfes <tsas.rolfes@gmail.com>

14 April 2023 at 16:27

\*This is an automated message.\*

African rhino conservation and the interacting influences of property, prices, and policy

Dear Mr 't Sas-Rolfes,

We have received the above referenced manuscript you submitted to Ecological Economics. It has been assigned the following manuscript number: ECOLEC-D-23-00720.

To track the status of your manuscript, please log in as an author at <https://www.editorialmanager.com/ecolec/>, and navigate to the "Submissions Being Processed" folder.

Thank you for submitting your work to this journal.

Kind regards,  
Ecological Economics

More information and support

You will find information relevant for you as an author on Elsevier's Author Hub: <https://www.elsevier.com/authors>

FAQ: How can I reset a forgotten password?  
[https://service.elsevier.com/app/answers/detail/a\\_id/28452/supporthub/publishing/kw/editorial+manager/](https://service.elsevier.com/app/answers/detail/a_id/28452/supporthub/publishing/kw/editorial+manager/)

For further assistance, please visit our customer service site: <https://service.elsevier.com/app/home/supporthub/publishing/>. Here you can search for solutions on a range of topics, find answers to frequently asked questions, and learn more about Editorial Manager via interactive tutorials. You can also talk 24/7 to our customer support team by phone and 24/7 by live chat and email.

This journal uses the Elsevier Article Transfer Service. This means that if an editor feels your manuscript is more suitable for an alternative journal, then you might be asked to consider transferring the manuscript to such a journal. The recommendation might be provided by a Journal Editor, a dedicated Scientific Managing Editor, a tool assisted recommendation, or a combination. For more details see the journal guide for authors.

#AU\_ECOLEC#

To ensure this email reaches the intended recipient, please do not delete the above code

---

*In compliance with data protection regulations, you may request that we remove your personal registration details at any time. ([Remove my information/details](#)). Please contact the publication office if you have any questions.*