Rural-Environmental Planning in the Multifunctional Transition: Lessons from the Governance of Working Landscapes

by

Raphael Anammasiya Ayambire

A thesis

presented to the University of Waterloo

in fulfillment of the

thesis requirement for the degree of

Doctor of Philosophy

in

Planning

Waterloo, Ontario, Canada, 2021

Examining Committee Membership

The following served on the Examining Committee for this thesis. The decision of the Examining Committee is by majority vote.

External Examiner	Julia Baird Associate Professor, Brock University
Supervisor(s)	Jeremy Pittman Assistant Professor, University of Waterloo
Internal Member	Michael Drescher Associate Professor, University of Waterloo
Internal-external Member	Juan Moreno-Cruz Associate Professor, University of Waterloo
Other Member(s)	Andrea Olive Associate Professor, University of Toronto Mississauga

Author's Declaration

This thesis consists of material all of which I authored or co-authored: see Statement of Contributions included in the thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Statement of Contributions

This thesis was prepared in line with the School of Planning's manuscript-based format. Raphael Anammasiya Ayambire was the sole author for Chapters 1, 2, 3, and 7, which were written under the supervision of Dr. Jeremy Pittman. These four chapters were not written to be published in peer-reviewed journals. Chapters 4, 5, and 6 were written as standalone manuscripts for publication in peer-reviewed journals. The exceptions to sole authorship are as follows:

Exceptions to sole authorship

Chapter 4**:** Ayambire, R.A., J. Pittman, M. Drescher, J. Moreno-Cruz and A. Olive. Working landscapes approach: a conceptual framework [Submitted to Sustainability Science].

Chapter 5: Ayambire, R. A., and J. Pittman. Opening the black box between governance and management: a mechanism-based explanation of how governance affects the management of species at risk [Submitted to Ambio].

Chapter 6**:** Ayambire, R. A., and J. Pittman. 2021. Adaptive co-management of environmental risks in result-based agreements for the provision of environmental services: A case study of the South of the Divide Conservation Action Program. *Journal of Environmental Management* 295. Elsevier Ltd: 113111. doi:10.1016/j.jenvman.2021.113111.

I hereby declare that I was responsible for the research conceptualization, data collection, and analysis of all three manuscripts. I also drafted, submitted, and corresponded with all the respective peer-reviewed journals. The other co-authors adopted supervisory roles, where they provided feedback on written drafts. Dr. Jeremy Pittman (the primary supervisor) provided significant directions on data collection and editorial assistance.

Abstract

Rural landscapes are transitioning from productivist to multifunctional uses, which implies that planning has to address the conflicts emanating from our need to protect the natural environment and promote social well-being. Yet, multifunctional landscape planning has remained elusive in both theory and practice. My doctoral research draws on the governance of working landscapes – an example of multifunctional landscapes – to address this gap. My aim is to shed light on the elements of governance necessary for protecting the natural environment and supporting the social well-being of rural communities. Specifically, I (1) propose a conceptual framework for the working landscapes approach, (2) examine the conditions and mechanisms that foster sustainable working landscapes, and (3) examine approaches for addressing risks in the management of working landscapes. My research used two main strategies of inquiry, including an integrative review and a case study. The case study was drawn from the South of the Divide region in Southwestern Saskatchewan, Canada.

The integrative review found that the working landscapes approach has the following features: (1) it focuses on integrating social well-being and environmental protection within the landscape, (2) it involves collective action among multiple actors, and (3) working landscapes shape and are shaped by their social-ecological context. These features make the approach an important option for addressing conflicts resulting from environmental protection and social well-being. However, the effectiveness of the working landscapes approach is impeded by socio-economic challenges such as the higher costs involved in managing working landscapes, conflicting interests among stakeholders, environmental and policy risks and uncertainties, a lack of appropriate knowledge, and mistrust among stakeholders. These challenges are addressed using multiple governance configurations in different contexts involving the state, market, and communities. Nevertheless, a

synthesis of these governance configurations suggests that certain common elements – trust, facilitative leadership, equity, local autonomy, and incentives – are critical for the sustainability of working landscapes.

In a case study of the South of the Divide region, I applied my conceptual framework of working landscapes to examine the conditions and mechanisms that foster sustainable working landscapes. I found that four governance conditions (i.e., facilitative leadership, local autonomy, trust, and incentives) connected by five mechanisms (i.e., institutional disruption, institutional crafting and drift, brokerage or bridging, program uptake, and alleviation of fear of harm) produced positive management outcomes in the South of the Divide. The most plausible pathway is that dissatisfied actors disrupt the existing governance arrangements and create new ones that reflect their desire for local autonomy. Local autonomy, in turn, creates an atmosphere for local actors to form coalitions and build trust; trust enhances program uptake and the co-design and co-implementation of incentives, which then alleviates land managers' fear of harm from participating in species at risk conservation programs. While these conditions and mechanisms were deemed essential for ensuring the sustainability of working landscapes, it emerged that environmental risk factors, particularly droughts, were also critical determinants of the sustainability of the South of the Divide.

I then examined the approaches used to address drought in the South of the Divide. Drawing on the experiences of land managers in the South of the Divide, I confirmed that drought affects the ability of land managers to meet both social well-being and environmental protection goals in working landscapes. Specifically, within the result-based conservation agreement framework – an approach used by the South of the Divide Conservation Action Program Inc. to implement species at risk conservation in the region – drought affects land managers by limiting their ability to

achieve ecosystem targets and forcing them to incur extra costs (i.e., extra management and opportunity costs) to meet ecosystem targets. Furthermore, I found that the incentive structure, which allows for a pro-rata reduction and the design of environmentally adaptive outcome indicators, helps reduce risks. Also, trust among actors and local autonomy facilitates continuous engagement among actors to address the uncertainty and unpredictability associated with droughts.

Collectively, this research enhances our understanding of how to address the conflicts emanating from our need to protect the natural environment and promote social well-being in the following ways. First, it advances a framework for the working landscapes approach. This framework will help guide empirical case studies on the working landscapes approach, further its theoretical understanding, and contribute to enhancing policy aimed at increased social well-being and environmental protection. Second, my research identifies two opportunities to enhance the prospects of policies that seek to address human-nature conflicts. The opportunities are (1) top-down regulations can enhance their likelihood for success by creating room for further institutional work at the local level (creating new institutions and forming coalitions to further local interests) and (2) focusing on underlying mechanisms, rather than only governance conditions, enhances policy prospects. Third, my research supports the proposition that multilevel institutional arrangements can help focus planning interventions on both place and function. Multilevel institutional arrangements allow for reconciling the dilemma of addressing the place-centred needs of people and respecting the interconnectedness of ecological systems (function-centred). Fourth, my research shows that social well-being and environmental protection can provide normative guiding principles for planning in rural environments, which contributes towards developing a normative theory for rural-environmental planning. In practice, it can guide the development of well-validated, durable criteria or indicators for successful rural planning outcomes.

Acknowledgements

I want to thank my academic advisor, Dr. Jeremy Pittman, for his exceptional guidance, support, and mentorship in all facets of my life. I would also like to thank the other members of my thesis committee, including Dr. Michael Drescher, Dr. Andrea Olive, and Dr. Juan Moreno-Cruz, for their immense support and mentorship. I am also highly indebted to the many faculty members at the School of Planning, University of Waterloo, who prepared me for this journey. I wish to thank especially Dr. Markus Moos and Dr. Jennifer Dean for the confidence bestowed in me by their encouragement and support inside and outside of the classroom. I also acknowledge the support from my colleagues at the Environmental Change and Governance Group and the entire University of Waterloo community.

I would also like to thank the staff of the South of the Divide Conservation Action Program Inc. and the ranchers in the South of the Divide Region for their support during my data collection. A special thank you to Dr. Diego Steinaker, Tom Harrison, and Kelly Williamson.

Many thanks to my friends and mentors both in Canada and abroad. A special thanks to Dr. James Akazili, Dr. Owusu Amponsah, Dr. Stephen Appiah-Takyi, Dr. Stephen Ayidiya, Dr. Gilbert Abirro, Dr. Murat Okumah, and Mr. Raymond Atanga, who inspired and supported me throughout my educational journey. I wish to also thank the Ghanaian community in Kitchener-Waterloo for providing a supportive family away from home. A special mention to Abraham Marshall Nunbogu and Maurice Dogoli for editing my work and supporting me all the way.

To my family and loved ones, particularly Adumpingo Ayambire, Sandra Ayambire, Esther Ayambire, Felicia Ayambire, Christopher Ayambire, and Ramatu Ayamga, I say a very big thank you for believing in me and supporting me.

Dedication

This dissertation is dedicated to my late grandmother, Apuripeeya Ayambire, who sacrificed everything she had for my education.

Table of Contents

Examining Committee Membership ..... **ii**
Author's Declaration ..... **iii**
Statement of Contributions ..... **iv**
Abstract ..... **v**
Acknowledgements ..... **viii**
Dedication ..... **ix**
List of Figures ..... **xiv**
List of Tables ..... **xv**
List of Abbreviations ..... **xvi**
Chapter 1: Introduction **1**
1.1 Why Governance of Working Landscapes? 1
1.2 Research Focus and Objectives 2
1.3 Empirical Context 5
1.4 Structure and Contribution of the Thesis 7
Chapter 2: Literature Review **10**
2.1 Introduction 10
2.2 Planning Sustainable Human-Nature Relations 10
2.2.1 Wheeler's Sustainability Planning Theory 13
2.2.2 Campbell's Procedural and Substantive Pathways to Sustainability 16
2.3 Situating Rural-Environmental Planning in the Sustainability Planning Framework 17
2.4 The Multifunctional Landscapes Planning Gap and the Promise of the Working Landscapes Approach 21
2.5 The Working Landscapes Approach 22
2.6 Advancing Sustainable Human-Nature Relations Through Governance 24
Chapter 3: Research Design **26**
3.1 Introduction 26
3.2 Knowledge Claims 26
3.3 Strategies of Inquiry 28
3.4 Data Collection 29
3.4.1 Data Searching for Integrative Review 29
3.4.2 Primary Data Collection 29

3.4 Data Analysis 30
3.6 Research Ethics 32
Chapter 4: Working Landscapes Approach: A Conceptual Framework 34
4.1 Chapter Summary 34
4.2 Introduction 34
4.3 Methods 37
4.4 Conceptualizing the Working Landscapes Approach: Three Propositions for Sustainability 39
4.4.1 Integration of Multiple Goals: Social Well-being and Environmental Protection 40
4.4.2 Collective Action Among Multiple Actors: State and Non-State Actors 43
4.4.3 Social-Ecological Context of Working Landscapes: Productive Human Activities and Social and Ecological influences 46
4.5 Overview of the Empirical Scholarship: Emergent Governance Challenges in Working Landscapes 48
4.5.1 Cost and Compensation 49
4.5.2 Equity 50
4.5.3 Knowledge Access and Integration and the Role of Trust 51
4.5.4 Multifunctionality, Scale, and Fit 53
4.6. Governance Responses 54
4.6.1 A typology of Governance Arrangements in Working Landscapes 54
4.6.2 Key Ingredients 57
4.5.3 Enhancing Governance Fit Through Collaborative and Multilevel Interactions 62
4.7. Synthesis: a framework for the working landscapes approach 63
4.8. Conclusion and Applications of the Framework 66
Chapter 5: Opening the Black Box Between Governance and Management: A Mechanism-Based Explanation of How Governance Affects the Management of Species at Risk 68
5.1 Chapter Summary 68
5.2 Introduction 69
5.3 What Links Governance to the Management of the Environment? 71
5.4. Methods 74
5.4.1 Research Design: Process Tracing 74
5.4.2 Case Study Context 75
5.4.3. Data Collection and Analysis 76

5.5 Results 78
5.5.1 Governance Conditions 78
5.5.2 Mechanisms 83
5.6. Discussion: Explaining the Link Between Governance and Management 90
5.7. Conclusion 95
Chapter 6: Adaptive Co-Management of Environmental Risks in Result-based Agreements for the Provision of Environmental Services: A Case Study of the South of the Divide Conservation Action Program 97
6.1 Chapter Summary 97
6.2 Introduction 98
6.3 A Case for Managing Environmental Risks in RBAs 100
6.4 Management Approaches for Environmental Risks in RBAs 102
6.5 Materials and Methods 103
6.5.1 Case Study Context: the Emergence of RBAs in the SoD 103
6.5.2 Data Collection and Analysis 105
6.6 Results 107
6.6.1 Nature and Effects of Droughts on Habitat Management for Species at Risk 107
6.6.2 Experiences of Drought and Participation in RBAs 108
6.6.3 Drought as a Form of Environmental Penalty to Land Managers in RBAs 110
6.6.4 Dealing with Environmental Penalties in RBAs: the Experience of SODCAP Inc. .. 113
6.7 Discussion 115
6.8 Conclusion: Towards Adaptive Co-Management of Environmental Risks in RBAs? 117
Chapter 7: Synthesis 119
7.1 Introduction 119
7.2 Purpose and Objectives 119
7.3 Key Findings 120
7.3.1 Objective 1: To propose a Framework for the Working Landscapes Approach 120
7.3.2 Objective 2: To Examine the Conditions and Mechanisms that Foster Sustainable Working Landscapes 122
7.3.3 Objective 3: To Examine Approaches for Addressing Risks in the Management of Working Landscapes 123
7.4 Contributions and Emerging Propositions 125
7.4.1 Contributions to the Environmental Governance Literature 125

7.4.2 Contributions to the Rural-Environmental Planning Literature 128
7.5 Study Limitations and Priorities for Future Research 132
7.5.1 Where is the Planner? 132
7.5.2 Learning Across Contexts 134
7.5.3 Connecting Governance to Social-Ecological Outcomes 134
7.6 Concluding Remarks 135
References 137
Appendices 167
Appendix A. Interview Guide 167
Appendix B. Observation Guide 170
Appendix C. List of Provincial Legislations Relevant to Working Landscapes 171
Appendix D: Background Data of Interviews and Focus Groups 173
Appendix E: List of Papers Included in the Integrative Review 174

List of Figures

Figure 2.1. The Triangle of Conflicting Goals for Planning and the Three Associated Conflicts. 12

Figure 3.1. Research Plan 32

Figure 4.1. A Conceptual Framework for the Working Landscapes Approach 66

Figure 5.1. Governance Enables Management Through Mechanisms 74

Figure 5.2. Conditions and Mechanism Linking Governance to Species at Risk Management 84

Figure 6.1. A Map of the Study Region 105

Figure 6.2. A Decision Tree for Identifying Environmental Risks in RBAs 113

List of Tables

Table 1.1. Manuscript Chapters, Journal Submission Status, and Research Objectives Addressed 9

Table 2.1. Modernist, Post-Modernist, and Ecological Worldviews of Planning 15

Table 2.2. Sample Definitions of Working Landscapes 23

Table 3.1. Ethical Issues and Approaches Used to Address them 33

Table 4.1. A Typology of Governance Arrangements in Working Landscapes 55

Table 4.2. Key Ingredients for the Working Landscapes Approach 61

Table 5.1. Governance Conditions in the SoD Region 80

Table 5.2. Institutional Crafting and Drift in the SoD 86

Table 7.1. Summary of Findings 124

List of Abbreviations

ALUS	Alternative Land Use Services
ABA	Activity-Based Agreements
CMA	Conservation Management Agreements
EPO	Emergency Protection Order
GBR	Great Bear Rainforest
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GSG	Greater Sage Grouse
MoE	Ministry of Environment
MRWCC	Milk River Watershed Council Canada
NGO	Non-Governmental Organization
UNEP	United Nations Environment Programme
PES	Payment for Ecosystem Services
PPPE	Plains and Prairie Pothole Ecoregion
PPP	Public Private Partnership
PSP	Private-Social Partnership
RBA	Result Based Agreement
RSA	Rancher's Stewardship Alliance
SARA	Species at Risk Act
SARPAL	Species at Risk Partnerships on Agricultural Lands
SES	Social-Ecological Systems
SoD	South of the Divide
SODCAP	South of the Divide Conservation Action Program
SSGA	Saskatchewan Stock Growers Association
TDR	Transfer Development Rights
WWF	World Wildlife Fund

Chapter 1: Introduction

1.1 Why governance of working landscapes?

The fight against the twin challenges of global climate change and biodiversity loss will partly be won or lost in working landscapes. Working landscapes are rangelands, forests, and cultivated fields managed for human well-being and environmental protection (Huntsinger and Sayre 2007; Kremen and Merenlender 2018). These landscapes are critical in the fight to protect the environment because they are both the cause and solution to these environmental threats. Yet, until recently, working landscapes have been perceived as drivers and not the solution. As rightly observed by Kremen and Merenlender (2018, 362), "working landscapes maintain biodiversity, [mitigates climate change], provide goods and services for humanity, and support the abiotic conditions necessary for sustainability and resilience." Kremen and Merenlender's (2018) definition suggests that working landscapes can indeed be part of the solution to these global environmental threats. This recognition signifies at least three significant shifts in planning and policy thinking, which also form the foundation of what will be described in this dissertation as the working landscapes approach. First, it embodies a departure from the framing of productive activities such as agriculture to be in constant conflict with environmental protection (Henle et al. 2008; Martinet and Barraquand 2012; Shackelford et al. 2015). Instead, the working landscapes approach acknowledges the interdependence and trade-offs between these productive activities and environmental protection and explores how to maximize multiple benefits within the landscape (Kremen and Merenlender 2018; Naugle et al. 2020). Second, the working landscapes approach hinges on complementarity with strict nature reserves or protected areas rather than a call for the conversion of strict reserves and wildlands, as suggested in some literature (e.g., Wuerthner 2014). Thus, it sees both protected areas and working landscapes as opportunities to

maximize environmental protection and human well-being. Third, the working landscapes approach calls attention to the need to work across property rights regimes (Brockington et al. 2018; Kremen and Merenlender 2018). Working across property rights regimes and property boundaries often raise concerns of trust, economic efficiency, and social justice that must be addressed. These three shifts collectively have implications for the governance and institutional change (Paavola 2007) required to effectively manage working landscapes (Brockington et al. 2018).

1.2 Research focus and objectives

The potential of the working landscape approach to help protect the environment and support human well-being simultaneously is no longer in question. Several studies have shown that working landscapes supply multiple ecosystem services, including critical habitats and migratory corridors for species, carbon sinks, and sources of food, fibre and timber (Polasky et al. 2005; Mitchell et al. 2013; Chanchani et al. 2016; Eastburn et al. 2017; Kremen and Merenlender 2018). These multiple ecosystem services are needed for social and ecological resilience and sustainability. However, the promise of the working landscape approach has been impeded by several socio-economic challenges (Kremen and Merenlender 2018). Direct challenges include the higher costs involved in managing working landscapes for both well-being and environmental protection (Naidoo et al. 2006; Kremen and Merenlender 2018), conflicting interests among stakeholders (Bergmann and Bliss 2004; Ferranto et al. 2013; Ferranto et al. 2014; Roche et al. 2015; Farley et al. 2017; Ellis 2019), and land-use changes in favour of industrial and urban development (Daniels 1997; Daniels 2000). Indirect challenges that impede the effectiveness of policies meant to address these direct challenges include environmental and policy risks and uncertainties (Baumgärtner and Quaas 2010; Derissen and Quaas 2013), a lack of appropriate

knowledge (Naugle et al. 2020), and mistrust between stakeholders (Bergmann and Bliss 2004; Reed et al. 2013; Henderson et al. 2014).

In the literature on working landscapes, governance has been suggested as a process to foster collaboration among the diversity of actors to address the challenges associated with the working landscapes approach (France and Campbell 2015; Brockington et al. 2018; Ellis 2019). Governance implies "…the establishment, reaffirmation or change of institutions to resolve conflicts over environmental resources" (Paavola 2007, 94). The governance of working landscapes emphasizes "rights to resources, the rules controlling their use, and the arrangements by which these are forged, enforced, and revised" (Brockington et al. 2018, 1257). The focus on governance also brings attention to management – i.e., the "…resources, plans, and actions…" (Lockwood 2010, 755) that are geared towards "… analyzing and monitoring, developing and implementing measures to keep the state of a resource [environment] within desirable bounds" (Pahl-Wostl 2009, 355). Management is important because it is the realm within which the outcomes and impacts of working landscape policies manifest. In this regard, governance is perceived as a process that facilitates sustainable management (Lockwood 2010) of working landscapes.

Despite the crucial role of governance in ensuring the success of working landscapes, effective governance of working landscapes remains elusive in the literature (Brockington et al. 2018). A critical reason for the obscurity of governance of working landscapes in the literature is the lack of a conceptual framework to guide research. Frameworks provide a common vocabulary for facilitating descriptive, diagnostic, and prescriptive enquiries about a phenomenon (McGinnis and Ostrom 2014; Bennett et al. 2018). Therefore, the lack of a framework for the working landscape approach has hindered theory building, systematic analysis of case studies, and guidance for

practitioners. While an integrative framework for the working landscapes approach remains elusive, the literature suggests that the success of the approach requires a transition in governance from command-and-control approaches to one that embraces collaboration, networks, and incentives (Barry et al. 2007; Brockington et al. 2018; Kremen and Merenlender 2018). However, the processes of governance transition or change that influence sustainable working landscapes are not well understood. Furthermore, the literature shows that risk factors, including natural conditions (e.g., climate change) and human factors (e.g., the uncertainty of the policy environment), can hinder sustainable working landscapes (Zabel and Roe 2009; Matzdorf and Lorenz 2010; Burton and Schwarz 2013; Osbeck et al. 2013). However, limited known empirical studies are available on how working landscape initiatives address these risk factors. These knowledge gaps underpin my dissertation, which is guided by the following research question and objectives.

Question: How can we govern working landscapes for human well-being and environmental protection?

Objective 1: to propose a framework for the working landscapes approach.

Objective 2: to examine the conditions and mechanisms that foster sustainable working landscapes.

Objective 3: to examine approaches for addressing risks in the management of working landscapes.

In addressing these research objectives, I examined the governance of a grassland working landscape in the South of the Divide (SoD) region in Southwestern Saskatchewan. I found that working landscapes face unique governance challenges, including payment of costs, addressing

inequities, distrust, managing environmental risks, and addressing cross-scale mismatches. These challenges can be addressed by better understanding the conditions and mechanisms that foster sustainable working landscapes. In this regard, the governance change from command-and-control to collaborative, multilevel, and incentive-based approaches has helped improve the management of working landscapes. However, further governance transition may be required to enhance management outcomes and the sustainability of working landscapes.

1.3 Empirical context

The study was conducted in the South of the Divide (SoD) region in Southwestern Saskatchewan, Canada. The SoD is a working landscape characterized by human habitation, active productive activities (e.g., ranching and crop production), and environmental protection (e.g., species-at-risk management programs). I selected the SoD for the study because of: (1) the availability of multiple ecosystem services relevant for human well-being and environmental protection, (2) the magnitude of social-economic and environmental challenges facing the working landscape, and (3) the recent governance transition that occurred in response to the needs of the working landscape. These factors make the SoD an important context for studying the governance of working landscapes.

The SoD is among the few places within the Northern Great Plains containing a sizable amount of Canada's remaining intact native grasslands (WWF 2016b; WWF 2016a). In addition, as of 2014, the SoD was home to at least 13 species at various levels of risk of extinction (Environment and Climate Change Canada, 2016). As a result of these characteristics, the SoD was listed as one of the 11 priority areas identified by the federal government of Canada as part of its pan-Canadian approach for transforming species at risk conservation (Environment and Climate Change Canada 2018). Furthermore, much of the land in the area is working landscapes managed by private land managers for crops and livestock production.

The region's importance for both conservation and production makes it prone to several of the social-economic challenges that confront working landscapes (Chapter 4). There is a history of conflict between land managers, who are perceived to be destroying the environment, and government conservation organizations (Pittman 2019). This perception has made land managers in the region apprehensive of conservation organizations, especially those with a regulatory authority. Also, until recently, the institutional framework in the region has been top-down and focused on punishing land managers for declines in species populations. The instatement of the emergency protection order (EPO) for the Greater Sage Grouse in 2013 is one of the major highlights of this governance regime. This relationship between land managers and the government led to several problems, including mistrust, injustices and inequities, and negative impacts on livelihoods. These challenges are also compounded by the prevalence of drought in the region. Between 1900 and 2014, Canada's Prairies experienced ten severe droughts (Bonsal *et al.*, 2020). With greenhouse gas (GHG) emissions projected to increase, the occurrence of severe droughts will likely increase (Bonsal and Regier, 2007; Bonsal *et al.*, 2011, 2020). These challenges must be addressed to ensure the sustainability of the working landscape.

Fortunately, there has been a recent transition in governance to help address these problems. This transition is characterized by the use of incentives, collaboration, and multilevel institutional arrangements. This transition has had an overall positive impact on the management of the working landscape as land managers voluntarily engage in managing their lands for species at risk. This progressing in governance over the years, which led to the emergence of species at risk management outcomes, provides a unique opportunity to examine the conditions and underlying mechanisms in the governance system that resulted in the management outcomes. It also gives us

an opportunity to understand how the new governance framework helps overcome the risk factors that affect the working landscape approach.

1.4 Structure and contribution of the thesis

This dissertation follows the manuscript-based format, and it consists of three standalone manuscripts (Chapters 4, 5, and 6). Table 1.1 provides an overview of the three manuscripts. The other Chapters (2, 3 and 7) are designed to discuss key concepts, theories, and methods. The manuscripts collectively contribute to advancing the theory and practice of the working landscapes approach. Chapter 2 discusses the key concepts and theories that underpin the dissertation, and Chapter 3 describes the research design.

Chapter 4 (Manuscript 1) proposes a conceptual framework for the working landscapes approach (Objective 1). This manuscript develops a conceptual framework for the working landscapes approach through a comprehensive review and synthesis of the governance dimension of working landscapes. The framework focuses on the local scale and how the local is embedded within multilevel governance arrangements. In the framework, the working landscapes approach is structured in terms of the social-ecological context, the key ingredients, collective action, and a linking mechanism. These elements, together, explain the social and ecological processes underpinning the approach and their impacts on social well-being and environmental protection.

Chapters 5 (Manuscript 2) and 6 (Manuscript 3) apply the framework differently. Chapter 5 examined the link between governance (exemplified in the framework by key ingredients) and management (exemplified in the framework as collective action) to identify the mechanisms and the institutional change processes that lead to sustainable management of working landscapes. This study is the first to adopt a mechanism-based approach to unpack the relationship between governance and management. The manuscript finds that a transition from top-down command-

and-control governance to one that fosters collaboration and multilevel interactions facilitates positive management outcomes for species at risk in working landscapes. However, this transition occurs under several governance conditions (e.g., facilitative leadership, trust, local autonomy, and incentives) which are connected by several mechanisms (e.g., institutional disruption, institutional crafting and drift, brokerage, program uptake, and alleviation of fear of harm). Overall, the paper finds that while the transition has had a positive impact on species at risk management, there is potential for improved outcomes when all the governance conditions or key ingredients important in the working landscape are addressed (e.g., equity).

While Chapter 5 examined the governance change processes that facilitate the management of species at risk in the region, it did not address the social-ecological context factors that also affect species at risk management in working landscapes. Chapter 6 responds to this gap by examining the influence of environmental risks (an example of a social-ecological context factor under the framework) on species at risk management (a collective action issue) and how the new governance arrangements in the SoD help address these risks. The study used drought as an example of environmental risks and a Result-based conservation agreement program implemented by the South of the Divide Conservation Action Program (SODCAP) as an example of the new governance arrangements in the region. It finds that environmental risks affect land managers involved with Results-based Agreements both by limiting their ability to achieve ecosystem targets and by forcing them to incur extra costs (i.e., extra management and opportunity costs) in their attempt to meet ecosystem targets under drought conditions. It also revealed that SODCAP, under the new governance arrangements, adopts a participatory and result-enhancing approach to environmental risk management. This approach helps protect land managers against the negative impacts of environmental risks and leads to better outcomes for species at risk management.

Chapter 7 provides a concluding synthesis of the three manuscripts and highlights their collective contributions to both theory and practice. The limitations of the current research and directions for future research are also highlighted.

Table 1.1. Manuscript chapters, journal submission status, and research objectives addressed

Chapter #	**Manuscript title**	**Journal (Target)**	**Status**	**Objective addressed**
4	A framework for the working landscapes approach	Sustainability Science	Ready to submit	to propose a framework for the working landscapes approach
5	Opening the black box between governance and management: a mechanism-based explanation of how governance affects the management of species at risk	Ambio	Submitted to journal	to examine the conditions and mechanisms that foster sustainable working landscapes
6	Adaptive co-management of environmental risks in Result-based Agreements for the Provision of Environmental Services: a case study of the South of the Divide Conservation Action Program	Journal of Environmental Management	Published	to examine approaches for addressing risks in the management of working landscapes

Chapter 2: Literature review

2.1 Introduction

My doctoral research broadly contributes to the planning of sustainable human-nature relations in rural environments using a working landscapes perspective. Therefore, this chapter is structured to describe the history and planning thinking underpinning contemporary approaches to planning sustainable human-nature relations and how the working landscapes perspective can provide useful lessons for advancing such efforts. I begin by exploring the challenges planners face when attempting to integrate social-economic development and environmental protection (section 2.2). I also introduce 'sustainability planning' as the most promising framework for addressing these challenges. In particular, I argue that rural-environmental planning, which has received the least attention among planning scholars (section 2.3) and has recently undergone a multifunctional transition, will benefit from applying the sustainability planning framework. Furthermore, I introduce the working landscapes approach as a useful example that is situated within the sustainability planning framework and could offer important lessons for advancing the planning for sustainable human-nature relations. Finally, I use governance as a context, a set of theories, and practices that rural-environmental planners can rely on to diagnose problems, make and implement plans relating to sustainable human-nature relations.

2.2 Planning sustainable human-nature relations

The planning project has evolved around people's relations with others and the natural environment (Healey 2016; Campbell and Zellner 2020). However, for more than half of the twentieth century, when the planning project took shape, the physical fabric of the city (beautification), management of urban expansion, and addressing social inequities between the elites, the working class, and the poor took centre stage. It was not until the 1960s and 1970s that the real concern about the negative environmental impacts of economic growth and resource

exploitation became apparent and spurred action on the front of human relations with the natural environment. Towards the end of the twentieth century, and following the release of the Brundtland report in 1987 (Brundtland 1987), the planning profession became very much aware of the challenge of managing people's relationship with the natural environment. Writing in 1996, Campbell (1996, 296) argues that "…planners face tough decisions about where they stand on protecting the green city, promoting the economically growing city, and advocating social justice." Essentially, Campbell recognizes that environmental protection (symbolized by the green city) has become a central goal of planning, alongside economic growth and social justice (Figure 2.1). However, he also recognizes how interconnected these goals are through the conflicts these separate planning goals generate. He thus argues that planners must address three main conflicts: the resource conflict, which results from the need for economic growth and environmental protection; the property conflict, which results from the need for social equity and economic growth; and the development conflict, which results from the need for social equity and environmental protection. Though extremely oversimplified, Campbell's planner's triangle provides a useful framework for understanding the complex nature of planning decisions, and in particular, how environmental protection introduces new challenges to planning.

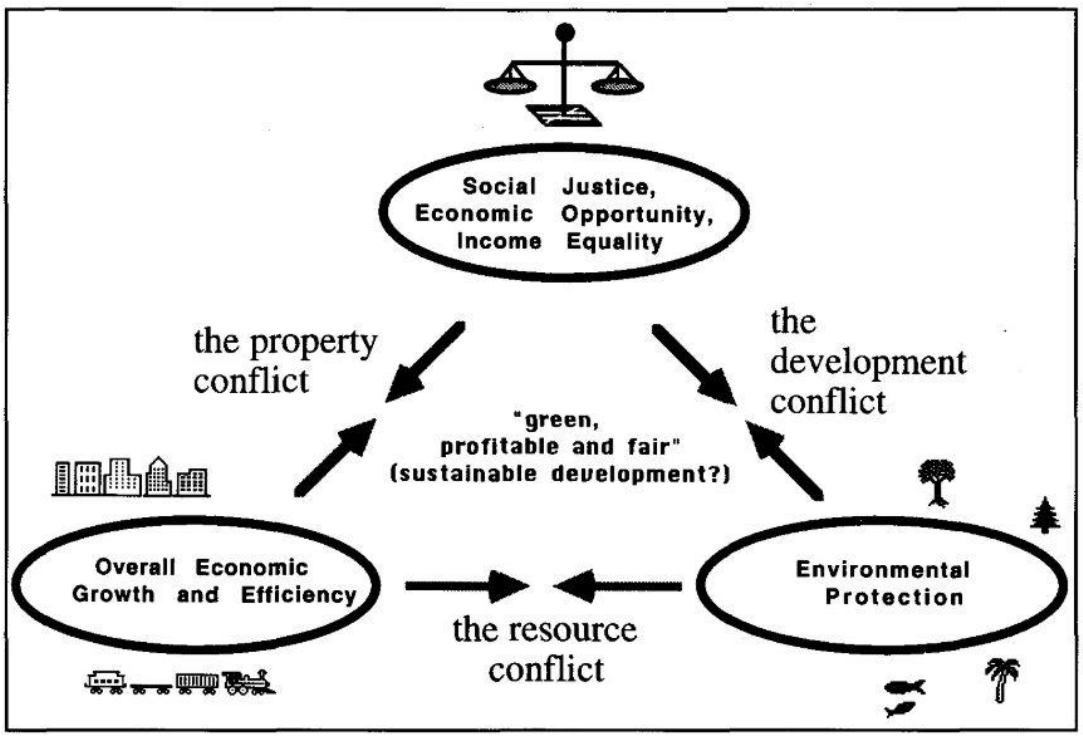

Figure 2.1. The triangle of conflicting goals for planning and the three associated conflicts.
Source: Campbell (1996)

Despite the enthusiasm that accompanied the environmental protection goal of planning, planning struggled to escape its history of promoting the development of cities at the detriment of the natural environment (Campbell 1996; Wheeler 2004). Part of the challenge was how to reconcile the conflicts emanating from the three distinct goals of planning. A search for a common ground led planners to embrace the notion of sustainability as a pathway that leads to the "elusive centre" of the planner's triangle. In what is now commonly referred to as sustainability planning (Wheeler 2004; Wong and Goldblum 2008; Wheeler 2016), scholars agree that planning must address the 3Es (environmental protection, economic development, and equity). For some, sustainability is the new, radical, and transformative planning paradigm that holds the key to a better future (Wheeler 2016). Yet, the attractiveness of the sustainability planning idea has raised pessimism and new

conceptual challenges. Notable among these challenges is how to define and operationalize sustainability. As Campbell argues, the sustainability craze will not be any different from the 1950s' belief in comprehensive planning if concrete steps are not taken to redefine and operationalize sustainable development. The efforts to define and operationalize sustainability in planning are ongoing; however, two efforts are worth noting here.

2.2.1 Wheeler's Sustainability Planning theory

The first effort at operationalizing sustainability planning is Wheeler's (2004, 2016) view of sustainability planning as a paradigm shift characterized by (1) result-oriented problem solving, (2) a long-term perspective, (3) an ecological thought, (4) a focus on place, and (5) active involvement of the public in problem-solving. First, result-oriented approaches to problem-solving imply that planning must be proactive and establish explicit targets based on existing and anticipated problems and work towards achieving them. Some of these sustainability goals have become common knowledge to most planners. For example, society must work to reduce greenhouse gas emissions, it must address social injustices, and it must reverse the rapid loss of biodiversity. However, there are other local or place-specific goals such as supporting rural employment and traditional lifestyles and promoting age-friendly communities that planners must proactively integrate into planning decisions over the long term. Both common and place-specific goals cannot be achieved through the business-as-usual approach where planners 'muddle through' (as this approach has been found to be too slow to meet sustainability targets) (Rees 2010; Moos 2017). Rather, they require that planners take a long-term perspective (see below) that recognizes the power of planning to create desired future conditions (Freestone 2012; Moos 2020). Thus, the result-oriented approach to sustainability planning stands in contrast with the idea of "muddling through" (Lindblom 1959) and other short-sighted incremental approaches to planning. Second,

as a long-term perspective, Wheeler argues that sustainability planning must create institutions and methods of analysis that focus on long-term change and discourage incentives for short-term thinking. This implies dethroning existing structures that gratify short-term accomplishments (e.g., economic growth indicators such as GDP and the use of discount rates, which assume that the economic consequences of actions in the present are worth more than similar actions in the future). It also implies the development of approaches to better demonstrate how short-term action would and could lead to long-term results (e.g., ecological footprint analysis) (Rees 2010). Third, sustainability planning is underpinned by an ecological thought – "the ability to understand the dynamic, evolving, radically contingent, and interdependent nature of human and natural systems." (Wheeler 2016, 56). This ecological worldview hinges on a strong desire to develop common values and rules that can facilitate survival on earth (*a small planet*) – an acceptance of the limits of growth. For planners, an ecological worldview "emphasizes communication and education to help evolve understanding; advocacy planning to achieve shared goals; evolving incentives and mandates between different levels of government." Also, because the ecological worldview takes a holistic perspective of the world – i.e., the web of life, it is concerned with linking the different scales of planning through multilevel institutions and collaborations (Wheeler 2004). Wheeler juxtaposes this ecological paradigm with modernist and post-modernist approaches to planning, which emphasized rational-comprehensive planning and decentralized local planning, respectively (Table 2.1). Fourth, Wheeler indicates that planning without attention to place attachment often leads to indiscriminate exploitation of natural ecosystems and a lack of stewardship ethic. In his view, sustainability planning focuses on territory rather than function, enhancing a sense of place, promoting local environmental stewardship, and supporting place-oriented identities. The focus on place also helps align planning actions to local needs such as the type of employment and

lifestyle. Finally, sustainability planning requires the active participation of everyone, especially underrepresented groups, in problem-solving. This implies attention to value-sensitive advocacy, institutional entrepreneurship, and grassroots mobilization to solve problems.

Table 2.1. Modernist, post-modernist, and ecological worldviews of planning

	Modernist Worldview Universal	Post-modernist Worldview	Ecological Worldview
Values	Universal values based on modern science	Pluralistic values based on cultural and cognitive traditions	Acknowledges pluralism but also a shared core value set based on common problems
Cognitive Approach	Atomistic (break problems down into constituent parts; view world as collection of individual elements)	Acknowledges multiple ways of viewing the world	Focuses on interrelationships and dynamic, evolving systems
Core Influences	Newtonian physics; neoclassical economics	Twentieth-century physics (relativity, uncertainty principle)	Ecological science; chaos theory; systems theory; social-ecological systems theory; many social theories
Political Implications	Reinforces centralized authority	Undermines centralized authority	Emphasizes flexible and evolving relationships between many different institutions
Preferred Planning Modes	Rational, comprehensive planning	Decentralized local planning to meet pluralistic community needs; communication to	Emphasizes communication and education to help evolve understanding; advocacy planning to achieve shared goals; evolving incentives and

		gain consensus on directions	mandates between different levels of government

Source: Wheeler (2016, 56)

2.2.2 Campbell's procedural and substantive pathways to sustainability

Unlike Wheeler, who focused on defining a worldview of sustainability planning, Campbell outlines practical – procedural and substantive – pathways for planners to achieve sustainable development. Campbell's first point is that sustainability planning calls for a shift in focus from "adversarial confrontation" (e.g., pricing externalities) to conflict negotiation, which he argues provides win-win outcomes. However, he also acknowledges that conflict negotiation may have its limitations in everyday planning. For example, in some cases, problem-solving may require an either-or approach or an all-or-nothing dispute (e.g., whether to build a hydroelectric power plant or not). Even in those circumstances where finding common ground appears impossible, conflict negotiation can still help find compromises or identify joint gains (Forester, 2016). Secondly, Campbell argues that in addition to procedural paths like conflict negotiation, planners can achieve sustainability through substantive pathways. For example, he suggests that land use and design approaches that seek to obtain a balance between the built and unbuilt environments can help resolve the conflict between economic and environmental interests. He emphasized the need for spatial interconnectivity for both wilderness and built areas. Campbell also proposes bioregionalism as a framework for attaining sustainability. Bioregionalism calls for "the rescaling of communities and the economy according to the ecological boundaries of the physical region" (Campbell 1996, 307). It is believed that the "ecological determinism" associated with bioregionalism enhances environmental awareness as the residents are connected to the ecological resources. In this regard, Campbell agrees with Wheeler that "place" is crucial for sustainability planning. Campbell, however, cautions that too much emphasis on ecological determinism can

sometimes overlook the interdependent nature of societies. In many ways, Campbell's substantive approaches to sustainability align themselves to the ecological worldview (Table 2.1), while his procedural pathways provide practical steps to help address the conflicts arising from addressing plural interests.

In sum, planning has historically struggled to find approaches to effectively address challenges relating to human-nature relations. However, the sustainability planning theory offers a promising framework that better engages with both the human and natural systems. The promise of the sustainability planning framework lies in its (1) focus on the ecological worldview, which emphasizes the complex interdependence of human and natural systems – this better responds to the need to address human (social-economic) and environmental challenges in concert; (2) emphasis on better connections between long-term, result-oriented planning goals and short-term planning actions – this helps avoid planning actions that lead to unsustainable long-term environmental outcomes; (3) emphasis on a balance between plural values or interests and shared goals – this helps direct plural values towards common ends; (4) focus on place – this helps align planning actions with the needs of the local people and take advantage of their local knowledge and environmental stewardship ethic; (5) focus on institutional change – this calls for evolution of planning institutions to better respond to the multilevel and interdependent nature of environmental problems; and (6) focus on conflict negotiation – this helps achieve consensus or at least joint gains involving human-nature conflicts.

2.3 Situating rural-environmental planning in the sustainability planning framework

For the majority of the public (some planners included), planning is all about cities and, to some extent, the peripheries of these cities. 'The rural' has historically been marginalized, especially in planning theory (Selman 1995; Hibbard and Frank 2019). The reasons for this marginalization are

varied. First, the contemporary form of planning arose in response to the rapid urbanization experienced during the industrial revolution (Hibbard and Frank 2019). At the same time, rural planning issues such as the management of natural resources (e.g., soils, forests, minerals, and water) and the reformation of local community institutions were also emerging. Unfortunately, as Selman (1995) argues, most of these rural planning issues emerged as concerns of public, private, and voluntary agencies. The lack of direct links to local planning authorities meant that planners did not have to provide solutions for them. Second, responding to the demands of modernism in the 1950s, rural primary production became highly industrialized. This industrialization and the need to connect primary production to industries disconnected agriculture from natural resources management and local communities (Hibbard et al. 2015). The result was the widespread concern of the destruction of the natural environment which occurred in the late 1970s. Responding to these concerns, the environmental movement began to emphasize environmental protection without regard to the effects on rural employment, livelihoods, and lifestyle (Hibbard et al. 2015). These two forces – industrialization and the environmental movement – further decoupled production and environmental protection. This resulted in further separation of environmental protection and rural agriculture as independent fields studied by conservationists, rural sociologists, and agricultural economists (Selman 1995). Third, the second wave of urbanization which intensified in the 1970s and the associated conversion of rural land led to the re-conceptualization of 'the rural'. Planners began to think about the city-region as the appropriate scale for planning. Thus, the rural became just a part of the city-region that was yet to be developed, sources of leisure for urban dwellers, and suppliers of ecosystem services (Hibbard and Frank 2019). However, as recent studies have shown, rural areas – places between cities – are important and deserve theoretical

attention by planning scholars (Harrison and Heley 2015; Frank and Hibbard 2016; Gallent and Gkartzios 2019).

Rural planning "…is interpreted broadly as policy, place-making, regulation and design interventions that shape rural places." (Gallent and Gkartzios 2019, 5). This conception of rural planning is a departure from traditional conceptions of rural planning as focusing on addressing the negative impacts of physical change (e.g., the threats of urbanization on rural lands) through top-down command-and-control strategies. It embraces emerging concerns of multilevel interactions, the need for collaboration among the diverse actors operating within the rural and natural resources space, and the need to address multiple planning goals (i.e., the three Es of planning). Among the varied reasons that make rural planning a useful endeavour, Scott et al. (2019, 1) rightly suggest that "managing land-use change and mediating between competing interests in the use of land is central to the rural planning challenge, particularly given threats to natural resources and importance of balancing global challenges with local demands and needs." Similarly, Hibbard et al. (2015) argue that contemporary rural planning focuses on integrating production, environmental protection, and consumption within the rural landscapes. These foci of rural planning are aligned with the important role that rural areas play in addressing global environmental challenges such as climate change and biodiversity loss, among others.

The environmental focus of contemporary rural planning draws parallels with the emergence of the environmental protection goal in planning theory and practice (section 2.2). In particular, it has shifted the focus of rural planning from sectoral policymaking (mainly agriculture and conservation) and the protection of agricultural lands from urban 'invasion' towards an integrated approach. Rural planning is increasingly concerned with addressing multiple, often contested goals of planning, including production, protection, and consumption (Hibbard et al. 2015; Frank and

Hibbard 2016). Some scholars have referred to this change as a transition from productivist (i.e., rural areas as centres of primary production) to multifunctional uses or "multifunctional transition" (McCarthy 2005; Holmes 2012). This multifunctional transition has posed new challenges to rural planners who are in search of common ground to reach the elusive centre of the planners' sustainability triangle. I argue that the sustainability planning theory (section 2.2) provides a useful framework for guiding such efforts for several reasons. To begin with, "the multifunctional transition demands that planning takes into account the future economic, social, and environmental consequences of contemplated actions." (Frank and Hibbard 2016, 250). This indicates the need for a long-term perspective and better connections between long-term planning and short-term actions as proposed by sustainability planning theories. Second, the need to mediate conflicting interests in rural planning (Gallent and Gkartzios 2019) cannot be achieved through adversarial planning. Lessons from our past experiences of command-and-control resource governance in rural areas (Cox 2016; Long et al. 2018; Abrams et al. 2020) suggest that more consensus-based approaches and conflict negotiation present better opportunities for success. Third, rural-environmental planning advocates for the recoupling of rural production and conservation with communities (Frank and Reiss 2014). This suggests a focus on place as an important principle for planning. There are advantages for focusing on place in rural contexts, including enhancing local environmental stewardship and promoting sustainable rural livelihoods. Forth, planning institutions are not structured to fit contemporary rural planning challenges. For example, environmental regulations and conservation incentives that are commonly used to integrate conservation and production in rural areas are considered issues of concern to NGOS and higher-level (federal and provincial) government agencies. This calls for institutional change to better meet the rural planning challenges.

2.4 The multifunctional landscapes planning gap and the promise of the working landscapes approach

The multifunctional transition of rural environments has come with new challenges for planners. Notable among them is the need to integrate social-economic development and environmental protection and restoration in rural landscapes (Hibbard et al. 2015). This challenge is not insignificant. Rural planners are often required to not only resolve the obvious conflict between conservation and social-economic development through zoning and physical design, but they must also address issues of mistrust, costs, equity, knowledge access and knowledge integration, and scale mismatches that hinder efforts to integrate development and conservation (Cash et al. 2006; Pittman and Armitage 2016; Ayambire et al. 2021). Unfortunately, even the sustainability planning framework, which has the greatest promise to address the emerging rural-environmental planning challenges (section 2.3), still lacks appropriate strategies to deal with these complex issues. For example, while writing about UK's rural planning system, Paul Selman observes that multifunctional-landscape plans were the missing link in sustainability planning (Selman 2002). This limitation is not only relevant to the UK alone. In other parts of the world that appear to be embracing multifunctional landscape planning, the efforts seem to focus exclusively on environmental protection or social-economic development (Hibbard et al. 2015).

I use the working landscapes approach (section 2.5) as an attempt to situate the sustainability planning framework within rural multifunctional landscapes. The approach could offer important lessons for advancing the planning for sustainable human-nature relations in the following ways: (1) the procedural approaches that can foster effective integration of diverse interests in rural multifunctional landscapes, (2) the substantive long-term goals and related short-term actions that can guide multifunctional landscapes planning practice, (3) the institutional change required to foster multifunctional landscapes planning, and (4) emerging innovative techniques that planners

can adopt to integrate social-economic development and environmental protection in multifunctional landscapes. In the next section (section 2.5), I introduce the working landscapes approach and demonstrate its utility for informing sustainable human-nature relations.

2.5 The working landscapes approach

Working landscapes are generally defined as rangelands, forests, and cultivated fields that are managed for human well-being and environmental protection through collective action (Table 2.2). These landscapes must already be in use for human productive activities (e.g., forestry, ranching, crop farming) and do not imply the conversion of protected areas or wild lands. Working landscapes are a typical example of multifunctional landscapes in that they supply multiple ecosystem services that may conflict with each other. For example, working landscapes provide critical habitats for wild species, enhance landscape connectivity for migratory species, serve as carbon sinks, provide food, fibre, timber, leisure, and employment for the many people that live and work on them (DeFries et al. 2007; Hansen and DeFries 2007; Huntsinger and Sayre 2007; Sayre 2007; Chazdon et al. 2009; Reiter et al. 2021). Also, working landscapes and protected areas represent typical examples of the sectoral policymaking (with working landscapes signifying production and protected areas representing conservation) that followed the industrial revolution (Hibbard et al. 2015; Frank and Hibbard 2016; Frank and Hibbard 2017). Therefore, the working landscapes approach, which advocates for the integration of development and conservation within single landscapes and also to connect working landscapes and protected areas in a matrix form (Kremen and Merenlender 2018), exemplifies the multifunctional transition in rural areas.

In addition to the multifunctionality of working landscapes, the approach engages with some of the critical questions that rural planning scholarship requires to advance sustainable human-nature relations. For example, the working landscapes scholarship addresses the challenges and benefits

of integrating production and conservation (Brook et al. 2003; Olive 2016; Farley et al. 2017), the institutional change required to advance this integration (Henderson et al. 2014; Pascual et al. 2014; Sikor et al. 2014; Farley et al. 2017; Pittman 2019), and the innovative policies and incentives required (Ayambire et al. 2021; Ayambire and Pittman 2021). These features make the working landscapes approach a useful example for informing multifunctional landscape planning in rural environments.

Table 2.2. Sample definitions of working landscapes

Definition	**Source (s)**
"Conservation in working landscapes maintains biodiversity, provides goods and services for humanity, and supports the abiotic conditions necessary for sustainability and resilience."… "Working lands conservation emphasizes the critical role of managing the matrix for species conservation to complement protected areas".	(Kremen and Merenlender 2018)
"The term working landscape generally refers to agricultural lands characterized by a long-standing balance between human and natural forces."	(Cannavò 2007, 220)
"… "working landscapes" thus carries the weight of a vast and diverse array of "ecosystem services" that humans both rely on and alter for better or worse. In this sense, it proposes as an ideal the synergistic combination of commodity production with the provision of public benefits of various kinds."	(Huntsinger and Sayre 2007, 3)
"When most people talk about the 'Working Landscape' they are referring to the land actively used in productive agriculture and forestry. Yet to many Vermonters, the working landscape also means additional public values it provides, including aesthetics, contributions to the tourism economy, and its central role in building a common sense of place and the Vermont quality of life. These values are all hard to quantify, but vital to the personal identity of Vermonters."	(Morse 2010, 2)

2.6 Advancing sustainable human-nature relations through governance

Conventional top-down command-and-control strategies fail to address the complex challenges in working landscapes and many other contexts involving human-nature relations (Holling and Meffe 1996; Cox 2016). At the same time, traditional citizen participation, a common approach adopted by planners, is fraught with challenges that hinder the fulfillment of genuine participation (Gaventa 2002; Fischer 2012).

> *Whereas citizen participation in the governmental process has traditionally focused on measures designed to support and facilitate increased public access to information about governmental activities, efforts to extend the rights of the citizens to be consulted on public issues which affect them, and to see that the broad citizenry will be heard through fair and equitable representative political systems, participatory governance seeks to deepen this participation by examining the assumptions and practices of the traditional view that generally hinders the realization of a genuine participatory democracy.* (Fischer 2012, 2).

This is especially true in rural landscapes where their multifunctionality gives rise to tensions over resource extraction and conservation among diverse stakeholders (wicked problems), some of which must not only be heard but must actively take part in shaping decisions and actions (Henderson et al. 2014). In this regard, governance emerged as "a new space for decision-making" (Fischer 2012, 1) that helps deepen participation by permitting: (1) the entry of multiple actors outside of the state into the decision-making space, (2) innovative approaches to problem-solving, and (3) emphasis on interactive and collaborative processes and the blurring of the boundaries separating the state, market, and the civil society (Lemos and Agrawal 2006; Ansell and Gash 2008; Driessen et al. 2012; Bennett and Satterfield 2018; Stoker 2018).

Planning is usually conceived as an instrument to implement aspects of governance goals or as a form of governance practice (Pierre 1999; Healey 2009; Campbell and Zellner 2020). This conception sees governance as a framework within which planners intervene in complex sustainability problems through the 'professional practice of planning.' However, governance can also be perceived as a context, a set of theories, and processes or practices which planners use to diagnose problems, make and implement sustainability solutions. I use governance in line with this second view as a context (i.e., rules, regulations, and institutional arrangements that enable effective management of resources), a process, and a set of theories (Pittman and Armitage 2016) that explain the interaction between multiple stakeholders and how those interactions translate into or affect sustainable outcomes. Using governance this way allows for a deeper exploration of conventional governance theories and propositions (e.g., effective environmental governance is needed to foster effective management) that can inform planning scholarship and practice. It also helps situate planners within the governance system to understand how their interactions with others can impact the natural environment. This is particularly important for rural environments where many have perceived the task of managing multifunctional landscapes as the work of non-profits and higher-level government organizations rather than planners.

Chapter 3: Research design

3.1 Introduction

This chapter describes the research design used to complete the study. It starts by describing the knowledge claims underpinning the research, followed by the strategies of inquiry and data collection and analysis techniques employed (Figure 3.1). Overall, the research design follows the qualitative research design advanced by Creswell (2009). The methods employed for the study are briefly described below and discussed in detail in Chapters 5 and 6.

3.2 Knowledge claims

"Policy analysis and planning are practical processes of argumentation" (Fischer and Forester 1993, 2).

Knowledge claims refer to the worldviews that underpin research, including what is there to be known, how to know it, how to obtain the knowledge and the specific procedures available for obtaining the knowledge (Creswell 2009). These broad worldviews influence how researchers go about gathering and contributing to knowledge (Creswell 2009). Many paradigms exist that underpin the claims researchers make about knowledge; however, my research is guided by the paradigm of pragmatism. Pragmatism is an alternative paradigm that positions itself somewhere outside of the metaphysical debate between positivism/post-positivism and constructivism (Morgan 2014). It avoids the unending controversy regarding truth and reality and orients itself towards solving real-life problems (Feilzer 2010; Frey 2018). Thus, "[t]ruth is what works at the time and not based on the dualism between reality independent of the mind (as with postpositivism and critical paradigms) and within the mind (as with constructivist and deconstructivist paradigms)" (Frey 2018).

Pragmatist planners believe that researchers can gain important knowledge through learning from and reflecting on the everyday experiences of practitioners (Ansell 2001; Healey 2009; Forester 2013). Similarly, practitioners can learn from their experiences and refine the approaches they use in professional practice. Thus, as Dewey argued, the process of "…developing knowledge of the world and acting in the world were all part of the same process of learning and discovering through experience" (Healey 2009, 280). In addition, these experiences can then help confirm or refine the theories researchers use (i.e., the theory-in-use) to orient their original research (Forester 2013). This is reflected in how I draw on the practical experiences of land managers and NGOs on the governance of working landscapes to inform planning and environmental governance theory.

Methodologically, pragmatism rejects the notion of philosophical loyalty and instead places the 'research problem' at the centre of the research (Mackenzie and Knipe 2006; Creswell 2009). According to pragmatists, the focus of research should be about determining the methods that are well-suited to the research problem of interest (Frey 2018). Therefore, a researcher should not be bounded by the two extremes of positivism and constructivism, with their associated quantitative and qualitative methods, respectively. Because of this flexibility regarding the choice of methods (i.e., a methodological plurality), pragmatism is mostly associated with mixed-methods research (Feilzer 2010; Frey 2018). It must be noted, however, that pragmatism is not naturally aligned to any specific methods. Another distinguishing feature of pragmatism is that it is real-world and practice-oriented (Mackenzie and Knipe 2006). Thus, the research questions pragmatists seek to answer should be identified from and have relevance to real-life problems rather than factitiously and arbitrarily set by the researcher (Johnston 2009; Kaushik and Walsh 2019). In this regard, my research is aligned with pragmatism because the research questions I seek to answer emanated from close interaction with practitioners who desired responses to practical questions. My interest,

therefore, is to adopt the variety of methods that are appropriate for addressing these questions rather than limiting the choice of methods to certain philosophical traditions, including post-positivism and constructivism. Thus, I select methods, collect data, and interpret the results based on the pragmatism research paradigm.

3.3 Strategies of inquiry

I use two strategies of inquiry throughout this dissertation. First, I use an integrative literature review (Torraco 2005; Rocco and Plakhotnik 2009) to develop a framework for the working landscapes approach (Objective 1). An integrative literature review is "a form of research that reviews, critiques, and synthesizes representative literature on a topic in an integrated way such that new frameworks and perspectives on the topic are generated" (Torraco 2005, 356). Integrative reviews are methodologically rigorous, permits the combination of knowledge from different research traditions and fields, and allows for the creation of a preliminary holistic understanding of an emerging phenomenon (Rocco and Plakhotnik 2009; Snyder 2019). I use the integrative literature review approach to help craft a framework for the working landscapes approach, drawing on the following: 1) the challenges and opportunities for integrating environmental protection and production in working landscapes, and 2) existing institutional solutions used in promoting environmental protection and production on working landscapes.

Second, I use a case-oriented approach to gather empirical data to examine the conditions and mechanisms that foster sustainable working landscapes (Objective 2). Also, I use the case-oriented approach to gather empirical data to investigate how programs based on the working landscape approach address risk factors associated with the management of working landscapes (Objective 3). Case studies allow for an in-depth and multi-faceted investigation of complex issues in their

real-life settings. This makes it appropriate for a phenomenon like the governance of working landscapes that is highly linked with people's lived experiences.

3.4 Data collection

I collected qualitative data in relation to the strategies of inquiry outlined in section 3.3: integrative reviews and case study. The data collection process is summarized below and further explained in the individual manuscripts (Chapters 5 and 6).

3.4.1 Data searching for integrative review

An integrative review of literature emphasizes rigorous methods and transparent data collection and analysis criteria (Whittemore and Knafl 2005). I combined a variety of data sources to help discover the variety of literature on working landscapes. These data sources include academic databases (e.g., Scopus and Web of Science). In addition, I consulted experts from fields that engage with the working landscape scholarships for suggestions on studies that might be useful for the study purpose. I briefed these experts (four in total) about the study and requested inputs regarding relevant studies from their respective fields. Bodies of scholarship that were included are environmental governance and policy, environmental economics, and environmental justice. These bodies of scholarship are included based on a survey of the literature to identify potential bodies of scholarships that might be relevant for understanding the governance of working landscapes. In total, 110 articles and six (6) reports were included in the study (Appendix E).

3.4.2 Primary data collection

I collected primary qualitative data using in-depth interviews (n=14 ranchers), focus group discussions (n=2, 5 and 4 people per group, respectively), participatory observation, and strategic project committee meetings to address objectives two and three. Empirical data collection for the project took place over three months from May-July 2019. The sample size is relatively small,

considering the total number of beef farmers in the region (N=728) (Statistics Canada, 2016). However, because I was interested in ranchers with experience with SODCAP's conservation programs, this sample covered many of the conservation leaders in the region. In addition, I collected the data until I reached theoretical saturation (Suddaby, 2006). The interview and FGD participants were purposively selected from ranchers in the SoD area involved with community pastures, grazing corporations, or grazing cooperatives (n=4) participating in SODCAP's conservation programs. Ranchers were selected in consultation with SODCAP and other key informants involved with managing local community pastures, grazing corporations, or cooperatives. These ranchers were known as "good managers" who were actively engaged in conservation. They also are known to have multiple species at risk on their properties. In total, 23 ranchers were either interviewed or participated in the FGDs (Appendix D).

Aside from the in-depth interviews and focus group discussions, I undertook participatory observation of habitat monitoring and the recruitment of land managers into the SODCAP's conservation programs. The purpose of the observation of the recruitment exercise was to gather data on what land managers considered important in deciding to participate in working landscape conservation. The observation of the habitat monitoring process provided a basic understanding of how results were determined as part of SODCAP's conservation programs and compensation payment. I also held one meeting with SODCAP's project committee to corroborate findings from the in-depth interviews and focus group discussions.

3.4 Data analysis

I used two main analytical techniques throughout the thesis: (1) qualitative analysis (Chapters 4 and 6) and (2) process tracing (Chapter 5). The qualitative analysis followed the basic coding and analysis processes for qualitative data outlined in Creswell (2009). For the primary data (i.e.,

interviews and focus group discussions), I first transcribed the data verbatim. The transcribed data were then organized under individual questions or themes and read through to gain a general understanding of the responses. Second, I coded the data using the NVivo qualitative data analysis software. Both inductive and deductive processes were used in the coding, where some themes were determined a priori through the review of the literature, and new themes were included as and when they emerged during the coding. Third, the coded data were segregated into themes and descriptions. Finally, the themes and descriptions were analyzed to identify interrelationships and then subjected to interpretation. I followed a similar approach for the literature review (Chapter 4), except that I did not have to transcribe any data. Thus, I skipped the first step in Creswell's qualitative data coding and analysis process.

I used process tracing – a qualitative approach that helps identify mechanisms that link input conditions to outcomes within single cases (Beach and Pedersen 2019) in Chapter 5 to identify the mechanisms and conditions that foster sustainable working landscapes. I began by identifying the input (e.g., governance) and output (e.g., management outcomes) conditions that exemplify sustainable working landscapes in the case region. This was followed by an inductive process that to identify the various conditions and mechanisms that connect governance to management outcomes. See Chapters 6 and 5 for details on the qualitative analysis and process tracing, respectively.

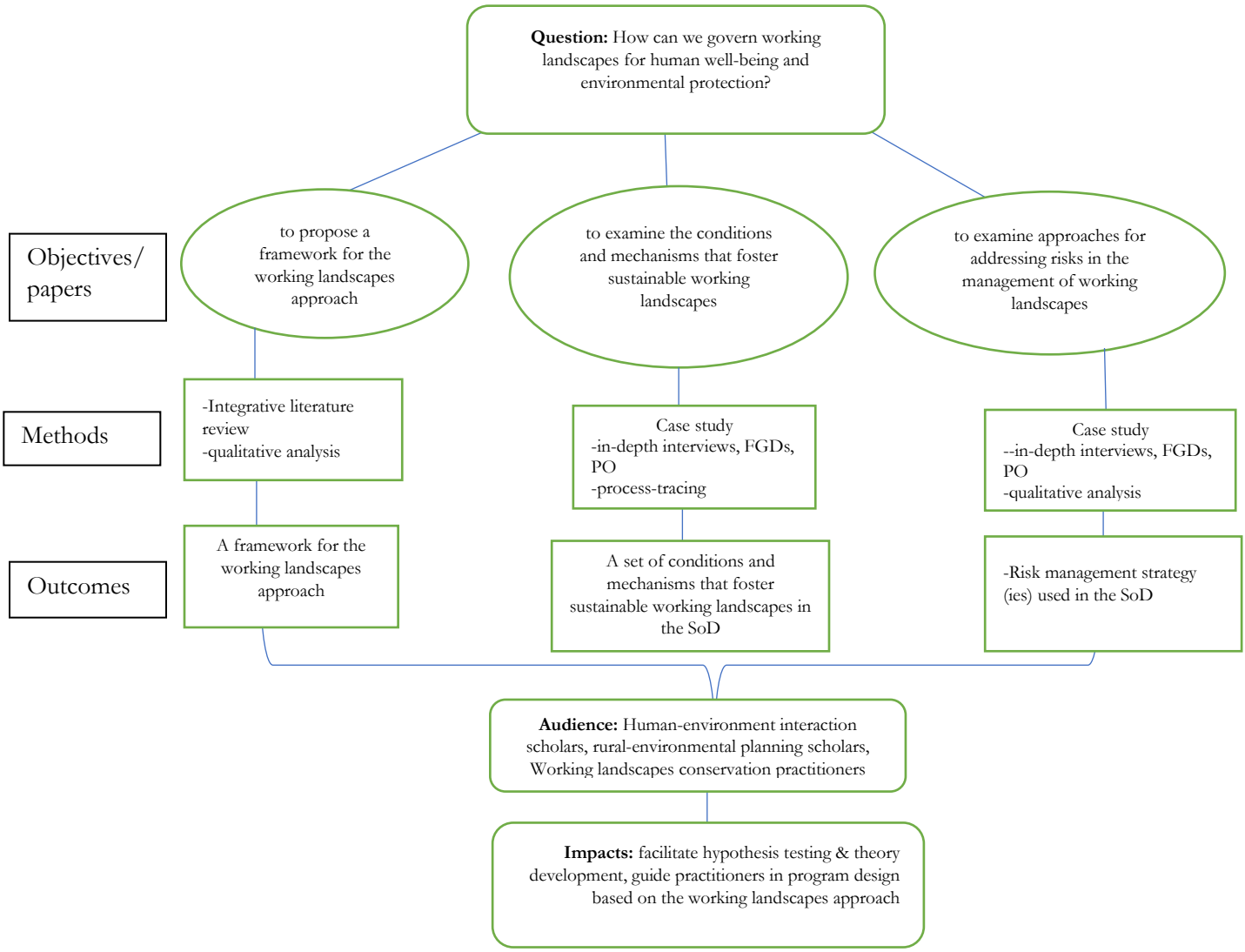

Figure 3.1. Research Plan

3.6 Research Ethics

The study adhered to the University of Waterloo's ethical guidelines and the Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans. The research was reviewed and approved by the University of Waterloo's Office of Research Ethics (ethics #31500). Table 3.1 summarizes the ethical issues addressed.

Table 3.1. Ethical issues and approaches used to address them

Ethical consideration	How it will be addressed
Informed and prior consent to participate	Research respondents were made to understand the objectives of the research as well as their rights to opt out of the study at will. They were given a consent document to read and agree to participate before I proceeded to engage them.
Anonymity and confidentiality of respondents	Participants were assured of their anonymity during the consenting process, and the data collected were encrypted to avoid unauthorized access. The data has also been de-identified to avoid any possible revelation of identity.
Research reporting and community benefits	The benefits of the research to participants and the community were clearly articulated to the research participants at the beginning of the research.

Chapter 4: Working Landscapes Approach: A Conceptual Framework

Raphael Ayambire, Jeremy Pittman, Michael Drescher, Juan Moreno-Cruz & Andrea Olive

4.1 Chapter Summary

The working landscape approach is gaining rapid recognition for its potential to help address global environmental crises such as climate change and biodiversity loss and support social well-being. Yet, the working landscapes approach still lacks a comprehensive conceptual framework to guide further research and practice. This article provides such a framework through a comprehensive review and synthesis of the governance dimension of working landscapes. The framework is built on five premises, including (1) the working landscapes approach focuses on simultaneously achieving social well-being and environmental protection goals within the landscapes, (2) it is concerned with fostering collective action among multiple actors to deliver sustainable outcomes, (3) the social-ecological context affects and is affected by the working landscape in question, (4) five key ingredients – equity, facilitative leadership, local autonomy, incentives, and trust – are essential for facilitating collective action in working landscapes, and (5) collaborative and multilevel interactions enhance governance fit in working landscapes. Our framework focuses on the local scale and how the local is embedded within multilevel governance arrangements. We hope that the framework we are proposing will help guide empirical case studies on the working landscapes approach, further its theoretical understanding, and contribute to enhancing policy aimed at increased social well-being and environmental protection.

4.2 Introduction

International commitments to advance sustainability through protected area designation continue to lag current and future sustainability thresholds (UNEP-WCMC and IUNC 2016). At the same

time, recent efforts to increase the amount of land under protection are more challenging than ever (Palomo et al. 2014; Jones et al. 2018; Hermoso et al. 2019b; Hermoso et al. 2019a). As a result, scholars and environmental groups have turned to working landscapes to complement protected areas (DeFries et al. 2007; Hansen and DeFries 2007; Chazdon et al. 2009; UNEP-WCMC and IUNC 2016; Drescher and Brenner 2018). The term 'working landscape' refers to rangelands, forests, and cultivated fields managed for human well-being and to protect the natural environment (Huntsinger and Sayre 2007; Kremen and Merenlender 2018). In this regard, the term describes an approach to environmental management where land managers adopt management approaches that foster production and still maintain the ecological integrity of the landscapes to support wild species and mitigate climate change (Kremen and Merenlender 2018). However, due to the socio-economic conflicts involved in managing land for human well-being and environmental protection, working landscapes are inherently associated with policy approaches that attempt to address the impasse between production and environmental protection (Cannavo 2007). We use the term "working landscapes approach" to encompass the environmental management approaches and the associated policy actions that support their implementation.

The increasing interest in the working landscapes approach as a way to promote sustainability is evident in the growing amount of scholarship addressing the potential of the approach to promote human well-being and environmental protection (Polasky et al. 2005; McGranahan 2008; Kral et al. 2015; Chanchani et al. 2016; Eastburn et al. 2017; Kremen and Merenlender 2018; Baudron et al. 2019; Buotte et al. 2020). These studies suggest that the working landscapes approach is effective for enhancing sustainability by complementing protected areas through serving as critical habitats for wild species, carbon sinks, promoting soil health, and enhancing landscape connectivity, among others (Chanchani et al. 2016; Eastburn et al. 2017; Kremen and Merenlender

2018; Buotte et al. 2020). Yet, enhancing the potential of the working landscapes approach for promoting sustainability requires an understanding of the governance processes that underpin its success or otherwise (Estrada-Carmona et al. 2014; Brockington et al. 2018). This has remained unaddressed. In addition, the approach still lacks a comprehensive conceptual framework that brings together its different elements.

Our aim in this article, therefore, is to propose a conceptual framework for the working landscapes approach focusing on its governance dimension. Our framework is built on five premises, which are as follows: (1) the working landscapes approach focuses on simultaneously achieving social well-being and environmental protection goals within the landscapes, (2) the working landscapes approach is concerned with fostering collective action among multiple actors to deliver sustainable outcomes, (3) the social-ecological context affects and is affected by the working landscape in question, (4) five key ingredients – equity, facilitative leadership, local autonomy, incentives, and trust – are essential for facilitating collective action in working landscapes, and (5) collaborative and multilevel interactions enhance governance fit in working landscapes. The first three premises are based on conceptual propositions put forward for enhancing the sustainability of working landscapes, while the final two premises are drawn from the emergent challenges confronting the working landscapes approach and the governance responses identified in the literature. In the following sections, we first explain these premises before synthesizing them into an integrated conceptual framework for the working landscape approach that is broad enough to work in different social and ecological contexts.

The working landscapes approach can be applied at diverse scales and levels, including at sub-national (i.e., local and regional) and cross-boundary levels. However, the framework we describe in this paper focuses on the local scale and how the local is embedded within multilevel governance

arrangements. Our focus on the local scale to frame the working landscapes approach is in response to the need for local resource users to actively participate in shaping policies that affect their lives and livelihoods (Armitage et al. 2020), especially given that the management of working landscapes is ultimately undertaken by local landowners and land managers. We hope that our framework for working landscapes approach will guide questions like 1) what enhances or inhibits the success of working landscapes at the local level? and 2) how can initiatives based on the working landscapes approach be designed, from an institutional perspective, to enhance success within diverse contexts? The framework is also expected to help advance interdisciplinary scholarship on working landscapes by facilitating empirical case studies on the approach.

4.3 Methods

We employ an integrative review methodology to develop the framework for the working landscapes approach. An integrative literature review is "a form of research that reviews, critiques, and synthesizes representative literature on a topic in an integrated way such that new frameworks and perspectives on the topic are generated" (Torraco 2005, 356). The integrative review has several differences from other forms of reviews but mainly because it focuses on generating or refining a theory, hypothesis, or a framework from existing literature (Whittemore and Knafl 2005; da Silva et al. 2020). Integrative reviews also allow for a combination of diverse forms and sources of data as well as empirical and theoretical research (da Silva et al. 2020). The integrative review we adopted in this paper follows the five steps outlined by Whittemore and Knafl (2005). The five steps include (1) problem identification and question formulation, (2) literature search, (3) data evaluation, (4) data analysis and (5) presentation or synthesis.

Three main research questions guided this review: (1) how is the working landscapes approach defined? (2) what are the governance challenges confronting working landscapes? and (3) what

governance arrangements are used to address the challenges in working landscapes? We searched for relevant literature from SCOPUS and Web of Science. We chose SCOPUS and Web of Science because they cover a wide range of literature. This wide coverage helps us draw on several journals and databases to obtain relevant data for the topic.

We searched the databases using a single search string, "working landscape" OR "working land." Restricting the search to papers that explicitly mention "working landscapes" or "working lands" could omit some relevant data on working landscapes. However, because we are interested in exploring the conceptualization of the working landscape approach, we deemed it necessary to focus on studies that explicitly address the concept. We also complemented the systematic search with bibliographic searching and solicitation from four experts in fields that commonly engage with working landscapes (e.g., environmental governance, species at risk conservation policy, environmental economics, and environmental justice).

The search returned 414 papers (293 from SCOPUS and 121 from WoS). We removed duplicates (156), leaving a total of 258 papers. These remaining papers were screened for inclusion using the following criteria: (1) the papers must be written in the English language, 2) they must be peer-reviewed, 3) the papers must be relevant to working landscapes – defined broadly as land managed for social well-being and environmental protection, and 4) the papers must address issues of governance. After the screening, one hundred and ten (110) papers were included for analysis (Appendix E).

The data analysis followed three steps. We first conducted open coding to identify all possible relevant themes (Plummer et al. 2012). The themes were broadly grouped under the three research questions. Thus, themes related to the conceptualization of the working landscapes approach were coded under "definitions," themes related to challenges were coded "challenges," and themes

under governance arrangements were coded "governance." The second stage involved identification of sub-themes within the three broad themes. Three sub-themes emerged under "definitions," framed under section 4.4 as the three propositions for the sustainability of working landscapes. Four sub-themes emerged under "challenges" (section 4.5), and three sub-themes emerged under "governance" (Section 4.6). Five key issues (Table 4.2) were further identified under the governance sub-theme "key ingredients." To identify the key ingredients, we focused on issues that were reported as 'important' (including related concepts such as necessary, crucial, relevant, drivers, motivators, conditions, etc.) for the success of working landscape initiatives.

The third stage involved an axial coding to identify patterns within the three separate thematic areas and between them (Pittman and Armitage 2016). To analyze patterns within and between themes, we focused on the presence of patterns and the direction of relationships. The "governance" themes appeared to be responding directly to the "challenges" themes. This relationship was summarized into two premises: (1) five key ingredients – equity, facilitative leadership, local autonomy, incentives, and trust – are essential for facilitating collective action in working landscapes and (2) collaborative and multilevel interactions enhance governance fit in working landscapes. These two premises, collectively, were related to the propositions under the "definitions" theme by acting as the social processes that facilitate the sustainability of working landscapes. These patterns of relationship are shown by the arrows in Figure 4.1.

4.4 Conceptualizing the working landscapes approach: three propositions for sustainability

The working landscapes approach aims to integrate the goals of sustaining people's well-being and protecting the natural environment on lands already used for human productive activities (e.g., forestry, ranching, crop farming) through collective action. Our conception of the working landscapes approach is undergirded by three central propositions, including that the approach (1)

seeks to integrate social well-being and environmental protection in a working landscape, (2) involves collective action among multiple actors, and (3) is applicable on lands that are already used for productive human activities and not intended to promote the expansion of agriculture, etc., into currently intact areas. We expand on each of these three propositions in the following sections.

4.4.1. Integration of multiple goals: social well-being and environmental protection

The working landscapes approach aims to integrate the well-being of people and environmental protection within the landscape in a mutually agreeable way. Well-being is used here in line with the social conception of well-being. According to this conception, well-being refers to "[a] state of being with others and the natural environment that arises where human needs are met, where individuals and groups can act meaningfully to pursue their goals, and where they are satisfied with their way of life" (Armitage et al., 2012, p. 3; adapted from McGregor, 2008). The social conception of well-being is different from the conventional use of well-being, which perceives well-being as individualistic and basic needs-oriented because it nests individual needs within a broader social context of needs (Bennett et al. 2015). Nesting individual need within the broader social context is essential because individual needs are not universal and may sometimes conflict, yet there is often the need to reconcile these varied needs to achieve sustainability. The social conception of well-being provides the necessary tools to help reconcile and integrate the different individual needs. Also, social well-being recognizes that well-being is both a process and an outcome (Ansell and Gash 2008). In line with this, social well-being is multidimensional, encompassing material, relational, and subjective dimensions (White 2010). The material dimension of well-being focuses on an individual's access to their physical needs, including income, assets, and the ecosystem services provided by the natural environment. Because access

to materials is affected by broader social structures (e.g., how land-use regulations affect farming or ranching), a crucial component of the material dimension of well-being is how social structures help distribute these materials fairly or otherwise. It is also concerned with whether environmental policies restrict access to material resources (Brueckner-Irwin et al. 2019) and whether there are alternative options (e.g., economic incentives) to help meet people's material well-being needs. The relational dimension focuses on the social interactions among people and broader social structures (i.e., organizations and rules) that determine an individuals' actions and influence in society (Ansell and Gash 2008). Therefore, relational issues are increasingly concerned with whether individuals and groups can participate, maintain their autonomous rights, and influence decisions affecting their lives or in their pursuit of well-being (Brueckner-Irwin et al. 2019). The subjective dimension of well-being directs attention to cultural values, identity, beliefs, and norms. In working landscapes, lifestyle attributes such as landowners' or land manager's sense of pride, their culture of ranching, and their moral obligation to steward the land for future generations can sometimes rank above profit-maximization (Ayambire et al. 2021). These subjective elements are crucial because they translate into people's level of (dis)satisfaction or preferences towards policies (Brueckner-Irwin et al. 2019).

Environmental protection is used broadly to refer to the maintenance of the ecological integrity of an ecosystem through the preservation and restoration of its natural features and functions or the introduction of new features to support the survival of specific ecosystem components (OECD 2007). It is a broad term that encompasses various activities, including less-consumptive behaviours, pollution control, climate change mitigation, and biodiversity conservation, among others. However, for the purposes of this paper, activities that come under the umbrella of environmental protection may include soil conservation, habitat management, pollution control,

species at risk management, climate change mitigation, and the protection of biodiversity. The working landscapes approach may aim to address one or more of these environmental protection issues depending on the goals of the initiative. In fact, in many circumstances, working landscape initiatives address multiple environmental protection goals. For example, the South of the Divide Conservation Action Program Inc. (SODCAP), a conservation program in southwestern Saskatchewan that is based on the working landscapes approach, undertakes habitat restoration, native grassland management, and invasive species control, among others within the working landscape (SODCAP Inc., 2017).

These environmental protection goals sometimes conflict with productive activities, such as ranching, forestry, and farming, activities that contribute to social well-being. The conflict results from the fact that undertaking environmental protection activities such as habitat management or climate change mitigation can 'harm' land managers in the form of reduced profits, increased management costs, or threaten certain lifestyles of landowners and land managers (referred to as land managers' fear of harm) (Environment and Climate Change Canada 2016; Hossu et al. 2018; Reiter et al. 2021). Addressing this conflict is central to the working landscapes approach (Cannavò 2007). But how can this conflict be addressed? As we demonstrate in this paper, the conflict can be addressed using various governance arrangements and policies directed towards alleviating land manager's individual and collective fear of harm (section 4). However, these policies and strategies may generally include providing incentives (Innes and Frisvold 2009) and enhancing the participation of diverse stakeholders in decision-making (Pascual et al. 2014; Martin et al. 2016; Olive 2016; Drescher and Brenner 2018). In addition, the policies and strategies should seek to engender collective action among the diverse actors, as collective action is an essential requirement for the sustainability of working landscapes (section 2.2).

Premise 1: The working landscapes approach focuses on integrating social well-being and environmental protection

---

4.4.2 Collective action among multiple actors: state and non-state actors

Collective action becomes necessary when the contribution of more than one actor is required to accomplish a given outcome (Sandler 2015). The theory of collective action was introduced by Mancur Olson (1965) and later popularized by Elinor Ostrom, who employed the theory to study how groups of natural resource users can self-organize to manage common-pool resources or public goods in a manner that helps them to escape the so-called tragedy of the commons (Cox et al. 2016; Partelow et al. 2020). However, the theory's importance hinges on its ability to elucidate the drivers of cooperation among people in collective action situations and the social and ecological factors that influence collective action itself. In this regard, collective action has gained broader application in many policy and resource governance endeavours (Muradian and Rival 2012; Muradian 2013; Partelow et al. 2020).

In this paper, we employ the collective action concept to explain the voluntary participation of multiple actors in undertaking environmental protection activities (e.g., species at risk conservation and climate change mitigation) or in the production of public ecosystem services (e.g., increasing biodiversity and carbon sequestration) on private, communal, and public working landscapes (Raymond 2006; Muradian 2013; Potoski and Prakash 2013). The effective provision of public ecosystem services or environmental protection in working landscapes requires the co-operation of many actors, including landowners or land managers, government, industry, environmental non-governmental organizations, communities, Indigenous actors, and the general public (Chazdon et al. 2009). Yet, the private interests of these actors, the large number of actors involved, and the non-excludable nature of most ecosystem services often make them prone to free-riding problems (Muradian and Rival 2012; Muradian 2013; Potoski and Prakash 2013). This makes collective action imperative for the working landscapes

approach. Aside from the need for collective action to foster environmental protection by eradicating free-riding problems, collective action can also contribute to social well-being by identifying and addressing the well-being factors that hinder or facilitate collective action. For example, a lack of participation in decision-making or misrecognition of people's identities can be perceived as injustices and lead to the refusal of landowners to enrol in conservation programs based on the working landscapes approach (Pascual et al. 2014; Martin et al. 2016; Olive 2016; Drescher and Brenner 2018). Similarly, landowners may refuse to enrol in conservation programs if their incomes are reduced unless adequate incentives are provided to accommodate the opportunity costs (Innes and Frisvold 2009).

Collective action within the context of working landscapes can occur in multiple ways, such as between state and non-state actors, between different state actors, and between different non-state actors. Collective action between state and non-state actors is necessary when part or the whole of the working landscape belongs to or is under the management of private individuals or groups. For example, in the South of the Divide region, Saskatchewan, where about 46 percent of the grassland working landscape belongs to private individuals, the co-operation of these private landowners is required to effectively manage species-at-risk (Environment and Climate Change Canada 2016). Many similar examples exist across the world, including in the Mesoamerican Biological Corridor (Miller et al. 2001; Kaimowtz 2008; DeClerck et al. 2010), the Brazilian Amazon (Soares-filho et al. 2014), the Altar Valley in Arizona (Sayre 2007) and many others. Such need for co-operation is the reason behind the introduction of incentive schemes to foster voluntary participation in habitat management programs on both public and private lands. It is also the reason behind the introduction of grass banking initiatives in several parts of North America to help link conservation in private and public working landscapes (Gripne, 2005; Tack et al., 2019; Ayambire et al., 2021). Collective action may also be necessary between different state actors, especially where the spatial boundaries of a landscape extend beyond one political jurisdiction or where the functions of different state actors in relation to

the landscape intersect (e.g., agriculture and conservation). In the Milk River Watershed, the working landscape falls under the jurisdiction of three different governments: the provinces of Alberta and Saskatchewan and the state of Montana (MRWCC, 2013). As a result, there is inter-jurisdictional co-operation in managing the watershed (see the Milk River Transboundary State of the Watershed Report). Sometimes, collective action between state actors may occur across different scales and levels of governance (e.g., the Okanagan Valley (Parrott et al. 2019)). Finally, collective action is necessary among different non-state actors. The commonest form of collective action is needed between different land managers within the working landscape. Ferranto et al. (2013) refer to co-operation between different landowners or land managers in a working landscape as cross-boundary co-operation. Cross-boundary co-operation involves land managers accounting for the "plans and practices of adjacent or nearby properties when making management decisions about their land" (Ferranto et al. 2013, 1083). This form of collective action is crucial for enhancing spatial coordination, a factor necessary for maximizing the production of public ecosystem services in working landscapes (Parkhurst et al. 2002; Hanley et al. 2012).

To summarize, collective action is the intermediate outcome of institutional configurations that aim to integrate social well-being and environmental protection in working landscapes. However, the nature of the collective action and the actors involved are dependent on the scale and level of interest. At the local scale, where the interest of institutions is to incentivize co-operation among the actors directly involved in the management of the working landscape, collective action involves understanding what hinders or motivates land managers to participate (e.g., sign contracts, share information, reserve adjacent lands etc.) in the production of public ecosystem services. Therefore, at this scale, the working landscapes approach is concerned with understanding how to incentivize landowners to enrol and participate in voluntary environmental programs aimed at providing public ecosystem services (Ferraro 2008; Innes and Frisvold 2009; Potoski and Prakash 2013; Drescher et al.

2017). Actions often anticipated in working landscapes at the local scale include enrolment in programs, information sharing, learning, and environmentally friendly land management (Innes and Frisvold, 2009; Parrott et al., 2019; Reed, 2008; Sayre, 2007).

Premise 2: Collective action enhances the sustainability of working landscapes by contributing to social well-being and environmental protection

---

4.4.3 Social-Ecological context of working landscapes: productive human activities and social and ecological influences

The last element of our definition focuses on the social-ecological context of working landscapes. The social-ecological context emphasizes both the character of the landscape itself and its interactions with other related SESs. Regarding the character of working landscapes, there is often confusion in the literature as to whether the working landscapes approach advocates for the domestication of wildlands (Wuerthner 2014) or the management of lands that are already actively used for human productive activities (Kremen and Merenlender 2018). We argue in line with Kremen and Merenlender (2018) that the working landscapes approach is a recognition that strictly protected areas alone can not meet the sustainability thresholds required to protect the natural environment and that working landscapes have the potential to complement protected areas (Jones et al. 2018; Hermoso et al. 2019a). Therefore, the working landscapes approach is only applicable on lands already used for human productive activities such as ranching, forestry, and crop cultivation (Kremen and Merenlender 2018). However, the actions occurring on working landscapes affect and are affected by broader social, political, economic, and biophysical factors beyond the landscape where they take place (DeClerck et al. 2010; Charnley et al. 2014; Pascual et al. 2014; Dawson et al. 2017). Thus, while it is crucial to understand the social and ecological

interactions within the working landscape, it is equally important to understand how the broader context interacts with the landscape of interest.

There are two main ways in which understanding the social-ecological context is important in the working landscapes approach. First, collective action activities at the local level are influenced by social and ecological events occurring at higher levels of social and environmental structure. For example, several landowner-focused conservation initiatives in working landscapes like the USDA Sage Grouse Initiative and the South of the Divide conservation action program in Saskatchewan are inspired or supported by federal government policies such as the US Farm bill and Canada's Greater Sage Grouse Recovery Strategy of 2014, respectively (Environment Canada 2013; Smith et al. 2016; Pittman 2019; Naugle et al. 2020). Indeed, these decisions are sometimes influenced by international frameworks on environmental protection (Busch and Jörgens 2005), such as the Convention on Biological Diversity and the Paris Agreement. In addition, funding for incentivizing voluntary collective action on working landscapes sometimes emanates from the Federal government. Aside from social influences, ecological factors such as climate change or extreme weather events can have a profound influence on what management actions are possible in working landscapes. For example, evidence abounds that drought can affect the ability of ranchers to manage rangelands for critical habitats and still maintain their levels of income (Zabel and Roe 2009; Matzdorf and Lorenz 2010; Rolfe et al. 2018; Ayambire and Pittman 2021).

Second, the broader context determines what is considered socially and ecologically fit or acceptable (DeCaro and Stokes 2013; Meek 2013; Epstein et al. 2015; Bennett et al. 2018). On the social side, several studies have suggested that landowners in working landscapes prefer local autonomy and flexibility in the management of their lands (Sorice 2012; Henderson et al. 2014; Stroman and Kreuter 2016; Gooden and Grenyer 2019; Pittman 2019). But it is not just the

preferences of landowners that matter in the working landscapes approach. The acceptance of policies from the public, who mostly fund working landscapes initiatives through public tax dollars, is crucial for gaining financial and political support for working landscapes (Biénabe and Hearne 2006; Olive 2015; Buxton et al. 2021). On the ecological side, Kremen & Merenlender (2018) suggest that working landscapes are expected to support protected areas by, for example, enhancing habitat connectivity and providing in-situ habitat for species. Therefore, depending on the character of the adjoining land uses (e.g., protected area, a watershed), the type of management required on the working landscape will likely differ (DeFries et al. 2007; Hansen and DeFries 2007; Warrier et al. 2020).

Premise 3: The social-ecological context affects and is affected by the working landscape in question

---

4.5 Overview of the empirical scholarship: emergent governance challenges in working landscapes

The most important challenge confronting working landscape conservation is how to identify the kinds of governance that are effective for working landscapes in different contexts (Brockington et al. 2018). Studies examining governance solutions relevant to specific regions must begin with a knowledge of the nature of governance challenges in working landscapes. Indeed, a growing body of scholarship exists that highlights the challenges confronting working landscapes. These challenges have centred around the right to use resources and in what ways, the rules that control resource use, and how the rules are designed and enforced (Agrawal et al. 2008; Brockington et al. 2018). Through a survey of the working landscapes scholarship, we have identified four broad categories of challenges related to governance facing working landscapes. We explain each of the

challenges below, focusing on how they can inform the design of governance solutions for working landscapes.

4.5.1 Cost and compensation

Managing land for both environmental protection and well-being comes with a cost, especially on lands originally managed purposely for profit (Kremen and Merenlender 2018). This cost comes in varied forms, such as opportunity cost, management cost, transaction cost, acquisition cost, and damage cost (Naidoo et al. 2006; Pittman and Ayambire 2020). These costs, if not compensated for, may negatively affect people's well-being and hinder collective action. For example, as Innes and Frisvold (2009) argue, landowners may refuse to enrol in conservation programs if their profits are reduced. Sometimes, landowners may enrol in conservation programs and fail to deliver optimum ecosystem services or environmental protection outcomes due to higher costs (Baumgärtner and Quaas 2010; Ayambire and Pittman 2021). Therefore, it is imperative for agencies employing the working landscapes approach to identify and compensate actors affected by higher costs.

Indeed, land managers and private landowners generally want to be compensated for supplying public ecosystem services or undertaking environmental protection activities, in working landscapes, that benefit the wider public (Brook et al. 2003; Olive 2016; Farley et al. 2017). However, some private landowners may see the sustainable management of land as a responsibility and a demonstration of citizenship (stewardship ethos) (Henderson et al. 2014; Pittman 2019). Therefore, this stewardship ethos must be balanced with the utilitarian approach to land management (Ayambire et al. 2021). Suggestions that the public accepts to fund the cost associated with compensation payments presents a real opportunity for addressing the utilitarian needs of landowners (Biénabe and Hearne 2006; Olive 2015; McCune et al. 2017). However, users of the

working landscapes approach continue to grapple with how to determine the appropriate amount of compensation that will entice collective action (Engel et al. 2008; Ferraro 2008) and demonstrate additionality (Wunder 2005; Ferraro and Pattanayak 2006; Pates and Hendricks 2020). There are no straightforward approaches for addressing these challenges since costs vary depending on several context factors, such as the nature of the service provided, environmental risk factors, and the alternative forgone uses. As suggested by Ayambire and Pittman (2021), context-specific factors such as cost in the working landscapes approach can only be addressed through meaningful participation built on trust among the various actors. Also, recent scholarship suggests that it may be better to focus attention on broader contextual factors that will facilitate collective action rather than seeking to determine exact amounts of compensation to entice collective action (Farley et al., 2017; Henderson et al., 2014; Pittman, 2019; Ayambire et al., 2021). This is because actors in working landscapes may have other priorities when considering participating in collective action activities. For example, landowners in southern Saskatchewan (Pittman 2019) and in the Plains and Prairie Pothole Ecoregion (PPPE) in the US (Sweikert 2017; Gigliotti and Sweikert 2019), in addition to the compensation for the extra cost, also desire autonomy and legal assurances that restrictions will not be placed on their properties. Therefore, compensation for cost should be treated as part of a broader suite of policy instruments and incentives designed to incentivize collective action (Muradian 2013; Ayambire et al. 2021).

4.5.2 Equity

Issues of equity permeate several aspects of the working landscapes approach, including uncompensated costs (distribution), disregard for people's identities, knowledge systems, and ways of life (recognition), and lack of participation (procedure). Inequities in these varied forms hinder collective action in working landscapes and deny decision-makers valuable information to

enhance effective governance. For example, a lack of participation in decision-making or misrecognition of people's identities can be perceived as injustices and lead to the refusal of landowners to enrol in conservation programs based on the working landscapes approach (Pascual et al. 2014; Martin et al. 2016; Olive 2016; Drescher and Brenner 2018). Similarly, Pascual et al. (2014) demonstrated that including equity in the design of Payment for Ecosystem Services (PES) programs can provide valuable feedback that affects governance and ecological outcomes. The authors, therefore, cautioned against "equity-blind" PES programs. Nonetheless, many existing programs based on the working landscapes approach are 'partially equity-blind.' Procedural equity and recognition have been relegated to the background despite several pieces of evidence pointing to the usefulness of multidimensional equity in enhancing environmental protection and social well-being (Pascual et al. 2014; Martin et al. 2015; Martin et al. 2016; Olive 2016; Olive and Rabe 2016). There is optimism that increasing global attention to multidimensional equity as a meta-norm in environmental governance will facilitate its diffusion to the local level (Lawless et al. 2020). However, this will require effective multilevel and collaborative governance arrangements that promote learning across scales.

4.5.3 Knowledge access and integration and the role of trust

Land management approaches used in working landscapes are "knowledge – rather than technology-intensive" (Sayre and Seibert 2015; Kremen and Merenlender 2018). Yet, knowledge of complex and dynamic systems like working landscapes is often elusive. Knowledge in working landscapes is distributed among many actors, and no single actor has all the knowledge (Berkes 2010; Armitage et al. 2012a; Pittman and Armitage 2016). In this regard, managers of working landscapes are challenged with accessing the relevant knowledge and integrating it to facilitate the effective management of working landscapes. Access to knowledge involves identifying the

knowledge needs, where to obtain knowledge, and having the ability to obtain it. Knowledge integration involves engaging the different sources of knowledge in decision-making (Pittman and Armitage 2016). A major challenge with knowledge access and integration in working landscapes is the lack of trust between the different sources of knowledge concerned with the governance of working landscapes. Ferranto et al. (2014) argue that private landowners in California distrust information that emanated from conservation and environmental groups with a regulatory authority. This is partly due to landowners' past experiences with the command-and-control regulatory regimes and the tendency of governments to place restrictions on environmentally sensitive working landscapes (Bergmann and Bliss 2004; Ferranto et al. 2013; Farley et al. 2017). Therefore, the lack of trust deters landowners from accessing and utilizing scientific knowledge from conservation and environmental groups. In contrast, "trained experts" have the tendency to leverage technical knowledge over other forms of knowledge, especially landowners' local ecological knowledge (Charnley et al. 2007; Armitage et al. 2012a). This underutilization of local ecological knowledge further increases a lack of trust and denies decision-makers valuable information that could enhance the social and ecological outcomes of working landscapes. A key proposition in the working landscapes scholarship to address these challenges is the need for knowledge co-production (Naugle et al. 2020). Co-production works best when actors agree to a shared vision regarding both outcomes and processes and are willing to collaborate towards achieving the vision. But more importantly, co-production requires that government organizations work to rebuild trust by promoting their predictability (Naugle et al. 2020). Trust can also be built by involving bridging organizations that can link different knowledge holders, integrate knowledge, and make it accessible to the various knowledge users (Berkes 2009; Armitage et al. 2012a; Crona and Parker 2012; Rathwell et al. 2015).

4.5.4. Multifunctionality, Scale, and Fit

A central feature of working landscapes is their multifunctional nature – i.e., they provide multiple ecosystem services flows that benefit catchment of different sizes or actors at different spatial scales (Kremen and Merenlender 2018; Frei et al. 2020). For example, a grassland working landscape serves multiple ecosystem functions such as forage for livestock, conservation of soil and water resources, recreational amenities, global carbon sequestration, and species at risk habitats (An et al. 2017). Some of these ecosystem functions (e.g., carbon sequestration and endangered species habitats) benefit actors at spatial scales outside the physical limits of the grassland working landscape in question. Because the provisioning of these ecosystem functions involves both direct and opportunity costs (Paavola 2016), it is fair that beneficiaries from outside the physical limits of the ecological resource contribute to paying for the cost. This calls for governance to match the different spatial scales where the provision and consumption of the ecosystem services take place (Gibson et al. 2000; Cash et al. 2006; Pittman and Armitage 2016). Also, in many circumstances, working landscapes require collective management, yet existing environmental conservation programs in working landscapes often focus more on incentivizing individual landowners (Parkhurst et al. 2002). These are referred to as the problems of spatial fit – "finding the appropriate spatial match between institutions and the environmental problem" (Armitage et al. 2012a, 248). Working landscapes also face problems of social fit – the ability of institutions to match social processes and characteristics of the actors. For example, when policy and management proposals conflict with land managers' beliefs, norms, and behaviours, they are less likely to accept them (DeCaro and Stokes 2013). These challenges suggest that working landscapes likely require collaboration among the multiple actors and multilevel linkages between the different levels and scales of interest.

4.6. Governance responses

4.6.1 A typology of governance arrangements in working landscapes

Environmental governance refers to "…the establishment, reaffirmation or change of institutions to resolve conflicts over environmental resources" (Paavola 2007, 94). For working landscapes, governance is commonly concerned with "changes in environment-related incentives, knowledge, institutions, decision-making, and behaviours" (Lemos and Agrawal 2006, 298) that are directed towards alleviating actors' fear of harm and enhancing collective action. A defining character of (environmental) governance, as opposed to 'government,' is the involvement of multiple actors and the changing role of the state in environmental decision-making (Lemos and Agrawal 2006; Armitage et al. 2012a). In line with this, Lemos & Agrawal (2006) argue that there is an emergence of several hybridized forms of governance arrangements centred around the relationship between communities, the state, and market actors. These hybridized forms of governance are even more present in working landscapes where there are a variety of land ownership types, multiple actors and interests, and multifunctionality of uses with potential spatial and temporal governance mismatches. In working landscapes, actors typically maintain part of their autonomous rights and give away others to facilitate co-operation with other actors in the production of ecosystem services (Ménard 2011). Consequently, the working landscapes literature is inundated with a variety of governance arrangements, often described by the policy instruments used, designed for specific goals and contexts (Ayambire et al., 2021). By organizing these different policy instruments according to the actors involved, the nature of interactions among actors, and the type of land ownership or property rights regimes, we identified at least six forms of governance arrangements commonly found in working landscapes (Table 4.1).

It is crucial to note that the different forms of governance arrangements (Table 4.1), especially the actors involved and nature of interactions, are not meant to be precise descriptions of how they operate. Rather, they are descriptions of 'core features' – or features that are almost always present – as reported in the existing scholarship. The relationships are much more nuanced, and new actors continue to emerge even within well-established partnerships. NGOs, for example, are increasingly acting in the community-government (or policy) interface (Evans and Wellstead 2013). Also, many PPPs, PSPs, and co-management arrangements operate within a governance framework established by state regulations or multilateral environmental agreements. For example, the South of the Divide conservation action program (SODCAP Inc) emerged from Canada's Federal Government's Greater Sage Grouse Recovery Strategy (Pittman 2019). Also, the nature of incentive schemes used in working landscapes is sometimes determined by government policy or international trade charters (e.g., conservation incentives should not be trade-distorting) (Hasund, 2013; Ayambire et al., 2021).

Table 4.1. A typology of governance arrangements in working landscapes

Forms of arrangements	**Description**	**Examples of instruments**	**Examples of programs**
Public-Private Partnership (PPP)	- Land is private property or public land leased out to private individuals - Governance interaction occurs mainly between state actors and the landowners or land managers	Certification, PES, Conservation Management Agreements (CMA), Legal Assurances, tax shifting, Transfer Development Rights (TDR)	- The Australian Landcare (Kremen and Merenlender 2018)
Co-management	- Land is public or a common pool resource - Governance interaction occurs mainly between a community of	Community-based natural resource management	- The Mongolian Community-Based Rangeland Management (Fernández-

	resource users/land managers and state actors		Giménez et al. 2015)
Private-Social Partnership (PSP)	- Land is private - Governance interaction occurs mainly between landowners and civil society	Easement, PES, extension services, CMA, TDR	- Alternative Land Use Services (ALUS) program in Canada (France and Campbell 2015; Ouellet et al. 2020)
Indigenous based Partnership	- Land belongs to Indigenous People - Governance interaction occurs mainly between Indigenous Peoples and state actors or between Indigenous Peoples and Civil Society	Co-management, Community-based natural resource management	- The Great Bear Rainforest (GBR) agreements (Smith and Sterritt 2007; McGee et al. 2010) - The Clayoquot Sound program (Nature United 2019)
State Regulations	- Private and public lands - Decisions are top-down - Civil society and landowners are mere recipients	Environmental laws, land use codes	- The Greater Sage Grouse Emergency Protection Order (EPO) - The Brazilian Forest Code (Soares-filho et al. 2014)
Interactive governance	- Land is either private or public property - Governance interactions occur as Partnership involving state actors, landowners/land managers, and civil society	CMA, Legal Assurances, Extension Services	- The South of the Divide conservation action program (SODCAP Inc., 2017)

	- Decisions can be top-down, bottom-up or both.		

4.6.2 Key Ingredients

The variations in the governance arrangements in working landscapes across different contexts (section 4.6.1) suggest that empirical generalizations will not be possible; however, one can derive a set of core elements that are common and portray the different arrangements (Ostrom, 2001 as cited in Plummer and Fitzgibbon, 2004). These common elements form the key ingredients for successful governance arrangements in working landscapes (Table 4.2). The key ingredients are framed as collective responses to the governance challenges identified under section 4.5 of this paper. Each of the key ingredients is explained below and summarized in Table 4.2. These elements are not mutually exclusive. For example, Selinske et al. (2017) observed that economic incentives would fail if there were no trust between the paying agency and the private landowners. Similarly, incentives designed without regard to local autonomy (Pittman 2019) or justice-as-recognition (Olive 2016) may fail to attract landowners (Henderson et al. 2014). Therefore, underlying these key ingredients is an understanding that each of them is important but must be considered in concert with the other elements and the social-ecological context when designing governance arrangements for working landscapes. While each key ingredient is important, we do not suggest that all of them will be equally necessary in all circumstances. Depending on the priorities of actors and the social-ecological context, certain ingredients may be deemed more important than others.

Equity

Equity is both fundamental (virtue or ego) and instrumental for attaining social well-being and environmental protection (Law et al. 2018). The fundamental view of equity posits that equity is valuable regardless of whether it impacts social well-being and environmental protection in working landscapes. On the other hand, the instrumental view of equity focuses on the impact of inequities on social well-being and environmental protection. Both views are crucial in the working landscapes approach because people's decision to undertake collective action activities is both influenced by ethics (fundamental equity) and how decisions and actions affect them (instrumental equity). For example, increasing equity in decision-making processes, recognition, and socio-economic outcomes can enhance landowners' acceptance of conservation policies (Pascual et al. 2014; Sikor et al. 2014; Olive 2016). Similarly, people (e.g., landowners) who hold sympathetic views (fundamental) about inequities towards certain groups (e.g., Indigenous peoples) may protest by avoiding collective action. This is because people's sense of responsibility towards others and moral anger predict pro-environmental intentions (Reese and Jacob 2015). In many situations, people simultaneously hold fundamental and instrumental views of equity (Law et al. 2018), making it difficult to differentiate between which views are influencing their behaviours or actions. Enhancing fundamental and instrumental equity involves understanding what equity issues are important to people within specific contexts and working to address them. Also, funding agencies can make equity a precondition for issuing grants to program managers.

Facilitative leadership

Leadership has received little attention in the working landscapes literature; yet, it remains a critical element for facilitating collective action (Ansell and Gash 2008). Meine & Nabhan (2015) highlights the critical leadership role that Aldo Leopold played in the success of the Coon Valley

Cooperative Conservation Initiative, one of the earliest examples of collaborative conservation in working landscapes. Similarly, Smith and Sterritt (2007) highlighted the important role of leaders in fostering collaboration in the Great Bear Rainforest. They argued that in complex socio-environmental problems involving conflicting interests among stakeholders, "leadership—far more than innovations in process or institutions—that ultimately will enable us to find our common ground" (Smith and Sterritt 2007, 14). Facilitative leaders may emerge spontaneously in response to unfavourable governance conditions (e.g., to disrupt top-down governance arrangements) (Pittman 2019) or maybe deliberately designed by public institutions to foster collaboration and collective action (Ansell and Gash 2008).

Local autonomy

Local autonomy contributes to grassroots participation and collaboration, incorporation of local knowledge into management, and increases the overall tendency for local actors to self-organize to address collective action problems (Brook et al. 2003; Ostrom and Basurto 2011; Sorice et al. 2013; Pittman 2019). Therefore, local autonomy is important for enhancing cross-boundary co-operation among land managers and for increasing acceptance of policies made by public agencies. As Pittman (2019) demonstrates in the South of the Divide region in Saskatchewan, local autonomy develops through a process of institutional work (led by local actors) associated with struggles to change the dominant top-down command-and-control regulatory regime. However, local autonomy can also be developed through deliberate attempts by government agencies to devolve decision-making power to local actors (Benneworth and Roberts 2002; Lockwood et al. 2009).

Incentives

Incentives are crucial for alleviating land managers' fear of harm (i.e., fear of reduced profits, restrictions, increased management costs, and lifestyle changes) and motivating collective action. Incentives may be economic (e.g., tax credits, cost-sharing, annual payments), legal (e.g., assurances), or social (e.g., public recognition). In many circumstances, different land managers prefer different incentives or a combination of incentives depending on their prevailing situation and plans. Therefore, having a suite of incentives that allows land managers to choose from is likely to increase social acceptability and enhance collective action (Ayambire et al. 2021). In addition, incentives must be designed with the active involvement of all actors to increase their responsiveness to the local context and enhance take-up (Reed et al. 2013).

Trust

Trust is important for any form of collective action, especially in the working landscapes approach, where actors often give away some of their autonomous rights to facilitate collective action (Ménard 2011). For example, private landowners will only grant access to their properties if they trust that conservation agencies would not place restrictions on their land. In this regard, the existence of trust allows landowners to accept to be vulnerable (Hamm et al. 2016; Hamm 2017) to collective action activities that contributes to social well-being and environmental protection. Trust has several dimensions (Table 4.2), most of which are directed towards the institutions initiating collective action activities (e.g., public and private conservation agencies). Therefore, enhancing the trustworthiness of institutions is a critical step towards building trust (Hamm 2017). Also, bridging organizations can help increase trust by serving as intermediaries between distrusting parties (Berdej and Armitage 2016; Berdej et al. 2019).

Table 4.2. Key ingredients for the working landscapes approach

Key ingredients	**Description**	**Key References**
Equity	Equity emphasis the need to move beyond incentives and examine the issues of power, historical injustices, and participation in decision-making (Martin et al. 2016; Olive 2016). Equity encompasses distribution, procedure, and recognition. It enhances legitimacy, acceptance, and accountability (Pascual et al. 2014).	(Cooke et al. 2012; Reed et al. 2013; Olive 2016)
Facilitative leadership	Facilitative leadership implies a less-intrusive approach where the leader's role is limited to ensuring the integrity of the governance processes (Ansell and Gash 2008). It involves protecting and promoting the interests of weaker groups (Ansell and Gash 2008) and organizing diverse actors towards a common end (Meine and Nabhan 2015).	(Smith and Sterritt 2007; McGee et al. 2010; Meine and Nabhan 2015)
Incentives	Incentives are motivators that are designed to guide actors towards desired actions or outcomes (Uphoff and Langholz 1998; Cetas and Yasue 2016). They are focused on redistributing costs and benefits associated with the supply of public ecosystem services or incentivizing collective action (Muradian 2013).	(Brook et al. 2003; Sorice et al. 2013; Henderson et al. 2014; Sweikert 2017; Ingram 2018; Pittman 2019)
Local autonomy	Autonomy refers to the ability of local actors (e.g., land managers) to determine rules and manage lands according to their local knowledge without higher authorities reprimanding or placing restrictions on their lands (Ostrom, 2014; Schlager, 2002). It is often associated with grassroots-oriented programs, the need for legal assurances, and result-based conservation agreements.	(Brook et al. 2003; Ostrom and Basurto 2011; Sorice et al. 2013; Pittman 2019)
Trust	Trust is having confidence in positive outcomes regarding another actor's conduct (Bergmann & Bliss, 2004). Trust may be determined by the competence and integrity of the government or program delivery agent, congruence of values (Kitt et al. 2021), residual (dis)trusts (Bergmann	(Brook et al. 2003; Bergmann and Bliss 2004; Ferranto et al. 2013; Reed et al. 2013; Henderson et al. 2014;

	& Bliss, 2004) and interpersonal trust (Graham 2014).	Olive 2015; Farley et al. 2017)

Premise 4: Five key ingredients – equity, facilitative leadership, local autonomy, incentives, and trust – are essential for facilitating collective action in working landscapes

---

4.5.3 Enhancing governance fit through collaborative and multilevel interactions

Aside from the five key ingredients (section 4.5.2), the literature suggests that enhancing governance fit – i.e., the "…coherence between governance systems and the social-ecological systems in which they are embedded." (Pittman et al. 2015, 487) is essential for the sustainability of working landscapes. The working landscapes approach faces several forms of governance misfits relating to the social and ecological nature of the working landscape (Young 2003; Epstein et al. 2015). These misfits can be addressed through active collaboration among the diverse actors and multilevel governance arrangements that connect the different levels of social organization that relate to the working landscape. Collaboration refers to the involvement of multiple actors in decision-making towards generating, integrating, and diffusing diverse knowledge among actors and balancing opposing interests (Ansell and Gash 2008; Bodin 2017). *Collaborative interactions* are characterized by deliberations among actors towards consensus-building (Ansell and Gash 2008) or a temporary normative order (Plummer and Fitzgibbon 2004). These interactions occur among land managers or communities in a working landscape, among civil society groups, and among governments. Examples of collaborative interactions in practice include land managers gathering to share experiences relating to biodiversity-friendly management methods (social learning) (Pahl-Wostl et al. 2008) or advocating for local autonomy (Pittman 2019). Similarly,

groups of conservation NGOs can partner to address issues of common interest as is present in SODCAP Inc. (i.e., Ranchers Stewardship Alliance, Sustainable Canada) (Pittman 2019). Also, different national or provincial governments may collaborate to manage working landscapes that cross jurisdictional boundaries (e.g., the Milk River transboundary watershed management) (MRWCC, 2013). The social interactions in the working landscapes approach may also be multilevel. *Multilevel interactions* are necessary for linking producers of ecosystem services at the local level to consumers spread out over larger spatial scales (Paavola 2016). Multilevel interactions are characterized by decentralized policymaking where international charters and federal policies dictate provincial and municipal level policies regarding working landscapes. Multilevel interactions also occur through federal, provincial, and municipal funding schemes that are geared towards instigating local actions in working landscapes.

Premise 5: Collaborative and multilevel interactions enhance governance fit in working landscapes

---

4.7. Synthesis: a framework for the working landscapes approach

The working landscapes approach begins with an intentional identification of a need to manage working landscapes for environmental protection and social well-being. We use intentionality to differentiate the working landscape, as a policy approach, from environmental stewardship, which may be a spontaneous or unplanned act by an individual land manager. This need is usually an environmental protection concern (e.g., species extinction risks, land degradation, or pollution) and the associated potential for the working landscape to help address the concern. However, the working landscapes approach may also be implemented as a precautionary measure to avoid environmental degradation. In complex SES like working landscapes, the need alone does not provide enough information to help policymakers make informed decisions. Instead, it is important

to have a more thorough understanding of the social-ecological context to understand what factors are linked to the need and would have a bearing on the design of institutional solutions (Bodin 2017; Bennett et al. 2018; Bennett and Satterfield 2018). For example, there is a history of animosity or residual distrust between many private working landscape owners and government due to past command-and-control regimes (Holling and Meffe 1996; Bergmann and Bliss 2004; Ferranto et al. 2013). Understanding this history would inform how policymakers can proceed with trust-building processes. Similarly, external factors such as extreme weather events (e.g., drought) are known to have an influence on environmental management outcomes such as habitat health (Loisel and Elyakime 2006; Baumgärtner and Quaas 2010; SODCAP Inc. 2017; Ayambire and Pittman 2021). This implies that policymakers will need to accommodate risks posed by these external factors in the design of economic incentives. Understanding the social-ecological context also has to encompass the property regimes, actors involved, motivations, capacities, and power relations (Bennett et al. 2018). Therefore, the need and the social-ecological context shape actions that must be taken to make the key ingredients (Table 4.2) fit or to be effective for a specific working landscape. Furthermore, working landscape problems are collective action problems (section 4.4.2) – i.e., they are focused on incentivizing the voluntary participation of multiple actors in the production of public ecosystem services that are prone to free-riding (Muradian and Rival 2012; Potoski and Prakash 2013). Therefore, central to the design of institutional solutions is the goal of ensuring that individual actors perform actions towards the collective interest. This implies that the key ingredients need to be designed to enhance positive interactions among the actors, which will, in turn, contribute to social well-being and environmental protection outcomes (Figure 4.1). The outcomes produced by the working landscapes approach may have an impact – negative or positive – on other SESs. For example, working landscapes may assist in the dispersal

of wild species across protected areas. Or land managers who participate in a specific working landscape initiative may transfer their knowledge to other landscapes.

Finally, fundamental to the working landscapes approach is a process of social interaction described here as collaborative and multilevel interactions (Figure 4.1). This social interaction is crucial because it is the backbone that holds the different components of the working landscapes approach together. Collaborative and multilevel interactions connect all the components of the working landscapes approach together through a multidirectional relationship. For example, trust is required for effective collaboration (Ansell and Gash 2008; Bodin et al. 2020); however, collaboration can be used as a tool for building trust (Bryson and Crosby 2006; Bodin 2017). Similarly, the social well-being of individuals may determine whether they continue to support collaborative relationships or not. However, collaboration is necessary for enhancing social well-being in working landscapes. In other words, each of the components influences and is influenced by the mechanisms of collaboration and multilevel interactions.

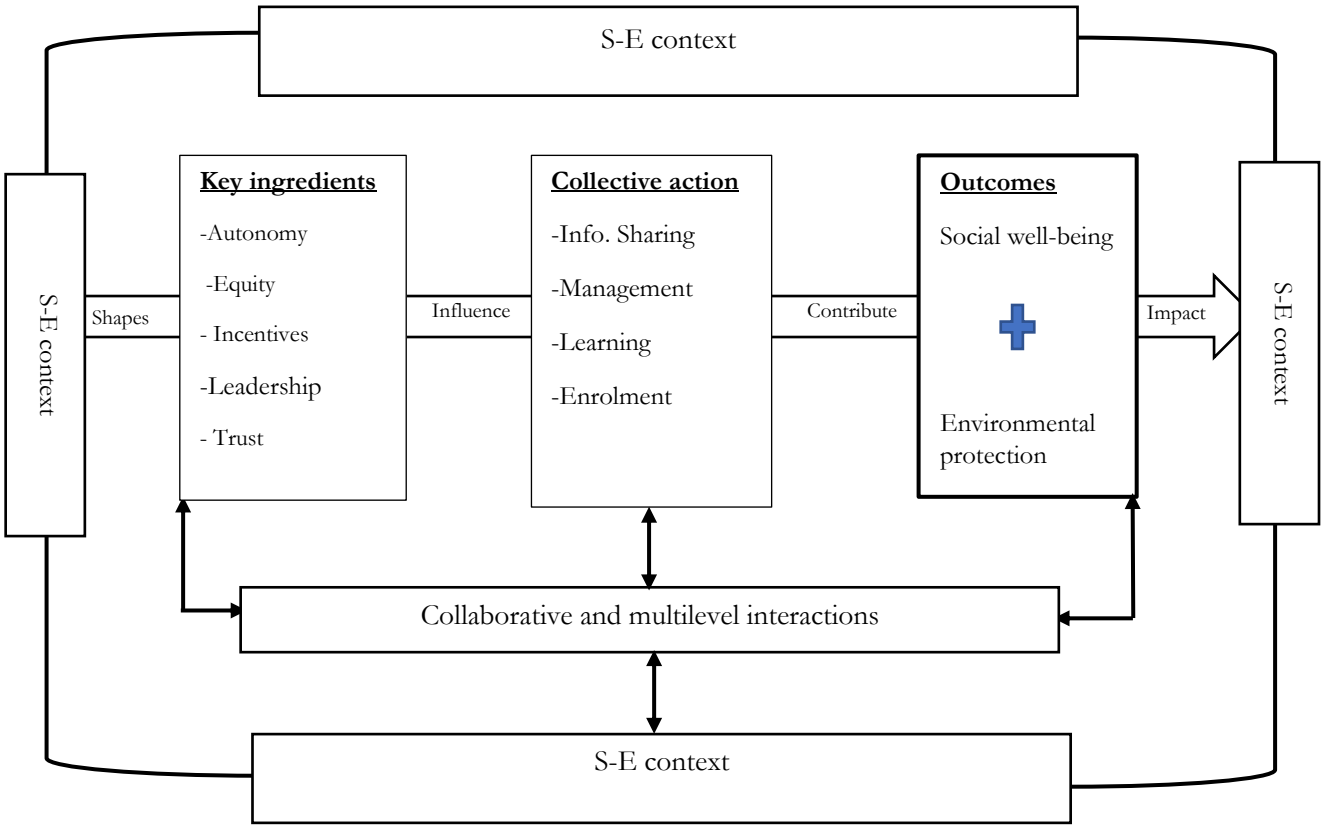

Figure 4.1. A conceptual framework for the working landscapes approach

4.8. Conclusion and applications of the framework

This paper integrated past research on environmental governance, collective action theory, environmental justice, and social-ecological systems to propose a conceptual framework for the working landscapes approach. The framework is intentionally broad to facilitate its application in different social and ecological contexts. In applying the framework, two of its elements are essential – the key ingredients and the linking mechanism – because they outline the social processes which are critical for shaping human actions in a working landscape. In addition, the framework emphasizes the importance of the social-ecological context in shaping the design of governance solutions for working landscapes. We believe that regardless of the commonalities as gleaned from across several hybrid governance arrangements, their implementation on the ground

will ultimately differ based on the context. Therefore, policymakers, NGOs, and other users of the working landscapes approach will need to apply this framework with keen attention to local context factors that are connected to the key ingredients and the linking mechanism. The framework is also a response to calls for research on the governance approaches that work for working landscapes (Brockington et al. 2018). Guided by this framework, scholars can now investigate or theorize relationships between different elements of the framework, examine how certain key ingredients emerge from the social-ecological context, and evaluate programs based on the working landscapes approach. We hope that in this way, the broad framework we are proposing will help guide empirical case studies on the working landscapes approach, further its theoretical understanding, and contribute to enhancing policy aimed at increased social well-being and environmental protection.

Chapter 5: Opening the black box between governance and management: a mechanism-based explanation of how governance affects the management of species at risk

5.1 Chapter summary

Good governance is needed to foster good management of the environment. Yet, the link between environmental governance and environmental management has received very little research attention. In this paper, we adopt a mechanism-based framework to unpack the link between the governance and management of species at risk or endangered species in a working landscape. Using species at risk management in the South of the Divide region of southwestern Saskatchewan as a case study, we identified four governance conditions connected by five mechanisms to produce management outcomes. The governance conditions include facilitative leadership, local autonomy, trust, and incentives. The five mechanisms include institutional disruption, institutional crafting and drift, brokerage or bridging, program uptake, and alleviation of fear of harm. We discuss how using a mechanism-based approach could help us better understand the processes within the governance system that trigger particular management outcomes. For example, in this case study, dissatisfied actors disrupt the existing governance arrangements and create new ones that reflect their desire for local autonomy. Local autonomy, in turn, creates an atmosphere for local actors to form coalitions and build trust; trust enhances program uptake and the co-design and co-implementation of incentives, which then alleviates land managers' fear of harm from participating in species at risk management. Our study also suggests that top-down institutions that create room for further institutional work can become acceptable at the local level and enhance species at risk management. We conclude that a mechanism-based explanation can be useful for opening the black box connecting environmental governance and management, and by so doing, offer valuable recommendations to guide policy.

5.2 Introduction

Good governance is considered a prerequisite for good management of the environment (UNEP 2002; Lockwood et al. 2010; Bennett and Satterfield 2018). Yet, the link between (environmental) governance and (environmental) management has largely remained conceptually blurred (Pahl-Wostl 2009; Lockwood 2010) and empirically untested. In this paper, we adopt a mechanism-based approach to empirically examine the link between the governance and management of species at risk in the South of the Divide (SoD) region in Southwestern Saskatchewan. Governance refers to "…the establishment, reaffirmation or change of institutions to resolve conflicts over environmental resources" (Paavola 2007). It involves actors, actor constellations or networks (Pahl-Wostl 2009), and power and authority relations (Lockwood 2010) that help formulate and implement environmental policies. Environmental management, on the other hand, involves "…resources, plans, and actions…" (Lockwood 2010, 755) that are geared towards "… analyzing and monitoring, developing and implementing measures to keep the state of a resource [environment] within desirable bounds" (Pahl-Wostl 2009, 355). Despite their differences, governance and management are sometimes used synonymously (Pahl-Wostl 2009), perhaps due to their practical similarities (Armitage et al. 2012a) and the conflation of governance and management functions by some actors – i.e., actors who engage in both governance and management activities. This lack of practical distinction about how the two activities are related has been taken for granted. This paper, however, is based on the premise that having a clear understanding of how governance is linked to management is essential for identifying mechanisms which policymakers can activate within the governance system to generate "an outcome of interest" (Mahoney 2001) or to facilitate changes in management.

There is no denying that the form of governance has implications for how actors respond to the management of environmental resources. For example, the working landscapes scholarship illustrated how a command-and-control regulatory regime results in adverse behaviour among private landowners and land managers towards species at risk conservation (Michael 2000; Innes and Frisvold 2009). On the other hand, more collaborative forms of governance that involve (1) the use of incentives, (2) limited restrictions on private property, (3) recognition of land managers as stewards, and (4) recognizing local context have been relatively successful in enhancing positive behaviour and increased (voluntary) participation of land managers in species at risk management (Reed et al. 2013; Henderson et al. 2014). Nonetheless, a critical question that remains is why actors respond better to more collaborative forms of governance. Past research suggests that certain conditions must exist within the governance system to facilitate good management. For example, Ayambire et al. (forthcoming) identified five conditions, including trust, incentives, leadership, equity, and autonomy, which mediate the interactions between governance and management to facilitate action among actors, especially landowners and land managers in working landscapes. Similar conditions have been identified in several other environmental policy and governance domains (Hysing 2009; Pittman et al. 2015; Berdej and Armitage 2016). However, the explicit linkages between these conditions – i.e., the mechanisms – are not known. Yet, these mechanisms are the entities that need to be activated by policymakers to generate "an outcome of interest" (Mahoney 2001) or, in our context, to facilitate changes in environmental management.

This paper contributes to our understanding of the conditions and their linkages within the governance system that facilitate management by answering the following research question: *what mechanisms link governance and management of species at risk?* We apply a process-tracing methodology (Beach and Pedersen 2019) to inductively identify these mechanisms in a grassland

working landscape in the SoD region. We draw on multiple qualitative approaches such as in-depth interviews, focus group discussions (FGDs), document analysis, and secondary data analysis to examine the conditions and their linkages that connect governance to species at risk management. The paper proceeds as follows. We first introduce mechanisms as the entities that link environmental governance to management. This is followed by a description of the study context and the research methods we used. Finally, we present the results of an empirical examination of species at risk management in the SoD as an outcome of governance to identify the mechanisms.

5.3 What links governance to the management of the environment?

The differences and relationships between environmental governance and environmental management are ones that have been taken for granted. This is a bold claim given that several authors have acknowledged their differences in both environmental governance and natural resource management scholarships (e.g., Stoker 1998; Ludwig 2001; Lockwood 2010; Armitage et al. 2012). However, beyond acknowledging their differences, no research has been conducted to examine their linkages and draw lessons for policy. This has resulted in misguided application of both concepts in scholarly and policy spheres. For example, part of the literature conflates governance and management or treats them as alternatives (Holling and Meffe 1996; Ludwig 2001). This conception, for example, has suggested that management cannot withstand wicked environmental problems and should be replaced with participatory and inclusive approaches that rely on dialogue, incorporation of traditional knowledge, and learning (Ludwig 2001). Interestingly, these ‘new ways’ of solving environmental problems are also described as governance (Lemos and Agrawal 2006; Armitage et al. 2012a). Another example of the conflation of both management and governance is when governance and management solutions are

recommended for addressing environmental problems without specifying any order. Indeed, both governance and management failures contribute to environmental problems, and both are needed for designing solutions. However, we are concerned that conflating governance and management solutions without indicating any form of 'order' or process – i.e., whether one solution precedes or influences another – makes it difficult for policymakers to act. In other words, policymakers usually act on the mechanisms (Mahoney 2001) rather than the plethora of governance and management conditions often presented as solutions.

Our conception of the relationship between environmental management and environmental governance is in line with Lockwood (2010). Lockwood (2010) argues that management is "a product of applied governance." This suggests a unidirectional relationship emanating from governance to management. However, in practice, management may provide feedback through monitoring to inform governance changes (Boyle et al. 2001; Folke et al. 2005). Lockwood further indicates that effective governance enables management outputs and outcomes. However, it is unclear how and why effective governance enables management outputs and outcomes. We contend that governance enables management through a process, which we refer to as mechanisms (Figure 5.1). Mechanism-based explanation is relatively new in environmental governance and management scholarship (e.g., Biesbroek et al. 2014; Biesbroek et al. 2017; Filbee-Dexter et al. 2018; Baird et al. 2019). However, it has the potential to help study topics like the relationship between governance and management that were formally black-boxed or grey-boxed[1] (Beach 2016; Biesbroek et al. 2017). Mechanism-based explanations emerged out of criticism of existing

[1] Black-boxed means that the causal processes linking inputs and outcomes are completely ignored, while grey-boxed implies a partial attempt to uncover these causal processes. Grey-boxing may result from equating mechanisms to intervening variables (Beach 2016). In the context of governance and management, black boxing means no attempt has been made to identify the causal processes linking the two, and grey boxing implies an attempt to use a 'laundry list' of governance conditions as the mechanisms that explain management.

approaches that use the correlation between a set of governance conditions (e.g., incentives, trust) and management responses as the basis for making policy and governance recommendations (Namugumya et al. 2020). These correlational approaches failed to clarify the causal processes through which the independent variables (e.g., the governance conditions) combine to affect a dependent variable (e.g., management) (Mahoney 2001).

We use mechanism to mean "… a set of interacting parts – an assembly of elements producing an effect not inherent in any one of them" (Hernes 2005, 74). Our emphasis is on "a set of interacting parts" and the fact that no single part can generate the effect produced by the set. Talking about parts, Biesbroek et al. (2014) argue that mechanisms involve *entities* and their *activities* (undertaken individually or in concert with other entities) that produce an observed outcome. In environmental governance, these entities could be perceived as the "… actors or organizations whom each have their specific characteristics such as values, belief systems, and experiences". (Biesbroek et al. 2014, 109). Activities are the actions undertaken by the entities that produce change (Beach 2016). According to this reading, environmental governance scholars have done extremely well by identifying the variety of actors that affect and are affected by environmental governance decisions. Similarly, they have studied several activities and conditions produced by these actors that facilitate sustainable management of the environment (e.g., trust, incentives, leadership, and equity). However, identifying actors, conditions, and activities alone does not satisfy the second part of our definition – i.e., these individual components, acting alone, are not enough to enable management (Hedström and Ylikoski 2010). Rather, it is the way they are combined within specific contexts that result in management responses. Therefore, in studying the governance-management nexus, the utility of the mechanism-based approach lies in its ability to

explain the *combination* of entities, their activities, and the conditions they create in the governance system that generate changes in management.

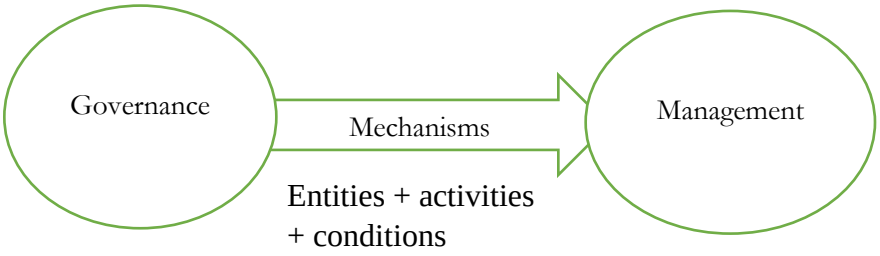

Figure 5.1. Governance enables management through mechanisms

5.4. Methods

5.4.1 Research design: process tracing

Process tracing is a qualitative approach that helps identify mechanisms that link input conditions to outcomes within single cases (Beach and Pedersen 2019). Process tracing has several advantages, including its ability to provide plausible explanations of phenomena in complex situations involving multiple intervening variables (Spijkers and Boonstra 2017), its suitability for studying governance processes (George and Bennett 2005), and to open black boxes that other qualitative and quantitative methods fail to do (Biesbroek et al. 2014). Due to these strengths, we use process tracing to uncover the mechanisms that link species at risk governance and species at risk management in the SoD region. There are three main approaches to process tracing: (1) theory-building or inductive, (2) theory-testing or deductive, and (3) explaining outcomes (Beach and Pedersen 2019). However, due to the limited existing mechanisms or theoretical explanations of the link between governance and management, we inductively identify these mechanisms from a variety of data sources. Therefore, the approach we take here bears semblance to theory-building or inductive process tracing (George and Bennett 2005; Beach and Pedersen 2019) – a similar approach is adopted by Biesbroek et al. (2014).

Even though we adopt an inductive approach to process tracing, it is important to note that we have some "theoretical priors" (Biesbroek et al. 2014) about the conditions that influence management in working landscapes (Ayambire et al., forthcoming). These conditions – trust, facilitative leadership, equity, incentives, and local autonomy – are factors that mediate the interactions between the governance system and management outcomes in working landscapes. Therefore, our aim is to identify (1) which of these conditions are present in the SoD region, (2) how these conditions interact to bring about or influence species at risk management outcomes, and (3) what is/are the underlying mechanism(s). Inductive process tracing aims to identify "one or more potential causal paths [from an empirical case) which can then be rendered as more general hypotheses for testing against other cases" (Bennett and George 1997, 17). Therefore, by going beyond general governance conditions to identify their interactions and underlying mechanisms, we seek to further the discussion on: (1) how scholars can understand the governance processes that generate particular management outcomes and (2) how policymakers can generate desired changes in management.

5.4.2 Case study context

The SoD is a region within Saskatchewan, Canada and is one of the 11 priority areas identified by the federal government of Canada as part of its pan-Canadian approach for transforming species at risk conservation (Environment and Climate Change Canada 2018). Even though the region has been recognized as important critical habitat for several species at risk and has some of the few remaining intact native grasslands within the Northern Great Plains (WWF 2016b; WWF 2016a), it was only from early 2015 that management outcomes for species at risk were observed in the region. However, this has followed several years of multilevel institutional work and the delivery of several management activities and outputs (e.g., preparation of species recovery strategies and

action plans) (Pittman 2019). Today, the SoD boasts several conservation programs that support species at risk management (SODCAP Inc. 2016). Available reports from these conservation programs help us track management outcomes in the form of the number of land managers actively involved in species at risk management and the recovery status of species and their critical habitats. This progressing in governance over the years, which led to the emergence of species at risk management outcomes, gives us a unique opportunity to examine the conditions and underlying mechanisms in the governance system that resulted in the management outcomes.

5.4.3. Data collection and analysis

We drew on multiple data sources to trace the link between governance and management in the SoD region. These data sources include relevant legislation at both the Provincial (e.g., the Provincial Lands Act, the Wildlife Habitat Protection Act, the Wildlife Act) (Appendix C) and the Federal (e.g., the Species at Risk Act) government levels. Other relevant documents include species at risk recovery strategies (e.g., the Greater Sage Grouse recovery strategy) and reports and action plans from government and non-governmental agencies interested in species at risk management in the region (e.g., SODCAP). These data sources were qualitatively coded using a combination of both inductive and deductive content analysis (Pittman 2019). We used the governance conditions – trust, facilitative leadership, equity, incentives, and local autonomy – as the main themes to guide the deductive analysis, whiles the interactions between the conditions, the actors involved, and the underlying mechanisms were identified inductively. During the analysis, we were also interested in identifying timelines of events that culminated into specific governance conditions and the management of species at risk. These timelines and events help us identify the 'critical junctures in the process (George and Bennett 2005; Beach 2016). The results were triangulated with in-depth interviews (n=14) and focus group discussions (n =2, 5 and 4

people per group, respectively) with ranchers in the region. The sample size is relatively small, considering the total number of beef farmers in the region (N=728) (Statistics Canada, 2016). However, because we were interested in ranchers with experience with SODCAP's RBA, this sample covered many of the conservation leaders who participated in the program. In addition, we collected the data until we reached theoretical saturation (Suddaby, 2006). We also consulted with SODCAP's project advisory committee to corroborate the findings from the interviews, FGDs, and document analysis. The participants were ranchers who actively participate in species at risk management.

In identifying the critical junctures, we made one significant assumption that actual species at risk management started after *outcomes (i.e., starting from when land managers began to deliberately manage lands for species at risk)* were observed in the region. This assumption is important for our analysis because, in species at risk management, the challenge has always been how the governance system can translate management *inputs (e.g., money and knowledge)* and *outputs (e.g., species recovery strategies and action plans)* into *outcomes (e.g., farm-level or landscape-level conservation actions)* (Miller et al. 2001; Innes and Frisvold 2009; Ciuzio et al. 2013; Ferranto et al. 2013; Potoski and Prakash 2013; Stroman and Kreuter 2016). For example, governments have been relatively successful in designing recovery strategies and action plans for species at risk – examples of management outputs. However, the challenge has been getting landowners and land managers to implement the actions at the landscape or farm level. Therefore, even though we are interested in the mechanisms that link governance and management of species at risk, our analysis focused on the mechanisms that link governance to management outcomes (Figure 5.2).

5.5 Results

The case study shows that there are multiple governance conditions that facilitate the management of species at risk, and these conditions likely reinforce each other to facilitate management. Furthermore, the conditions are connected through five (5) underlying mechanisms, which translate into the management outcomes. Also, the management conditions were produced through several years of institutional work involving state actors at the federal level and non-state actors at the local level. This section first examines the governance conditions present in the region and the underlying mechanisms that connect these governance conditions to management outcomes.

5.5.1 Governance conditions

Ayambire et al. (forthcoming) suggest that some governance conditions – trust, facilitative leadership, equity, local autonomy, and incentives (Table 5.1) – are needed to facilitate effective management in working landscapes. This section diagnosis whether and how these conditions manifest in the SoD. Table 5.1 provides a summary of the governance conditions present. The results were triangulated using document analysis, in-depth interviews, and focus groups. We also consulted with SODCAP's project advisory committee to corroborate the findings from the interviews, FGDs, and document analysis. To identify the governance conditions, we first allowed the ranchers to freely explain or discuss the motives and the conditions that motivated their participation in species at risk management. This approach gave us the opportunity to uncover any likely governance conditions that we did not pre-empt. However, to enable us to address all the governance conditions we pre-empted, we asked follow-up questions on governance conditions that we felt had not been addressed by research participants. As shown in Table 5.1, all the governance conditions, except for equity (which, in the view of research participants, centred on Indigenous rights), were present in the region (see discussion below). While it is not within the scope of the current paper to rank the governance conditions in order of importance, it is crucial

to note that nearly all interview participants noted the relevance of local autonomy, trust, and incentives for their participation in species at risk management. More importantly, as indicated by the interview excerpts below, most interviewees frequently mentioned these conditions together and sometimes suggesting that they are inseparable.

> "Everything that happens, there is a direct effect to my bottom line, the prices are up, calf prices go down, it still costs that amount of dollars to put that dugout, to build that fence. So, you know, funding, if we can get some outside funding [incentives] and help manage the resource that's there, look after the species at risk, I mean, that's a benefit for everybody". "… But it's not just the money, you know, we think about the fact that these agreements by SODCAP are non-restrictive. That is huge for us because we need to have some autonomy". *(Interview participant 1)*

> "The good part of it, as I understand is, it is result-based and not prescriptive. It gives the manager of the corporation the flexibility to do what they see fit to meet the results… if you don't meet the results, you don't get the payment; but at least you don't get penalized. I like a lot of the work that SODCAP does". "… and I think part of the issue is we trust some of the people on the board [SODCAP]. So, I don't think our beef is with SODCAP. I think they're on our side". *(Interview participant 2)*

Facilitative leadership was mostly mentioned as a key condition by ranchers who played leading roles in advocating for local autonomy and designing incentive programs. This appears to suggest that some of the ranchers might take the leadership role played by their colleagues for granted. This may not be surprising because Ayambire et al. (forthcoming) also found that facilitative leadership, despite its importance, has received the least attention among the governance conditions reported in the working landscapes literature in relation to land managers. We believe that the ranchers might be more easily reminded of the conditions that have immediate effects on

their individual well-being than of the sacrifices of others. However, this is not to suggest that leadership was not considered important to the ranchers whom themselves did not play leadership roles. In fact, during one focus group discussion, a significant amount of time was committed to appreciating ranchers who played facilitative leadership roles after one rancher raised the issue of leadership and the sacrifices of their colleagues.

Table 5.1. Governance conditions in the SoD region

Governance conditions	**Description**
Facilitative Leadership	Facilitative leadership is important for ensuring and maintaining the integrity of the governance processes (Ansell and Gash 2008). It helps organize diverse actors towards a common end whiles protecting the interests of weaker actors and groups (Meine and Nabhan 2015). These types of leaders are also described as institutional entrepreneurs (Baird et al. 2019). In the SoD, facilitative leadership occurred after the Emergency Protection Order (EPO) for the Greater Sage Grouse (GSG) was instated in 2013. During this period, the ranchers felt portrayed as criminals who perpetuated the extinction of the GSG. As a reaction, two NGOs (the Rancher's Stewardship Alliance and Sustainable Canada) came together and led the ranchers to actively work towards a change in the way species at risk management was done in the region (Pittman 2019). It is because of their leadership role that resulted in the apparently more important role currently played by ranchers in conservation governance in the region.
Local autonomy	Autonomy is the ability of the ranchers and their associated local groups to determine rules and manage their land according to their local knowledge without higher authorities reprimanding or placing restrictions on their lands (Ostrom, 2014; Schlager, 2002). Local autonomy was the ultimate outcome of the leadership actions undertaken by Rancher's Stewardship Alliance and Sustainable Canada. An

	important sign of the emergence of local autonomy, according to the ranchers, is the increased voice that land managers now have in decision-making processes. This is evident in the representation of land managers in decision-making roles within conservation organizations in the region. However, the ranchers believe that more institutional work is still needed to enhance ultimate autonomy. For example, some ranchers cited the provision in SARA (section 80) that allows the federal government to instate an EPO to protect a listed species as a sign that they have not yet attained absolute autonomy.
Trust	Trust is having confidence in positive outcomes regarding another actor's conduct (Bergmann & Bliss, 2004). Ranchers consistently alluded to their relationship with SODCAP as a sign of trust between conservation agencies and land managers. They also believe that the decision by SODCAP to implement result-based conservation agreements was a sign that SODCAP also trusts in the ranchers to deliver positive results for species at risk. Finally, trust was deemed an important precondition for the co-design and co-implementation of incentive schemes that respect ranchers' local autonomy. Nonetheless, like local autonomy, ranchers were still apprehensive about allowing free access to their land, citing fears that the government might instate another EPO in the region.
Incentives	Incentives are motivators that are designed to guide actors towards desired actions or outcomes (Uphoff and Langholz 1998; Cetas and Yasue 2016). In SoD, incentives were generally mentioned regarding economic incentives, even though legal and social incentives are also important. The ranchers believed that the incentives were a recognition of their good stewardship and provided them with monetary support to manage the land for both livestock and species at risk. They indicated that one of the most important outcomes of the institutional work that they have undertaken over the years is the design of incentive schemes that respect their autonomy and enhances trust. Thus, the

	implementation of the incentive schemes represented a penultimate stage of the governance processes that led to management outcomes (Figure 5.2).
Equity	Equity emphasises the need to move beyond incentives and examine the issues of power, historical injustices, and participation in decision-making (Martin et al. 2016; Olive 2016). Equity did not feature as a critical condition for the emergence of the management outcomes in the region. However, both ranchers and SODCAP felt it was critical to further enhance the management of species at risk.

Source: Adapted from Ayambire et al., (forthcoming).

While the issue of equity did not feature as a key condition that motivated ranchers' participation in species at risk management, SODCAP's advisory committee indicated that it was under discussion, and projects were underway to, for example, include issues of Indigenous rights. Also, some ranchers acknowledged the importance of equity, often noting that it would be good to address Indigenous rights issues as part of the incentive programs. The focus on Indigenous rights issues alone under equity is an indication of the importance that people in the region attach to the matter. It also suggests that the ranchers may have narrowly defined equity as focusing on Indigenous rights. For example, other issues such as participation, recognition, gender, and distribution of rewards, which we anticipated would be considered as equity issues in the region, were surprisingly not mentioned under equity even after prompts. Three reasons likely explain this outcome. First, the ranchers also perceived the incentive schemes as a recognition of their good stewardship. Second, because the ranchers in the region form a close community, and many of them form part of ranching corporations and co-operations, issues of disparities in incentive payments are easily dispelled. Third, ranchers perceived local autonomy as the ultimate outcome of participation. Therefore, participation did not seem to them an important condition for their involvement in species at risk management, but local autonomy was.

5.5.2 Mechanisms

The second part of the analysis focused on identifying the interactions or connections between the different governance conditions and the underlying mechanisms that link them to management outcomes. In identifying the connections between the governance conditions, we examined the key events (and their timeliness) associated with each governance condition. We also examined whether each preceding condition had any influence on the next condition. The result of this analysis is an ordering of the governance conditions beginning with the creation of the federal Species at Risk Act (SARA) – Canada's foremost legislation on species at risk management – in 2002 and ending with the time when the first management outcomes were observed (corresponding with the time when ranchers began to deliberately manage land for species at risk) (Figure 5.2). While we began the analysis from the creation of SARA, the first critical juncture was the instatement of the Emergency Protection Order (EPO) for the protection of the Greater Sage Grouse in 2013. Each of the preceding governance conditions influenced the emergence of the succeeding condition, indicating a single pathway towards the emergence of management outcomes (Figure 5.2). However, all the governance conditions continue to progress towards management outcomes, indicating that none of the conditions has stopped operating, and all still contribute to the management outcomes observed in the region today. More importantly, all the conditions were connected to management outcomes through a series of mechanisms. We explain each mechanism below.

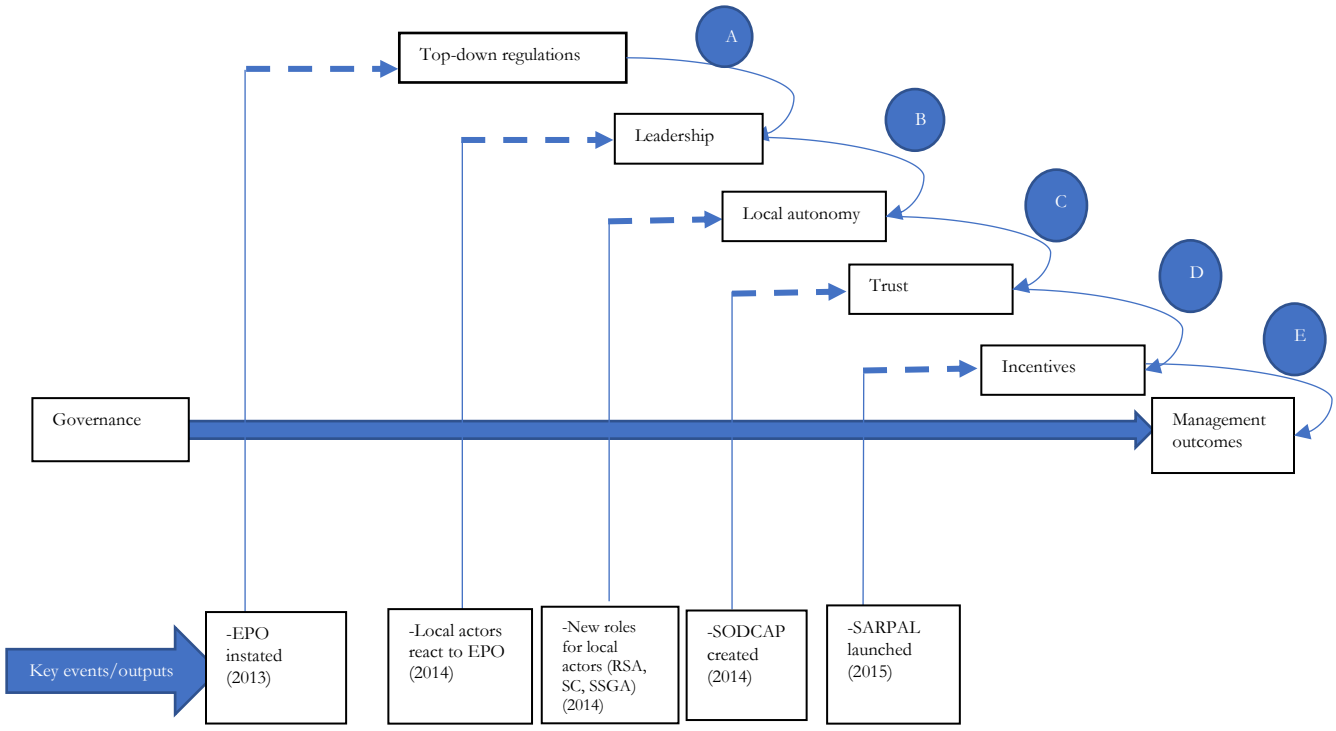

Figure 5.2. Conditions and mechanism linking governance to species at risk management

5.5.2.1 Mechanism A – Institutional disruption

Institutional disruption has its roots in organizational studies but has recently been applied to study institutional change in environmental governance (Patterson and Beunen 2019; Pittman 2019). Institutional disruption comes from the notion that there are some actors whose interests may not be satisfied by the existing institutional structures and are watching for windows of opportunity to disrupt the existing institutions (Lawrence and Suddaby 2006). In the case study, the local actors, mainly landowners, land managers, and local NGOs (e.g., Ranchers Stewardship Alliance and Sustainable Canada), were dissatisfied by the instatement of the EPO[2] by the federal government of Canada and organized themselves to disrupt the existing top-down and command-and-control

[2] See Pittman (2019) for a detailed account of the events that led to the instatement of the EPO in 2013.

resource governance regime. As indicated by the quote below, at the time of this research, ranchers were still apprehensive about interacting with federal government agencies.

> "I'll do an interview with you guys. But if the Department of Fisheries and Oceans was here, they wouldn't be here. If the Department of Fisheries and Oceans was here, no! They have that regulate and penalize approach" *(Interviewee 5).*

The local NGOs led the process by providing information sessions, meetings, and media advocacy to convey their dissatisfaction and court public support. They also positioned themselves as viable organizations that can lead or actively participate in the governance of species at risk in the region by forming coalitions (Pittman 2019). In addition, due to the federal government's increased commitment to conserving species at risk in the region as signified by the instatement of the EPO (Wark 2020), the local actors saw another window of opportunity to advocate for an alternative form of conservation governance which was more collaborative and incentive-based. In this regard, these leaders could be seen as institutional entrepreneurs (Baird et al. 2019). Ultimately, the institutional disruption was successful and resulted in the crafting of new institutions to lead conservation governance in the region. Other existing institutions changed roles or took on additional roles in the process (Table 5.2).

5.5.2.2 Mechanism B – Institutional crafting and drift

The institutional disruption that took place created a pathway for more local involvement in conservation governance and the emergence of local autonomy. The local autonomy demanded that local actors were well-positioned to take on more responsibility in conservation governance. This resulted in the creation of new institutions and some other institutions changing roles to include conservation issues (Table 5.2). The creation of new institutions is referred to as institutional crafting (Lawrence and Suddaby 2006; Patterson and Beunen 2019), and the changing

roles of existing institutions are referred to as institutional drift (Glückler and Lenz 2018). The crafting and drifting of institutions were significant because they paved the way for some amount of local autonomy to emerge. Most of the members of these institutions are landowners and land managers who desired to have control over or influence conservation governance that affect their lands. This autonomy further enhanced collaborations and institutional innovations – i.e., brokerage – leading to trust-building.

Table 5.2. Institutional Crafting and Drift in the SoD

Actor	***Key historic roles***	***Key roles in new arrangements***
Saskatchewan Stock Growers Association (SSGA)	The SSGA is a non-profit organization created in 1913 to represent the cattle industry on the legislative front. One could summarize their historic role as one that focused on protecting the economic interests of their members.	Due to the perceived threats posed by the EPO, SSGA became an active advocate for incentive-based conservation in the region. They recently partnered with SODCAP to administer the SARPAL program.
Sustainable Canada (SC)	N/A	SC was created in response to the EPO. They are members of SODCAP.
Rancher's Stewardship Alliance, Ca (RSA)	The RSA was created in response to SARA (Pittman 2019). It is an alliance of ranchers who manage their lands for livestock and wild species.	While RSA appeared to be already advocating for the interest of their members since the creation of SARA, they became more involved in species at risk conservation after the EPO. RSA is a member of SODCAP.

South of the Divide Conservation Action Program (SODCAP)	N/A	SODCAP is a collaborative partnership involving land managers, conservation organizations, and government. SODCAP was created to implement actions relating to the South of the Divide Multi-Species Action Plan. SODCAP is currently the focal point for most issues relating to species at risk management in the region.
Grazing Corporations and cooperative (pasture boards)	Like the SSGA, the grazing corporations and cooperatives were created to coordinate cattle ranching and advocate for the interest of their members in Crown lands.	Since the inception of the incentive-based conservation governance, grazing corporations and cooperatives are now involved in negotiating contracts with SODCAP, undertaking management for species at risk and assisting in monitoring species at risk.
Corporations and cooperatives' land managers	Land managers and riders were formally hired to focus on sustaining livestock production. Their role was primarily to promote the economic interests of the corporations and cooperatives.	In the new arrangements, land managers also focus on addressing issues of species at risk. As a result, they now receive training on species at risk management.
Ranchers	Ranchers primarily managed their lands for profit, even though most of them are environmentally conscious.	Like land managers, ranchers now engage in species at risk management.

5.5.2.3 Mechanism C – Brokerage or bridging

An important result of the institutional crafting and drifting that occurred in the region was the opportunity created for the different local actors to collaborate. However, these organizations still needed a common platform to collaborate more effectively for species at risk management. In this regard, the creation of SODCAP as a partnership to implement the South of the Divide Multi-Species Action Plan was a welcome act for these local organizations. SODCAP is a bridging organization that brings together several actors, including land managers, non-profits, and the government. Though federally inspired, SODCAP has become more grassroots-oriented due to the higher involvement of local actors in decision-making (Pittman 2019). Brokerage or bridging refers to a mediating unit that connects previously disparate social arenas (McAdam et al. 2008; Biesbroek et al. 2017). Bridging organizations are increasingly important for liaising with multiple actors to solve problems that they would originally not be able to solve acting alone (Brown 1991). Bridging is particularly important in conservation governance because it fosters trust-building, the integration of multiple sources of knowledge, social learning, conflict resolution, and collaboration (Berkes 2009; Dedeurwaerdere et al. 2015; Berdej and Armitage 2016; Berdej et al. 2019). While SODCAP performs most of the functions of bridging organizations, it was its trust-building role that featured prominently during the interviews and FGDs. Land managers constantly referred to the implementation of non-prescriptive conservation programs as a sign that SODCAP knows them and trusts their stewardship. They also cited their participation in key decision-making as an important indication that they were considered important in species at risk management. Perhaps, more important is that SODCAP and the resultant trust it created paved the way for the co-design and co-implementation of the incentive programs. In fact, most land managers would not have

participated in species at risk management had it not been for the trust in SODCAP, as shown in the quotes below.

> "I think one of the reasons why we did the agreement was because they [SODCAP] are so easy to work with, you know, they're in it for our best interest, and we have the same ideas of wanting to preserve the land and keep it going the way that we have been – they've been obviously seeing the good in that." *(Interviewee 3).*

> "Initially [before SODCAP], let's say, I was driving out in my place and saw the Sage grouse; the last person that was going to know about it is an environmentalist. You could just imagine the ramifications of what could happen if you had something like that on your land" *(Interviewee 4)*.

> "If there's no trust between the parties, they shouldn't be together. The most important thing is the trust of the people and not the paper contract." "…if not because of SODCAP, we wouldn't be here talking to you" *(FGD 2)*.

5.5.2.4 Mechanism D – Program uptake

The trust among the different actors and in SODCAP contributed to them (particularly SODCAP and SSGA) co-designing and co-implementing incentive schemes under SARPAL. SARPAL is an initiative funded by Environment and Climate Change Canada with the aim of improving conservation programming in agricultural regions across Canada. SARPAL uses multiple innovative programs, including result-based conservation agreements, habitat management agreements, and niche marketing programs (Pittman 2019; Reiter et al. 2021) that are incentive-based and producer-oriented. Therefore, despite its federal orientation, SARPAL is a significant departure from the previous command-and-control tendencies inherent in the EPO and other applications of SARA (Pittman 2019). We describe the process of local organizations collaborating among themselves and with the federal government to design and implement incentive programs

as ‘program uptake.’ This mechanism was the penultimate one and paved the way for the first management outcome – land managers deliberately managing their lands for species at risk – to manifest.

5.5.2.5 Mechanism E – Alleviation of the fear of harm

One of the most important concerns of land managers is the fear that species at risk management would harm them. Harm to landowners and land managers mostly includes a reduction in their profits and restrictions placed on their lands (Environment and Climate Change Canada 2016; Hossu et al. 2018; Reiter et al. 2021). Therefore, before signing up for conservation programs, land managers look for assurances that they will not be harmed through restrictions or reduction in profits. Because the incentives under SARPAL provided compensation to land managers for the reduced profits resulting from the participation in species at risk management, the fear of reduced profits was alleviated. Similarly, because the programs were generally non-prescriptive, land managers felt that the fear of restrictions was also alleviated. Nonetheless, some land managers in the region still desire legal assurances (Ayambire et al., 2021), especially considering that section 80 of SARA allows the federal government to install an EPO to protect a listed species is still in force.

5.6. Discussion: explaining the link between governance and management

We began this paper by arguing that the link between environmental governance and management has been taken for granted. We also suggested that taking this link seriously could offer opportunities for better understanding the governance conditions and underlying processes that generate particular management outcomes. By doing this, environmental governance scholarship could become more relevant to policymakers who often need to act on the mechanism that produces management outcomes. Therefore, we used a mechanism-based explanation to unpack

the link between governance and management of species at risk in the SoD region. Drawing on Ayambire et al. (forthcoming), we hypothesized that several governance conditions interact to influence management outcomes in working landscapes. We posited that these governance conditions are also connected through underlying mechanisms which produced the management outcomes observed in the region. Indeed, the case study illustrated that multiple governance conditions – facilitative leadership, trust, local autonomy, and incentives – interacting through five underlying mechanisms produced management of species at risk in the SoD (Figure 5.2).

Our mechanism-based approach offers a number of important insights for a better understanding of how governance influences management outcomes. First, in recent years, the unbridled excitement that accompanied incentive-based governance of species at risk has dwindled. In many examples, the participation of land managers in species at risk management has remained below expectations (Rolfe et al. 2018; Snilstveit et al. 2019). Consequently, scholars are beginning to look more critically at what factors might be constraining participation in management (Sorice et al. 2011; Sorice et al. 2013; Selinske et al. 2017). Much of this research has reported the need to diversify the portfolio of policy instruments and incentive programs to match the different interests of land managers (Selinske et al. 2017; Ayambire et al. 2021). This approach has been useful but to a limited extent as we only know, for example, that land managers may be motivated by other conditions aside from economic incentives. However, the how and why these conditions emerge as well as whether and how they interact to produce management outcomes, have remained under-researched. The current case study suggests that the conditions are interconnected through series of underlying mechanisms, and triggering one mechanism in the governance system can spark further conditions and mechanisms. This finding is critical for two reasons. First, it expands the policy focus from only trying to meet landowner preferences towards certain governance

conditions (e.g., by replicating successful conditions) to also addressing why landowners prefer those conditions. This addition to policy helps direct efforts to policy actions that are more likely to generate successful outcomes in specific contexts. For example, results presented in this paper suggest that landowners may have ultimately accepted to manage their land for species at risk in the SoD not just because they prefer incentives but because the incentives alleviated their fear of harm. Focusing on this mechanism – the alleviation of the fear of harm – may suggest that there could be different conditions, aside from incentives, that may help alleviate land managers' fear of harm in different contexts. Therefore, policymakers may increase the probability of success of conservation programs by also focusing on underlying mechanisms. Second, it suggests that it may not be useful to think of governance conditions as standalone factors that contribute to management outcomes. Rather, certain conditions may trigger others or even combine with them to facilitate management outcomes. Thus, depending on how the conditions and mechanisms combine, the management outcomes may be positive or negative. In this regard, while our case study demonstrates a positive outcome for species at risk management, we believe that a negative outcome is possible depending on how the mechanisms play out. For example, the institutional disruption could have resulted in chaos if it were not followed by institutional crafting at the local level to complement the top-down regulatory system. Similarly, the incentive programs that resulted from the program uptake would not necessarily yield positive management outcomes if they had not alleviated the land managers' perceived harm.

Second, our study shows that some positive management outcomes may emerge even if the governance system fails to address all the important conditions within the context of interest. For example, while equity (which was absent in the SOD according to respondents) was deemed important for research participants in the SoD, some positive management outcomes still emerged.

Although, the absence of equity in the region might be explained by the narrow focus of ranchers on Indigenous rights, it still helps explain the emergence of management outcomes because ranchers' decision to manage land for species at risk is inherently determined by their perceptions. Therefore, the emergence of positive management outcomes despite the perceived absence of equity has important implications for policy. For example, there is a tendency for policymakers or program administrators to become complacent as a result of the initial positive management outcomes. However, as we have demonstrated in this paper, both land managers and program administrators desired to address issues of Indigenous rights. This desire, if not realized, could become a disincentive to participation in species at risk management. Also, we cannot say if the inclusion of equity in the SoD region would have meant better management outcomes than currently observed. However, we could surmise, based on the positive correlations between landowner values and preferences and participation in conservation programs (Sorice and Conner 2010; Sorice et al. 2011; Sorice 2012), that the overwhelming support for equity may likely translate to positive attitudes of land managers towards the conservation program and consequently increase program participation and management outcomes. Finally, equity may not have been the only absent but important conditions; there is a possibility that many more of such conditions will emerge alongside new mechanisms that may change management outcomes. Therefore, it beholds policymakers or program administrators to continue to monitor new governance conditions and mechanisms that may emerge and affect management outcomes.

Third, the achievement of some positive management outcomes, despite the perceived absence of equity, may suggest that there are necessary and sufficient conditions in the governance system (Cragun et al. 2016) that play out to produce management outcomes. However, we are unable to say if the conditions present in our case study represent sufficient conditions or any of the

conditions are necessary conditions since we did not test which of the conditions was deemed indispensable for the achievement of management outcomes. Nonetheless, our results point to a strong possibility that some governance conditions are necessary for other conditions to be effective. For example, our results suggest that incentives will be less effective in the absence of trust. This is a claim that has been supported in other studies (Ferranto et al. 2013; Muradian 2013). Similarly, local autonomy might not be achieved without facilitative leadership. Again, since we did not test necessity and sufficiency, we can only hypothesize that some governance conditions may be prerequisites for other conditions to emerge. This hypothesis is important in our quest to make environmental governance research more useful for policymaking because, as we have shown in this paper, multiple governance conditions interact through several underlying mechanisms to produce management outcomes. Yet, it is possible that the observations we have made are only present in our case study. Therefore, our ability to theorize about the relationships between individual governance conditions will help us develop strong mechanisms that are useful for policymaking in different contexts. We believe that enough theorization of the relationship between specific governance conditions will ultimately lead to the development of general theories that explain the governance-management nexus.

Fourth, although this study was intended to demonstrate from a mechanisms perspective how governance is linked to the management of species at risk, it also shed some light on the institutional change processes that yield particular management outcomes. Perhaps, an important finding worth highlighting is that in our case study, top-down regulations that exhibited command-and-control tendencies failed to deliver management outcomes. However, top-down regulations could become acceptable at the local level and foster the delivery of positive management outcomes if they allow room for institutional crafting and brokerage to occur. As we have shown,

SODCAP was created as a tool to implement the federal government-inspired South of the Divide Multi-Species Action Plan and, to a large extent, implement the section 11 conservation agreements under SARA. However, due to the opportunities for strong local involvement, most land managers in the region have considered SODCAP a local ally created to protect their interests alongside species at risk (Pittman 2019). This insight suggests that environmental governance scholars might be missing a critical piece in their quest to understand why many top-down regulations are less desirable in species at risk management (Innes and Frisvold 2009; Sorice 2012; Pittman 2019). Perhaps the problem is not that the regulations are top-down but because they do not offer leverage for further institutional work. Adopting a mechanism-based approach could help uncover why local actors such as land managers detest top-down regulations.

5.7. Conclusion

Environmental governance has been largely and rightly treated as an organizing framework but has been criticized for not providing enough policy guidance and does little to explain undesirable environmental outcomes (Partelow et al. 2020). We set out in this paper to illuminate a different dimension of environmental governance, which we believe has the potential to make governance scholarship more relevant to policy – i.e., the link between governance and management. We adopted a mechanism-based approach to uncover the link between environmental governance and species at risk management in a working landscape. In doing this, we treated management as a product of governance (Lockwood 2010), which allowed us to hypothesize about how governance conditions interact through underlying mechanisms to produce management outcomes. Our findings suggest that four governance conditions – facilitative leadership, trust, incentives, and local autonomy – interact to produce good management outcomes in the SoD region. However, these conditions are connected by five interlinked mechanisms: institutional disruption,

institutional crafting and drift, brokerage, program uptake, and alleviation of fear of harm. Among the mechanisms identified, the alleviation of the fear of harm is more likely to occur in most species at risk management contexts as the fear of restrictions and reduced profits are widely reported (Burton and Schwarz 2013; Hasund 2013; Polhill et al. 2013; Olive and McCune 2017; Kremen and Merenlender 2018). The other four mechanisms will likely vary according to context. For example, in contexts where there are already well-established local institutions that coordinate environmental protection, the institutional crafting mechanism may not occur or will be limited to institutional drift. Alternatively, already established institutions may undergo bridging. Similarly, in contexts where there are no command-and-control policies that trigger institutional disruption, local actors or policymakers interested in initiating species at risk management might begin to craft institutions.

Our case study has demonstrated that a mechanism-based explanation can be useful for opening the black box connecting environmental governance and management, and by so doing, offer useful recommendations to guide policy. Also, the inductive process-tracing approach adopted in this paper helps identify potential causal paths which can be treated as hypotheses for testing in similar cases (Bennett and George 1997). Therefore, we do not claim that the mechanisms and the causal path illustrated in this case study will be the same or even similar in other cases. Rather, we see our findings as an important foundation for many more case studies that will contribute to robust theoretical explanations on how environmental governance is linked to management.

Chapter 6: Adaptive co-management of environmental risks in Result-based Agreements for the Provision of Environmental Services: a case study of the South of the Divide Conservation Action Program

6.1 Chapter summary

Environmental risks pose a threat to the achievement of ecosystem outcomes in Results- or Outcome-based Agreements for species at risk conservation on agricultural lands. As a result, environmental risks can deter prospective land managers from participating in Results-based Agreements if not addressed. This qualitative case study examines a Results-based Agreement program implemented by the South of the Divide Conservation Action Program (SODCAP Inc.) in Southwestern Saskatchewan. We contribute to understanding the nature of environmental risks in Results-based Agreements and how SODCAP Inc., an emergent leader in grassroots-focused conservation governance in Southwestern Saskatchewan, works with land managers to address environmental risks. Using drought as an example of environmental risks, the study finds that drought is a common occurrence in the study area; therefore, land managers consider it a critical determinant when deciding to participate in Results-based Agreements. The study also reveals that environmental risks affect land managers involved with Results-based Agreements both by limiting their ability to achieve ecosystem targets and by forcing them to incur extra costs (i.e., extra management and opportunity costs) in their attempt to meet ecosystem targets under drought conditions. Finally, the case study illustrates a participatory and result-enhancing approach adopted by SODCAP Inc., which draws several parallels with adaptive co-management, to manage environmental risks. Our study findings contribute to a relatively limited body of scholarship in environmental risk management in Results-based Agreements. In addition to the study's policy relevance, it also calls for studies into conservation programs that are result-enhancing.

6.2 Introduction

Result-based Agreements (RBAs) or Outcome-based Agreements – i.e., conservation programs designed to reward producers of environmental services based on the achievement of outcomes as opposed to undertaking conservation actions (as is the case in Activity-Based Agreements (ABAs)) (Engel et al. 2008) – are on the ascendency (Whitten et al. 2007; Hanley et al. 2012). Hanley *et al.* (2012) suggest that the upsurge in RBAs is attributable to their non-restrictive nature, which gives land managers the flexibility to manage land according to their knowledge of the land (e.g., information on parts of the land that can maximize ecosystem services and alternative approaches to enhance ecosystem outcomes). This flexibility leads to the relatively efficient production of ecosystem services compared with payment for actions (Whitten et al. 2007; White and Sadler 2012). Also, RBAs tend to exclude land managers with a low probability of providing environmental services, hence reducing conservation costs (Gibbons et al. 2011). In addition, land managers value local autonomy in the management of their land (Pittman 2019); therefore, they favour conservation programs that afford them the flexibility and autonomy to decide on how to manage their land (Whitten et al. 2007; Henderson et al. 2014).

On the other hand, RBAs are associated with higher risks to participating land managers. Other drawbacks of RBAs (although not exclusive to RBAs) may include leakages, lack of permanence, and non-additionality (Murray et al. 2007; Hanley et al. 2012; Van Noordwijk et al. 2012). However, in this paper, we focus on environmental risks in RBAs. These risks emanate from the fact that several factors determine conservation outcomes, some of which may lie outside the land managers' control (Hanley et al. 2012; Burton and Schwarz 2013; Osbeck et al. 2013). One of such risks is the effects of environmental stressors (i.e., extreme climate events) on conservation outcomes. Extreme climate events such as drought, flood, sea-level rise, and heatwaves can

obstruct ecosystems' natural functioning, thereby affecting the efficient production of ecosystem services by land managers. This may induce a failure on the side of land managers to meet conservation targets outlined in RBAs and the non-payment of compensation by the regulator (Matzdorf and Lorenz 2010). Due to this positive correlation between extreme climate events and the achievement of conservation outcomes, climate-vulnerable and risk-averse land managers tend to avoid participating in RBAs (Zabel and Roe 2009; Matzdorf and Lorenz 2010; Rolfe et al. 2018). Therefore, conservation agencies (i.e., government agencies and NGOs) need approaches to help address these risks and enhance land managers' participation in the production of public environmental services under RBAs.

While the literature on RBAs is growing, research on how to manage the associated environmental risks is in its infancy (Matzdorf and Lorenz 2010). One of the earlier studies to consider environmental risks as a variable in the design of incentive schemes was by Loisel and Elyakime (2006). The authors used a set of theoretical modelling and simulation to assess farmers' relative preferences for incentive programs that accounted for the weather events compared with those that focused only on results. Matzdorf and Lorenz (2010) examined whether weather-related risks impact farmers' willingness to participate in RBAs. They concluded that while their study did not show clear evidence of negative impacts on farmers' willingness to participate, it pointed to the need for further research on how to account for weather risks in RBAs. Derissen and Quaas (2013) tackled how to address environmental risks in RBAs using a principal-agent model. The authors suggest combining ABAs and RBAs will provide optimal results under conditions of information asymmetry and environmental risks. However, all these studies have failed to examine the nature of the environmental risks and how they are addressed in real-life settings. Similarly, other risk management approaches such as financial insurance and conservation auctions have rarely been

applied to study RBAs, even though they also have the potential to address risks in RBAs (Connor et al. 2008; Hellerstein et al. 2015; Alexander et al. 2021; Loch-Temzelides 2021). We contribute to addressing this gap through a case study of land managers who participate in RBAs administered by the South of the Divide Conservation Action Program Inc. (SODCAP Inc.) in Southwestern Saskatchewan. Specifically, we use drought as an example of environmental risk to understand the nature of environmental risks, how the program administrator addresses these risks, and land managers' perceptions about the risk management approach. By focusing on the environmental risk dynamics in a real-life setting, this paper reveals new insights that past simulation studies have failed to uncover.

6.3 A case for managing environmental risks in RBAs

RBAs follow a simple Input-Process-Outcome scenario, where inputs are expected to yield specific outcomes depending on the use of appropriate processes (Matzdorf and Lorenz 2010). Inputs are the base resources required by the land manager, which are combined with processes to achieve outcomes. Inputs may include the land, knowledge, equipment, and finances. Processes are the specific activities, actions, or inactions that a land manager adopts towards achieving an RBA's target outcomes. Outcomes refer to the environmental services (e.g., habitat health, number of species) expected to be provided, measured by established outcome indicators. Under RBAs, land managers are paid compensation on the condition that they adopt appropriate inputs and processes towards achieving the desired outcomes (Engel et al. 2008; Osbeck et al. 2013). Thus, the inputs and processes are not regulated by the conservation agency and are not considered in the payment of compensation. In other words, conservation agencies focus on the results to determine whether to pay compensation to land managers or not. This uniqueness in RBAs ensures flexibility and allows land managers to use cost-efficient and workable knowledge (often based on

experience) (Matzdorf and Lorenz 2010). This also supports recent shifts towards incorporating local ecological knowledge in environmental management (Saylor et al. 2017) and land managers' quest for local autonomy (Pittman 2019).

However, the use of outcomes to determine compensation payment implies that environmental risks that affect land managers at the input and process levels may not be accounted for by the conservation agency unless these risks are included in determining the overall compensation package (Russi et al. 2016). Indeed, in practice, most environmental risks are borne by the land manager (Loisel and Elyakime 2006; Matzdorf and Lorenz 2010; Osbeck et al. 2013). When environmental risks are treated this way, society stands to lose because profit-oriented land managers under conditions of environmental risks will typically decide to use on-farm agrobiodiversity as natural insurance for their private ecosystem services to the detriment of the public ecosystem services (Baumgärtner and Quaas 2010). For example, when faced with a drought, a profit-oriented livestock farmer is more likely to overgraze the fixed piece of land to maintain their profit levels than restrict the quantity of livestock feeding on the land to provide habitat for wild species. Some prior research suggests that land managers, as stewards of the land, manage conditions that support the production of public ecosystem services (e.g., habitat for species) as well as the production of private ecosystem services (e.g., livestock) (Bennett et al. 2018). This perspective suggests that when environmental risks are increasing, the land manager is likely to increase the supply of on-farm biodiversity as insurance for his private interests, which in turn benefits society (Baumgärtner and Quaas 2010). While this is true for environmentally-conscious land managers, the levels of on-farm biodiversity produced under such unregulated conditions remain "inefficiently low" (Baumgärtner and Quaas 2010). Therefore, society will be

better off providing extra incentives to land managers to help offset the negative impacts of environmental risks so as not to affect the production of public ecosystem services.

6.4 Management approaches for environmental risks in RBAs

Risk management is not new in the Payment for Environmental Services (PES) scholarship. Indeed, over a decade ago, Schwarz *et al.* (2008), while supporting the use of RBAs as an alternative to ABAs, reckoned that one of the biggest challenges of adopting RBAs was the greater risks it posed to land managers. Therefore, they suggested that environmental risks and uncertainty must be included in the design of RBA programs. Two leading suggestions were made, including incorporating risk premiums and splitting the compensation payment "between a guaranteed element for participation plus a bonus upon delivery of the desired outcome" (Schwarz *et al.* 2008, p. 34). Several other authors have since proposed similar frameworks (e.g., Zabel and Roe 2009; Derissen and Quaas 2013). The work of Derissen and Quaas (2013) has been auspicious. The authors argue that combining ABAs and RBAs will provide optimal results under conditions of information asymmetry and environmental risks. They suggest that ABAs are only optimal if there is no information asymmetry, while RBAs are only optimal if there are no environmental uncertainties or risks. In practice, however, there are always likely information asymmetries and environmental risks; therefore, combining the two approaches is the only optimal option. While this approach is promising, it appears to suggest that in PES schemes, the regulator's interest is to attract land managers to join the program and ensure cost-efficiency. However, when too much emphasis is placed on cost-efficiency, there is the risk of neglecting approaches that can enhance ecosystem outcomes. This is because when land managers are forced to make conservation decisions under severe restrains to their socio-economic well-being, the ecosystem service outcomes are usually inefficiently low (Baumgärtner and Quaas 2010). Thus, as we suggest in this

paper, rather than only attracting land managers and ensuring cost-efficiency, it may be useful to adopt a participatory approach that is also result-enhancing.

6.5 Materials and Methods

6.5.1 Case study context: the emergence of RBAs in the SoD

This study is based in the South of the Divide (SoD) (Figure 6.1) – an area within Saskatchewan, Canada. SoD is among the few places within the Northern Great Plains containing a sizable amount of Canada's remaining intact native grasslands (WWF 2016b; WWF 2016a; Pittman 2019). In addition, as of 2014, the SoD was home to at least 13 species at various levels of risk of extinction (Environment and Climate Change Canada 2016). These characteristics make the SoD a priority place for conservation. More importantly, much of the land in the area is working landscapes managed by private land managers for crops and livestock production. Available estimates suggest that about 46% of the area's land is privately owned (Environment and Climate Change Canada 2016). The remaining land, the majority of which is leased out to private land managers and grazing corporations/cooperatives, is shared between the provincial government (50%) and the federal government (3%), excluding the Grasslands National Park (GNP). This makes collaboration with private land managers an integral part of the governance of species at risk conservation in the area.

The SODCAP Inc., a collaborative partnership involving land managers, conservation organizations (e.g., Ranchers Stewardship Alliance, Sustainable Canada), and government, administers RBAs in the SoD area. SODCAP Inc. is a federally inspired partnership established to help implement the South of the Divide Multi-Species Action Plan. While federally inspired, SODCAP Inc. has become locally rooted, often attempting to promote environmental protection while maintaining land managers' socio-economic well-being in the SoD area (Pittman 2019). It

is in line with this goal that SODCAP created the RBAs (Environment and Climate Change Canada 2016). However, the RBAs are also aligned with a larger change in policy approach by Saskatchewan's Ministry of Environment (MoE). In 2008, the MoE initiated a review of its existing, mostly command-and-control, approach to environmental protection (Condor and Wilson 2013). The review recommended a move towards a results-based regulatory framework that promotes innovation and efficient use of the Ministry's human and financial resources (Condor and Wilson 2013; Goverment of Saskatchewan 2014).

SODCAP's RBA model focuses on rewarding land managers to supply critical habitat for selected species at risk (e.g., Greater Sage Grouse and Sprague's Pipit) in the SoD area. Therefore, in measuring conservation outcomes, SODCAP measures habitat features such as forbs, grass height, and litter cover rather than counting the number of species (Environment and Climate Change Canada 2016). Incentives are paid on an annual basis. Between 2015 and 2018, there were a total of 31 agreements signed, covering a total land area of about 126,000 acres (SODCAP Inc. 2016; SODCAP Inc. 2017; SODCAP Inc. 2018).

One critical concern of land managers participating in the RBAs is the impacts of extreme climate events, mainly extended periods of drought, on the attainment of habitat targets. Indeed, drought is a perennial condition in the Canadian Prairies, including in the SoD area (Environment and Climate Change Canada 2016). Between 1900 and 2014, Canada's Prairies experienced ten severe droughts (Bonsal et al. 2020). With greenhouse gas (GHG) emissions projected to increase, the occurrence of severe droughts will likely increase (Bonsal and Regier 2007; Bonsal et al. 2020). SODCAP Inc., in its 2018 annual report, suggested that the incidence of drought in the region affects the attainment of habitat targets by participating land managers (SODCAP Inc. 2018). Therefore, the continued success of the RBAs in the SoD area will partly depend on how

conservation agencies address drought in the payment of compensation to participating land managers.

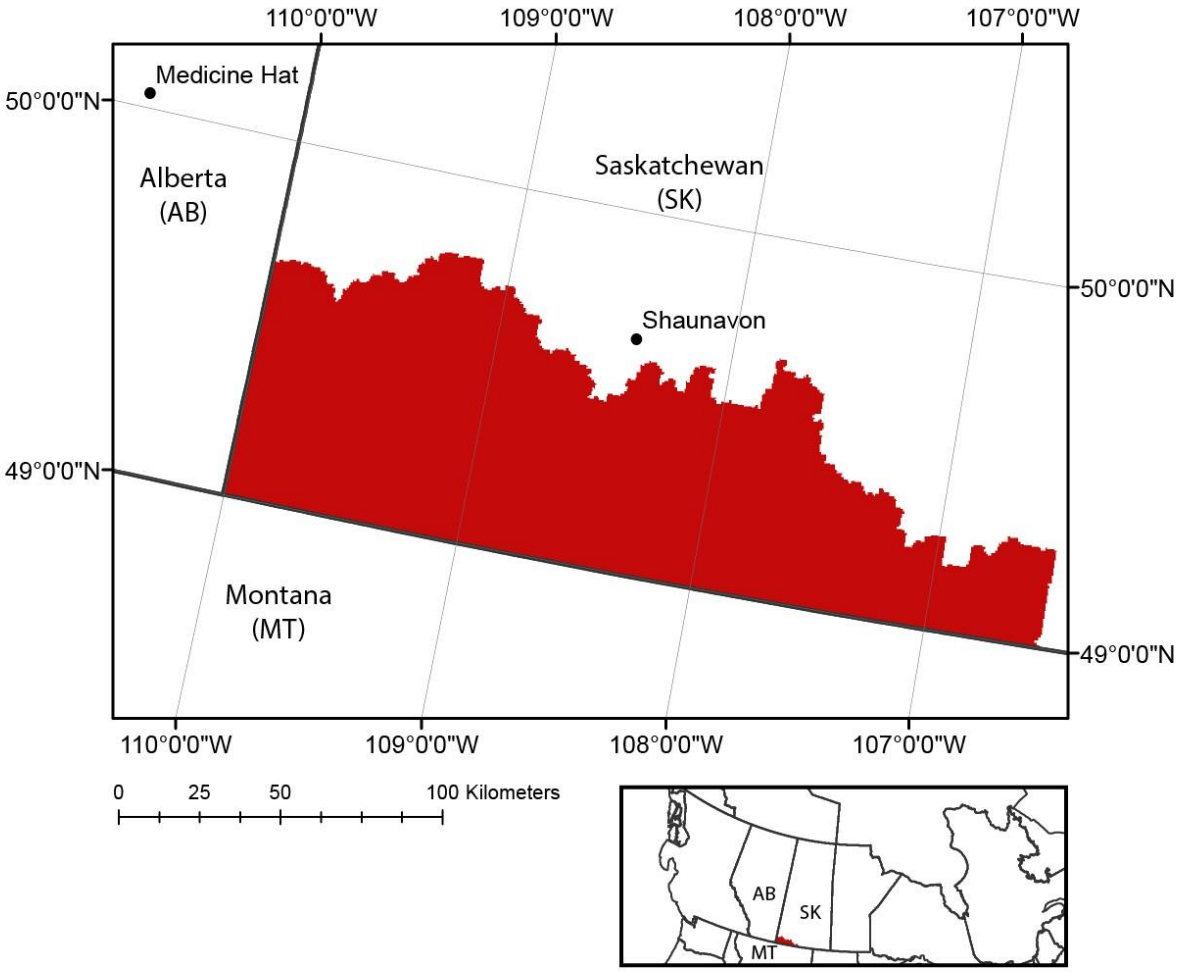

Figure 6.1. A map of the study region

6.5.2 Data collection and analysis

Data collection for the project took place over three months from May-July 2019. We adopted multiple qualitative approaches to collect the data, including in-depth interviews (n=14 ranchers), focus group discussions (n=2, 5 and 4 people per group, respectively), and participatory observation of habitat monitoring and the recruitment of land managers into the RBAs. The sample size is relatively small, considering the total number of beef farmers in the region (N=728)

(Statistics Canada 2016). However, because we were interested in ranchers with experience with SODCAP's RBA, this sample covered many of the conservation leaders who participated in the program. In addition, we collected the data until we reached theoretical saturation (Suddaby 2006). We also consulted with the project's advisory committee at strategic times to corroborate key observations made during interviews and focus group discussions (FGD). The interview and FGD participants were purposively selected from ranchers in the SoD area involved with community pastures, grazing corporations, or grazing cooperatives (n=4) participating in SODCAP Inc.'s RBA program. Ranchers were selected in consultation with SODCAP Inc. and other key informants involved with managing local community pastures, grazing corporations, or cooperatives. These ranchers were known as "good managers" who were actively engaged in conservation. They also are known to have multiple species at risk on their properties. In total, 23 ranchers were either interviewed or participated in the FGDs. Interview participants were asked to share their experiences and concerns regarding the RBA program, emphasizing the effects of drought on meeting habitat targets and the approach adopted by SODCAP to address these concerns. They were also asked to describe scenarios or experiences under which they were or would not be paid compensation due to the occurrence of drought. A similar approach was adopted during the FGDs. However, in the FGDs, we focused more on identifying mutual experiences (Michel 2011) and verifying whether the collective ideas differed from those generated from the in-depth interviews. In all, the results from the FGDs confirmed those generated from the in-depth interviews. All interviews and FGDs were conducted in person and recorded using an electronic recording device. To gain an in-depth understanding of the selection and recruitment of land managers into the RBA program, the lead author followed the program recruitment officer to the

field throughout the data collection period. The lead author also received training and actively participated in habitat monitoring for onward assessment to determine compensation payment.

We followed the basic coding processes for qualitative data analysis outlined in Creswell (2009). First, we transcribed the data verbatim. The transcribed data were then organized under individual questions or themes and read through to gain a general understanding of the responses. Second, we coded the data using NVivo qualitative data analysis software. Both inductive and deductive processes were used in the coding, where some themes – i.e., effects of drought on habitat health and land management, cost of drought to land managers, perceptions of risk management approach in place – were determined *a priori* through the review of the literature, and new themes were included as and when they emerged during the coding. Third, the coded data were segregated into themes and descriptions. Finally, the themes and descriptions were analyzed to identify interrelationships and then subjected to interpretation. The interrelationships were built into a decision tree model for identifying instances where drought can affect land managers (i.e., in compensation payment) in RBAs.

6.6 Results

6.6.1 Nature and effects of droughts on habitat management for species at risk

Overall, research participants see drought as a perennial occurrence in the area, and its effects were dire. According to the land managers, in the two years preceding the interview, they had experienced extended periods of droughts, which negatively affected their operations and the production of habitats for species at risk. This was further explained as:

> It seems the drought comes in cycles about every five to ten years: it seems like we get hit with about two, three years of drought, and then we'll start to get some rain, and then we'll get some really wet years. …And when we do hit into drought, then that's when the habitats get hit harder

> because guys don't want to sell their cows because they need those cows to produce calves to pay for stuff (Interviewee 1).
>
> Of course, the last two years, there hasn't been a lot of recovery [of species' habitat] because of the drought. That is one of the challenges. (Interviewee 2).
>
> The management [environmentally friendly management] is way more important in the bad years when you're abnormally dry or where you got abnormal rainfall. And yet, it is the cows that pay the bills and not the species at risk. We can only do so much (Interviewee 3).

Land managers recognize drought as a phenomenon that affects livestock production and as a critical determinant of whether habitats for species at risk were maintained. The claims of *Interviewees 1 and 3* are particularly insightful. They suggest that during drought, and in the absence of incentive support, land managers are forced to choose between protecting their economic interest and conserving the environment. As the quotes posit, land managers are more likely to maintain their economic well-being. Choosing to protect their economic interests under conditions of drought does not mean that the land managers are not concerned about the environment; instead, it is an indication that land managers work within a limited resource budget, restraining the extent to which they can conserve the environment. This limitation makes incentive programs like SODCAP Inc.'s RBA a welcome intervention for land managers since it helps land managers simultaneously protect their economic interests while maintaining healthy habitats for species at risk.

6.6.2 Experiences of drought and participation in RBAs

Land managers were asked whether their knowledge of the drought situation and its effects on livestock production and habitat health played a role in their decision to participate in the RBA program. They unanimously believed that in one way or the other, they considered the implications

of drought on the attainment of habitat targets before accepting to be part of the RBA program. However, the motives of land managers were sharply divided. More than half of them believed that they were concerned that drought might prevent them from meeting habitat targets and, thus, be unfairly penalized. As one land manager puts it:

> When I was approached over the result-based agreement, I got mixed feelings about [the] result-based agreement. We go into a drought like we did the last two years, and it affects your results. We were hoping that somewhere along the line, some of these environmental groups can realize that management for habitat is not just in the good years. I was happy when they [SODCAP Inc.] said they would consider it (Interviewee 4).

In one of the field observations where a land manager was approached to become a participant in the RBA, he was emphatic about his reservations; *"what happens when there is a drought like we had last year?".* This group of land managers was interested in being assured by SODCAP Inc. that drought would be considered a variable when determining payment of compensation.

The remaining land managers appeared less concerned about the effects of drought on meeting habitat targets. They believed that they were already incurring extra costs to conserve the environment during droughts, even if it was a form of insurance or in readiness for any drought in the following year. Therefore, while they considered drought before accepting to participate in the RBAs, it was in regard to the fact that the compensation was a form of recognition for their 'good stewardship.' In order words, they viewed the incentive program as a support for them to continue to provide species habitat even under inclement weather. However, when prompted as to whether they would feel unfairly penalized if they were not paid compensation for a particular year because of drought, they responded in the affirmative. This implies that even though these land managers believed that their operations were environmentally friendly and the RBA was only a form of

recognition, they still felt that drought must be considered in the determination of compensation payment.

6.6.3 Drought as a form of environmental penalty to land managers in RBAs

As we have demonstrated above, drought is a critical determinant of ecosystem outcomes (i.e., habitat health) in the SoD area and can be a source of environmental penalties – *the extra cost that land managers bear as a result of environmental events beyond their control* – to participating land managers. But in what ways are these penalties experienced by land managers? Land managers described three scenarios under which they may be unfairly penalized because of drought. These scenarios are summarized in Figure 6.2 and discussed in detail below.

Scenario 1 or Penalty 1: Land managers are not paid compensation because the drought prevented them from meeting their habitat targets

The RBA model requires that land managers be paid compensation only if they meet the defined habitat targets. However, when a drought occurs, land managers may not be able to meet the habitat targets, thereby forfeiting their compensation. This scenario is referred to as penalty 1 – the forfeited compensation that is induced by the occurrence of drought (Figure 6.2).

Scenario 2 or Penalty 2: Land managers' management and opportunity cost increases in efforts to meet habitat targets in drought years

Management cost refers to the costs associated with undertaking grazing rotations, water maintenance, fence maintenance, buying hay, and salt distribution on the landscape (Naidoo et al. 2006; Pittman and Ayambire 2020). According to the land managers, in a typical drought year, these cost items increase above the average amounts spent in a non-drought year, even though they could not put figures on them. For example, regarding the grazing rotations, an interviewee posited

that in the last year, he undertook one extra rotation to avoid overgrazing due to the drought. They estimated that, on average, each rotation takes about 40-man hours, even though the number of hours varies according to the size of the livestock and distances between rotations (Pittman and Ayambire 2020). Also, because grazing intensity is reduced to accommodate the drought, land managers indicated that they often must either rent pastures or buy more hay to supplement the forfeited grazing.

> …I would say we even increase the amount of time doing the same job as normal years and what other people in other places do… for example, last year, we made one extra rotation just because we didn't want to overgraze (Participant, FGD 1).

Opportunity cost refers to the costs associated with reducing stocking rates to ensure the provision of multiple ecosystem services (Pittman and Ayambire 2020). Land managers revealed that they reduce their stocking rates below the recommended Animal Unit Month (AUM) to conserve species habitats and meet the RBA targets in drought years. Some land managers reduced their total stock by as much as 100 cows during the 2018 season*: "We normally keep about 350 cows. We are down to 250 cows because of the drought last year" (Interviewee 1).*

In a drought year, the increase in both management and opportunity costs above the average cost in a non-drought year is a demonstration that land managers have exceeded their minimum efforts – the required amount of cost needed to ensure the optimum supply of grass for livestock and healthy habitat for species at risk (Figure 6.2). Sometimes, land managers are able to meet their habitat targets after exceeding their minimum efforts and hence are paid compensation. When this happens, land managers suffer what we refer to as penalty 2 – the extra cost incurred by a land manager, because of drought, in order to meet the habitat targets *(*Figure 6.2).

Scenario 3 or penalty 1+2: Land managers are concerned that they may not be paid compensation even after putting in extra efforts to meet habitat targets

Exceeding the minimum effort is no guarantee that a land manager will meet the habitat targets. According to a participant in one of the FGDs, *"you may even do all that [incurring extra management and opportunity costs] and still fail to meet the habitat targets. What do you do about that?"* (Participant, FGD 2). If this happens, land managers are not paid compensation because they have failed to meet the habitat targets. In this scenario, land managers suffer from the forfeited compensation (Penalty 1) and the extra management and opportunity costs (Penalty 2). Therefore, they suffer a double penalty (Penalty 1+2) (Figure 6.2).

The three scenarios suggest that environmental risks affect land managers involved with RBAs both by limiting their ability to achieve ecosystem targets and by forcing them to incur extra costs (i.e., extra management and opportunity costs) in their attempt to meet ecosystem targets under drought conditions. Furthermore, given that these risks, especially the extra costs incurred, are difficult to measure, it suggests that regulators need a participatory approach that engages with land managers to help understand and integrate environmental risks into the design of RBAs.

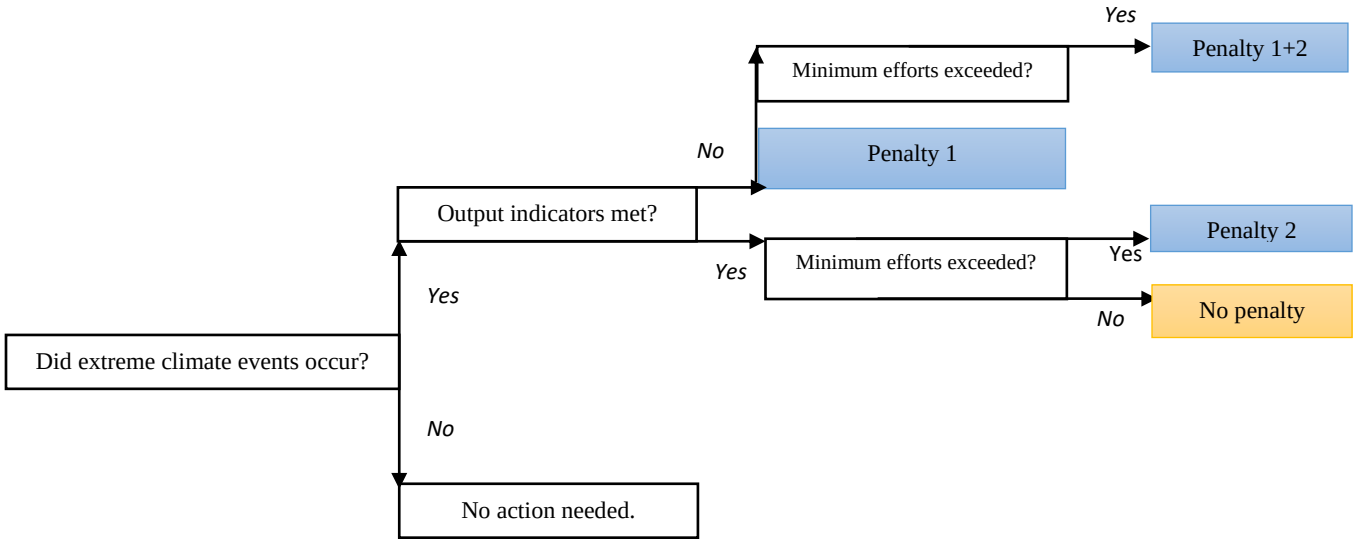

Figure 6.2. A decision tree for identifying environmental risks in RBAs

In any given year, there are either droughts or not. In the absence of drought, RBA program administrators will not be required to undertake any action. However, when droughts occur, they are required to examine their effects on participating land managers as part of the decision-making process towards determining compensation payment. To be able to identify the true effects of the drought on land managers, program administrators should first determine whether land managers met the habitat targets. If land managers did not meet the habitat targets because of the drought, they have suffered *penalty 1*, which should be accounted for in the determination of compensation payment. If the land managers met their targets, the administrator should further inquire if they exceeded their minimum efforts to meet their targets. Where land managers did not exceed their minimum efforts, it implies that the drought did not impact the achievement of the habitat targets and hence *no penalty*. On the other hand, when land managers exceeded the minimum efforts as a result of the drought and met their habitat targets, land managers have suffered *penalty 2*, which should be accounted for in the determination of compensation payment. Sometimes, land managers will fail to meet the habitat targets even after exceeding the minimum efforts. This results in a *double penalty*, which should be accounted for in the determination of compensation payments.

6.6.4 Dealing with environmental penalties in RBAs: the experience of SODCAP Inc.

We inquired from land managers whether SODCAP Inc. had taken steps to address the penalties described above. The authors also consulted with the project's (the RBA) advisory committee to elicit from them the approach used by SODCAP Inc. to address the likely penalties (Figure 6.2). Both parties confirmed that mechanisms were in place to address environmental penalties. In particular, the land managers indicated that penalty 1 was accounted for in the payment of compensation through a pro-rata reduction from the agreed rate of compensation payment per acre of land. Furthermore, SODCAP Inc. reported in its 2018 annual report that "several producers

received partial payments because the habitat targets were not met" (SODCAP Inc. 2018, p. 9), further confirming the claims of the land managers. However, according to land managers, penalty 2 was not yet accounted for, even though they were optimistic that SODCAP Inc. was working with them to account for it in the future. Indeed, the advisory committee indicated that efforts were underway to adapt habitat targets to changing weather conditions. This claim was further corroborated by the SODCAP's 2018 annual report, "species experts from the Saskatchewan Ministry of Environment and Environment and Climate Change Canada are assisting with adapting habitat targets as more research becomes available" (SODCAP Inc. 2018, p. 9).

Overall, land managers seem satisfied with the approach SODCAP Inc. adopted to address likely environmental penalties. This was partly because land managers were actively involved in decision-making regarding how compensation was determined.

> Actor A [3]and I worked together for I don't know how many years to get to this agreement. And they offered several different agreements, but it was of no advantage to us whatsoever. And so, Actor A worked really, really hard to get this agreement (Interviewee 5).

> I was concerned until we got this rain, that this was our third drought year. And I was told [by SODCAP Inc.] that it would be put in the factors when it comes to a payout time. (Interviewee 5).

It is instructive to note that Actor A has firsthand knowledge of SODCAP Inc. and ranching in the area. Therefore, Actor A was aware of the impacts of drought on habitat health and the land managers' socio-economic well-being. Actor A's position and the quotes from *Interviewee 5* suggest a high level of engagement and the involvement of actors that span the boundaries of

[3] Actor A is used as a pseudonym to protect the identity of the person involved.

program administrators and land managers. Therefore, land managers' confidence that their concerns were being addressed is founded on the goodwill and trust in the program administrators.

6.7 Discussion

We applied multiple qualitative approaches, including in-depth interviews, FGDs, and observation, to obtain a detailed and thorough understanding of environmental risk dynamics in RBAs within their real-life contexts. To the best of our knowledge, no other study has done this before. Our case study results demonstrate that environmental risks, as they are outside the land manager's control, affect the attainment of environmental outcomes. Therefore, if not catered for in the design of RBAs, environmental risks could serve as a disincentive to prospective land managers (Whitten *et al.* 2007; Hanley *et al.* 2012; Derissen and Quaas 2013). Although several studies agree that environmental risks affect conservation outcomes, none of them describes the nature of these effects on land managers participating in RBAs. In fact, previous studies suggest that the only effect of environmental risks on land managers in RBAs is the risk of not meeting their ecosystem targets and hence the non-payment of compensation (Schwarz *et al.* 2008; Gibbons *et al.* 2011). However, it is crucial to note the managerial modifications that are likely to arise when land managers face environmental risks. Ignoring those managerial modifications could lead to underestimation of the real effects of environmental risks on land managers. Our results suggest that, indeed, under conditions of drought, land managers are forced to increase their management costs and opportunity costs in an attempt to meet ecosystem targets.

The additional costs placed on land managers due to environmental risks can have dire consequences for society. This is because, under conditions of environmental risk, the profit-oriented land manager is more likely to prioritize their private interests over the public interest (Baumgärtner and Quaas 2010). Therefore, they may, for example, overgraze the land destroying

habitat for species at risk even if it means forfeiting the compensation. Even if land managers decide to protect their private interests and the public interests, the resulting ecosystem outcomes may be lower than when incentive support is provided (Baumgärtner and Quaas 2010). These findings suggest the critical need for conservation agencies to address environmental risks in RBAs, taking into account the impacts of their actions or inactions on ecosystem outcomes. In this regard, SODCAP Inc.'s approach to addressing environmental risks in its RBA is promising.

Our study revealed that SODCAP Inc. is in the process of combining a pro-rata reduction and the use of environmentally adaptive outcome indicators (i.e., habitat targets) to reduce land managers' risks (SODCAP Inc. 2017). SODCAP Inc. is already implementing a participatory approach that is focused on enhancing ecosystem outcomes. SODCAP Inc.'s participatory approach involves engaging land managers in an ongoing basis to determine how to pay compensation that accounts for risk events. While it is unclear at the time of this study how SODCAP Inc.'s environmentally adaptive outcome indicators would look like, past studies give an indication of what environmentally adaptive outcome indicators should entail. Heink & Kowarik (2010) argue that outcome indicators in PES must be sensitive to environmental change. They must also account for local climatic and soil conditions and historical events that have a bearing on the ecosystem service in question (Kaiser *et al.* 2010). The pro-rata reduction and the environmentally adaptive outcome indicators are not in any way unique to SODCAP Inc. However, SODCAP Inc.'s focus on enhancing ecosystem outcomes by supporting land managers through outreach and engaging land managers in decision-making on an ongoing basis regarding compensation payment during drought is promising. SODCAP, in addition to monitoring habitat targets, also monitors costs, which provide the information needed for adaptive management of the risks. Since SODCAP Inc. allows land managers to deliberate on the impacts of drought on management costs and the supply

of species at risk habitat, they can account for the extra management and opportunity costs that have been unaccounted for in many existing RBAs. Also, because the participation is on an ongoing basis, environmental uncertainties can be accounted for as and when they arise. Finally, the outreach events provide useful information that can help land managers reduce their exposure to environmental risks (Wandel *et al.* 2018).

6.8 Conclusion: towards adaptive co-management of environmental risks in RBAs?

This paper examines the nature of the effects of environmental risks on land managers participating in SODCAP Inc.'s RBA in Southwestern Saskatchewan. It also examines the approach adopted by SODCAP Inc. to address environmental risks. The results suggest that drought is a common occurrence in the study area; therefore, land managers consider it a critical determinant in participating in RBAs. In addition, the study reveals that environmental risks affect land managers involved with RBAs both by limiting their ability to achieve ecosystem targets and by forcing them to incur extra costs (i.e., extra management and opportunity costs) in their attempt to meet ecosystem targets under drought conditions. The additional costs placed on land managers due to environmental risks could have dire consequences for society if not addressed. These new insights call for a change in policy direction towards one that seeks to enhance ecosystem outcomes. An example of such change is SODCAP Inc.'s efforts to adopt a participatory and result-enhancing approach in its RBAs to help improve ecosystem outcomes.

SODCAP Inc.'s approach draws several parallels with adaptive co-management (Plummer et al. 2012; Plummer et al. 2013). Adaptive co-management emphasizes experimental and experiential learning, monitoring and evaluation, collaboration with multiple stakeholders (e.g., different levels of government, resource users, and local communities), integrating science and policy, and responsive management to address change and uncertainty (Plummer et al. 2012; Plummer et al.

2013; Hasselman 2017). As we have demonstrated throughout this paper, SODCAP Inc. itself is a collaborative partnership involving land managers, conservation organizations (e.g., Ranchers Stewardship Alliance, Sustainable Canada), and the federal and provincial governments. SODCAP Inc.'s RBA approach emphasizes continuous learning, integration of science, local knowledge, and policy, and monitoring, evaluation, and feedback (SODCAP Inc. 2016, 2017, 2018). These parallels make us wonder if we are seeing an emergence of adaptive co-management of environmental risks in RBAs.

The academic scholarship on the successes of adaptive co-management (Plummer *et al.* 2012, 2017) and the experiences from SODCAP Inc.'s RBA promise that such an approach within the context of RBAs might have positive effects. However, it is premature to conclude whether adaptive co-management of environmental risks is the way forward. Therefore, future studies should explore the potential of adaptive co-management as an alternative or an addition to more traditional economic-based environmental risk management in RBAs. Important starting points may include examining how adaptive co-management might enhance ecosystem outcomes in RBAs and how economic-based risk management approaches can work with adaptive co-management to address environmental risks in RBAs.

Chapter 7: Synthesis

7.1 Introduction

The purpose of this chapter is to synthesize the results from the three previous analyses (Chapters 4, 5 & 6) into a coherent whole and identify their collective contribution to theory and practice. I begin by reiterating the purpose and objectives of the Ph.D. research. I follow this up with a summary of the key findings before explaining the contributions to theory and practice. Next, I state the study's limitations. Finally, I provide some concluding remarks.

7.2 Purpose and objectives

I designed my research to advance our understanding of the working landscape approach in order to contribute to the planning of sustainable human-nature relations in rural environments. In doing so, I contribute to addressing the challenges emanating from our need for environmental protection and social-economic development. My research is based on the premise that governance provides a context, a set of theories, and processes (Pittman and Armitage 2016) which planners use to diagnose problems, make and implement sustainability solutions. Governance in this sense implies a new space for decision-making that helps deepen participation by permitting (1) the entry of multiple actors outside of the state into the decision-making space, (2) innovative approaches to problem-solving, and (3) emphasis on interactive and collaborative processes and the blurring of the boundaries separating the state, market, and the civil society (Lemos and Agrawal 2006; Ansell and Gash 2008; Driessen et al. 2012; Roth and Dressler 2012; Bennett and Satterfield 2018; Stoker 2018). Based on this premise, I use a governance perspective to frame my research question and objectives, which are as follows:

Question: How can we govern working landscapes for human well-being and environmental protection?

Objective 1: to propose a framework for the working landscapes approach

Objective 2: to examine the conditions and mechanisms that foster sustainable working landscapes

Objective 3: to examine approaches for addressing risks in the management of working landscapes

In addressing these research objectives, I employed multiple qualitative research methods. Also, each objective is addressed in a separate manuscript presented as chapters (Chapters 4, 5, and 6) in this dissertation. A discussion of the findings is provided under each objective below.

7.3 Key findings

In this section, I discuss the key findings in relation to each of the research objectives. Table 7.1 provides a summary of the key findings.

7.3.1 Objective 1: to propose a framework for the working landscapes approach

The first objective aimed to propose a framework for the working landscapes approach. To achieve this objective, I conducted a review and synthesis of the literature on the governance dimension of working landscapes towards developing an integrated conceptual framework. The review focused on three major components: (1) the characteristics of the working landscapes approach, (2) the emergent governance challenges in working landscapes, and (3) the existing governance arrangements in working landscapes. First, the review found that the working landscapes approach has three main characteristics, including that (1) it focuses on integrating social well-being and environmental protection within the landscape, (2) it involves collective action among multiple actors, state and non-state actors, and (3) working landscapes shape and are shaped by their social-ecological context. These three features collectively reveal critical governance challenges as apparent in the empirical scholarship on working landscapes.

Second, regarding the governance challenges in working landscapes, the review found that the challenges centre on the right to use resources and in what ways, the rules that control resource use, and how the rules are designed and enforced (Agrawal, Chhatre, & Hardin, 2008; Brockington et al., 2018). Specifically, the review found that the higher cost involved in managing working landscapes for both social well-being and environmental protection hinders the effectiveness of the working landscapes approach. This is especially important given that a large portion of working landscapes are managed by individuals and groups who bear the cost even though the benefits may accrue to actors spread out over larger spatial scales (Paavola 2016).

Another challenge identified was the difficulty accessing and integrating diverse sources of knowledge to effectively manage working landscapes. Land managers do not trust knowledge from governments and other conservation agencies due to their past experiences of command-and-control governance regimes (Bergmann and Bliss 2004; Ferranto et al. 2013; Farley et al. 2017). On the other hand, "trained experts" tend to leverage technical knowledge over other forms of knowledge, especially landowners' local ecological knowledge (Charnley et al. 2007; Armitage et al. 2012a). These barriers hinder access to appropriate knowledge and prevent the integration of knowledge from different sources. Furthermore, working landscapes face problems of fit. These include spatial fit – finding the appropriate spatial match between institutions and the environmental problem (Armitage et al. 2012a, 248) and social fit – the ability of institutions to match social processes and characteristics of the actors.

Third, in response to these challenges, numerous governance arrangements have emerged from around the world, focusing on how communities, the state, and market actors interact to address concerns of cost, knowledge access and integration, and governance misfits or mismatches. While these governance arrangements vary in how they configure the relationships between

communities, the state, and market actors, there are essential commonalities (i.e., trust, incentives, leadership, local autonomy, and equity) that can inform the design of effective working landscapes. In addition, collaboration and multilevel institutional arrangements help facilitate interactions among the different actors and scales to make the working landscapes approach effective.

These findings were synthesized to develop a conceptual framework that focuses on the local scale and how the local is embedded within multilevel governance arrangements. In the framework, the working landscapes approach is structured in terms of the social-ecological context, the key ingredients, collective action, and a linking mechanism. These elements, together, explain the social and ecological processes underpinning the approach and their impacts on social well-being and environmental protection.

7.3.2 Objective 2: to examine the conditions and mechanisms that foster sustainable working landscapes

The second objective applies the framework developed in the first objective to examine the conditions and mechanisms that foster sustainable working landscapes. I examined the link between governance and management as a means of understanding how governance conditions and mechanisms help create positive management outcomes in working landscapes. In this regard, positive management outcomes signal sustainable working landscapes. The analysis focused on identifying the key ingredients or governance conditions, mechanisms, and the most plausible pathway that contributed to the emergence of positive management outcomes in the working landscape. I applied this analysis to one case study in the SoD region. I found that four governance conditions (i.e., facilitative leadership, local autonomy, trust, and incentives) connected by five mechanisms (i.e., institutional disruption, institutional crafting and drift, brokerage or bridging, program uptake, and alleviation of fear of harm) produced positive management outcomes in the SoD. The most plausible pathway is that dissatisfied actors disrupt the existing governance

arrangements and create new ones that reflect their desire for local autonomy. Local autonomy, in turn, creates an atmosphere for local actors to form coalitions and build trust; trust enhances program uptake and the co-design and co-implementation of incentives, which then alleviates land managers' fear of harm from participating in species at risk conservation programs.

While some positive management outcomes emerged in the region, it was evident from this study that the inclusion of equity – a key ingredient identified in the framework (objective one) but not was perceived as absent in the study region – would have further enhanced positive management outcomes. This suggests that the emergence of positive management outcomes at a particular time alone may not fully explain the sustainability of working landscapes. Therefore, sustainability likely requires continuous efforts to understand the important governance conditions and mechanisms that might emerge to change management outcomes.

7.3.3 Objective 3: to examine approaches for addressing risks in the management of working landscapes

The third objective also applies the framework in objective one (Chapter 4) to understand environmental risk management in working landscapes. Chapter 4 suggested that the sustainability of working landscapes partly depends on how the social-ecological context factors affect collective action and shape the key ingredients towards influencing positive collective action. Chapter 5 examined how the governance conditions (key ingredients) and associated mechanisms shape management (an example of collective action). However, Chapter 5 did not address how the social-ecological context factors affect collective action or shape the key ingredients towards achieving sustainable working landscapes. Objective 3 (Chapter 6) responds to this gap by examining how environmental risks (social-ecological context factor) affect collective action and how the governance conditions are structured to address these risks. The analysis used SODCAP's result-

based conservation agreement as a composition of the governance conditions in the SoD region and used drought as an example of environmental risks to address research objective 3.

Drawing on the experiences of land managers in the SoD, I found that drought affects the ability of land managers to meet both social well-being and environmental protection goals in working landscapes. Specifically, within the result-based conservation agreement framework, drought affects land managers by limiting their ability to achieve ecosystem targets and forcing them to incur extra costs (i.e., extra management and opportunity costs) to meet ecosystem targets. Therefore, if left unaddressed, drought can discourage land managers from participating in actions (e.g., enrolment, management) that would lead to the sustainability of working landscapes. Furthermore, I found that the incentive structure, which allows for a pro-rata reduction and the design of environmentally adaptive outcome indicators, helps reduce risks. Also, trust among actors and local autonomy facilitates continuous engagement between SODCAP and land managers to address the uncertainty and unpredictability associated with droughts.

Table 7.1: Summary of Findings

Research Question	Research Objectives	Summary of Findings	Chapter
How can we govern working landscapes for human well-being and environmental protection?	to propose a conceptual framework for the working landscapes approach	The collective efforts of multiple actors determine the sustainability of working landscapes; however, the collective efforts of these actors can be influenced by putting in place appropriate governance arrangements (key ingredients and interacting mechanisms) that fit the social-ecological context of the working landscape in question.	4

	to examine the conditions and mechanisms that foster sustainable working landscapes	Multiple governance conditions and linking mechanisms influence sustainable management of working landscapes.	5
	to examine approaches for addressing risks in the management of working landscapes	A flexible incentive structure that focuses on enhancing social and ecological outcomes through continuous engagement among actors and attention to the social-ecological context helps address environmental risks in working landscapes.	6

7.4 Contributions and emerging propositions

Each of the key findings discussed in section 7.3 represents an independent contribution to the literature. However, the three analyses also collectively contribute to the theory and practice of environmental governance and rural-environmental planning. These contributions are outlined in this section. The contributions are presented as propositions – i.e., statements that convey the relationship between two or more concepts (Gay and Weaver 2011; Pittman 2016) – and are organized under environmental governance and rural-environmental planning. The contributions to practice associated with each proposition are also presented.

7.4.1 Contributions to the environmental governance literature

Proposition 1: Top-down regulations that offer opportunities for further institutional work improves their acceptability and likelihood of success.

In recent decades, top-down governance regimes such as regulations have come under intense criticisms for the negative social and environmental outcomes that result from those governance

regimes (Armitage et al. 2012a). These criticisms are summed up by the theory of the pathologies of command-and-control, which suggests that governance of social-ecological systems by top-down bureaucratic institutions results in negative consequences (Holling and Meffe 1996; Cox 2016). Critics, therefore, further suggest that bottom-up or collaborative governance solutions that combine top-down and bottom-up approaches are better for governing social and ecological systems (Michael 2000; Innes and Frisvold 2009). In this regard, the idea that top-down governance can yield positive outcomes for social-ecological systems when combined with other modes of governance is not new. For example Pittman (2016) proposed that hierarchical governance and network governance can co-exist and interact to produce sustainable outcomes in the land-sea interface.

However, my specific contribution is that the nature (i.e., whether the top-down regulations allow opportunities for further institutional work or not) of the top-down governance is important in even determining whether other modes of governance can emerge and the resulting social-ecological outcomes. As noted in Chapter 5, more collaborative approaches have historically yielded relatively sustainable social and environmental management outcomes than top-down approaches. However, my research has revealed that top-down regulations could become acceptable at the local level and foster the delivery of positive management outcomes if they allow room for institutional crafting and brokerage to occur. Based on this finding, I propose that top-down regulations can still foster sustainable social-ecological outcomes by creating opportunities for local actors to create new institutions and form coalitions among existing institutions to further their interests. This potential was clearly illustrated by the case of SODCAP presented in Chapter 5, where, although created to implement federal government regulations (e.g., SARA), it has become a grassroots-focused organization perceived by land managers as their ally.

Take-away messages for practice

1. Top-down regulations from higher-level governments should create opportunities for further institutional work at the local level to improve their acceptability and opportunities for success.

Proposition 2: Focusing on underlying mechanisms, rather than only governance conditions, enhances policy prospects

Good governance is often perceived as a prerequisite for effective management, which is an indication of policy success (Pahl-Wostl 2009; Lockwood 2010). However, the link between good governance and effective management has remained unclear. The perception is that governance should create the context (e.g., rules, regulations, and institutional arrangements) (Pittman and Armitage 2016) and conditions needed (e.g., leadership, trust, equity, etc.) (Chapter 4) for effective management (Lockwood 2010). This perception has focused policy attention on creating the appropriate context and conditions (*i.e., what made governance successful*) to facilitate effective management. However, the underlying mechanisms (*i.e., why governance was successful*) that contribute to effective management has been 'black boxed'. As Chapter 5 demonstrates, focusing on the mechanisms introduces new insights that can inform policy. For example, mechanisms help explain *why* certain governance conditions engender effective management whiles others fail. It also provides a different framework for thinking about policy solutions that are context-specific. This means that understanding the mechanisms that lead to effective management redirects attention of policymakers towards finding contexts (rules, regulations, and institutional arrangements) and conditions that will facilitate the occurrence of those mechanisms. For example, I found that land managers in the SoD ultimately accepted to manage their land for species at risk because the governance conditions alleviated their fear of harm. Therefore, if policymakers seek

to foster species at risk management in other contexts, they would seek conditions and strategies that will help alleviate land managers' fear of harm in that specific context rather than trying to introduce the same governance conditions that were successful elsewhere. Furthermore, underlying mechanisms can help explain how certain governance conditions emerge or result from other conditions. For example, Chapter 5 demonstrated how facilitative leadership led to local autonomy through institutional disruption and local autonomy led to trust through brokerage, among others. This is important for policy because it provides guidance on the how different governance conditions interact to produce management outcomes.

Take-away messages for practice

1. Policymakers should also endeavour to determine *why* certain governance arrangements were successful in other contexts rather than only *what* made them successful.
2. It is important for policymakers to understand how different governance conditions interact to produce management outcomes.

7.4.2 Contributions to the rural-environmental planning literature

Proposition 3: Multilevel institutional arrangements help focus planning interventions on both place and function

One of the pillars of the sustainability planning theory (Campbell 1996; Wheeler 2004; Wheeler 2016; Campbell and Zellner 2020) is that planning must (re)focus attention on place to prevent indiscriminate exploitation of resources and address the place-specific needs of local residents. However, the interconnectedness of ecological resources (Brondizio et al. 2009) makes too much attention to place undesirable because it might lead to misfits (functional and spatial misfits) (Wheeler 2004). Proposition 3 contributes to addressing this dilemma. I propose that multilevel

institutional arrangements, which helps link institutions at a larger scale (focusing on function) and institutions at a smaller scale (focusing on place) (Paavola 2016), enhances sustainable management of local resources, helps supply ecosystem services to the general public, and protects the interests of local people. As noted in Chapter 4, land managers of working landscapes supply ecosystem services at the landscape scale to beneficiaries spread out over larger spatial scales. The collective efforts of these land managers are coordinated by local institutions (e.g., SODCAP, grazing corporations and grazing co-operatives), whiles the payment of compensation is provided by state institutions through public taxes and other private benefactors (Chapter 5).

A critical reason for the success of working landscapes is, therefore, dependent on how the local (place-centred) and state (function-centred) institutions collaborate through multilevel institutional arrangements. While multilevel institutional arrangements have been researched extensively in the conventional environmental governance scholarships (Armitage 2007; Brondizio et al. 2009; Paavola 2016), the planning scholarship has been slow to embrace them. My contribution is that planners, especially those interested in rural environments, can serve the place-specific demands of their residents and still respect the interconnectedness of ecological resources by establishing relationships between place-centred planning and function-centred planning institutions.

<u>Take-away messages for practice</u>

1. Efforts to plan for sustainable human-nature relations in rural environments should endeavour to establish linkages between place-centred and function-centred planning institutions.

Proposition 4: Social well-being and environmental protection can provide normative guiding principles for planning in rural environments

Recent renewed interest among planning scholars to discover a theory of good city form (Talen and Ellis 2002) re-echoes earlier debates over whether planning should focus on process or substance. Advocates for a substantive theory argue that planning requires "well-validated, durable criteria for successful outcomes" (Talen and Ellis 2002, 36). While these debates have unfortunately only focused on cities, Hibbard and Frank (2019) and Selman (1995) have recently extended the debate to rural planning. Hibbard and Frank (2019) particularly proposed a framework to help develop a substantive theory of rural planning. Among other things, Hibbard and Frank (2019) suggest that one of the key components of any substantive theory for rural planning is an understanding of the "what" (i.e., what is the object of rural planning?) of rural planning. In order words, what are the "well-validated, durable criteria for successful outcomes" in rural planning? It is unclear what the object of rural planning is, given the diversity of rural areas. Nonetheless, as the sustainability planning framework suggests, planning needs to develop shared values even in the midst of the diverse values and interests in society (Wheeler 2016). Those shared values are being developed for rural environments.

I contribute to the development of those shared values in rural environments by proposing that social well-being and environmental protection can provide the much-needed "well-validated, durable criteria for successful outcomes" for rural planning. As Chapter 4 demonstrates, social well-being and environmental protection provide overarching goals for integrating diverse interests within multifunctional landscapes. These goals help address both individual (e.g., profit) and public interests (e.g., species at risk management), which are central for addressing the conflicts planners face in their attempt to achieve sustainability (Campbell 1996; Campbell and Zellner 2020). Social well-being and environmental protection are broad enough to encapsulate

the diversity of rural environments (Chapter 4), yet they also provide enough specificity for the development of indicators for measuring outcomes (Chapters 5 and 6).

Take-away messages for practice

1. Planning efforts (e.g., land-use change and design and conflict negotiation) by rural-environmental planners should aspire to achieve social well-being and environmental protection.
2. Rural-environmental plans should be prepared to reflect how specific planning actions would lead to social well-being and environmental protection.
3. The development of sustainable planning indicators can be guided by social well-being and environmental protection goals.

Proposition 5: Incentive programs facilitate conflict negotiation in multifunctional landscapes

Campbell (1996) put forward that sustainability planning demands a shift in focus away from adversarial planning and towards conflict negotiation. Also, John Forester and others have developed an impressive scholarly work drawing on how practitioners address everyday planning conflicts through negotiation and mediation (Fischer and Forester 1993; Forester 2008; Forester 2013; Forester 2016; Schön 2017). However, there are still very limited tools available to planners who are confronted with conflict situations. I propose that in rural multifunctional landscapes, where planners face conflicts between social-economic development and environmental protection goals, incentive programs are viable tools for negotiating or mediating conflicts. I use incentives broadly to include motivators that are designed to guide actors towards desired actions or outcomes (Uphoff and Langholz 1998; Cetas and Yasue 2016). These motivators may be economic (e.g., tax credits, cost-sharing, annual payments), legal (e.g., assurances), or social (e.g., public recognition).

Like in proposition 3, incentive programs have also been widely researched in conventional environmental governance literature (Chapter 4) but are yet to be fully embraced by planners. Therefore, incentives should be developed as part of the suite of planning tools available for mediating conflicts over planning decisions in rural environments. As demonstrated in Chapters 5 and 6, incentives were used in the SoD to alleviate land managers' fear of harm and address environmental risks, respectively. These are both instances of conflict over whether to protect species at risk on working landscapes or not. As my research revealed, the conflict was resolved by paying incentives to land managers for the extra cost incurred in managing their land for both species at risk and livestock.

Take-away messages for practice

1. Efforts to address planning conflicts should embrace incentive schemes as tools for negotiation and mediation.

7.5 Study limitations and priorities for future research

While each manuscript pointed to some limitations and several opportunities for further research, I believe that there are three main limitations to my research: (1) the positioning of planners outside of the research, (2) focus on a single case, and (3) a limited focus on outcomes. These limitations also signal priorities for future research. Each of the limitations, as well as the directions for future research, are discussed below.

7.5.1 Where is the planner?

As I have argued in Chapter 2, an important contribution of my research is towards improving understanding of the theory and practice of *planning* sustainable human-nature relations in rural contexts. Because of this focus on planning, an obvious question that follows is where the planner is in a research that seeks to inform planning practice. This question is particularly crucial because

planning research developed around the role, approaches, and competencies planners use in solving societal problems (Weber and Crane 2012). I positioned the planner outside of the research for two main reasons. First, I intended to make an interdisciplinary contribution to the working landscapes literature, including to the environmental governance literature (propositions 1 and 2) and the rural-environmental planning literature (propositions 3-5). The second is to allow me to develop an interdisciplinary understanding of the working landscapes approach without ties to any specific field of practice. This is important for fostering interdisciplinarity and for learning across multiple disciplines. Also, the working landscapes literature is not traditionally tailored towards the professional practice of planning; hence any attempt to constrain the research question to professional planning would limit the lessons we can learn. Therefore, broadening the research question to encapsulate other fields of practice would offer important lessons for planning theory and practice, as I have demonstrated in this Chapter (propositions 3, 4, and 5).

Regardless of the limited focus on professional planning practice, the study suggests that professional planners can play a critical role in governing working landscapes. For example, professional planners in Canada and elsewhere can leverage their competencies in communication, leadership, and interpersonal skills (Canadian Institute of Planners 2011) to foster collaboration among the multiple stakeholders in the working landscapes approach. They can also use their competencies in human settlements and plan and policy considerations to better integrate working landscapes policies within broader community development to increase social well-being and environmental protection. These provide useful starting points for better positioning professional planners within the working landscapes approach. Therefore, further studies should explore the role of planners and how they relate with other actors in working landscapes. These studies should frame planners as part of the governance system to understand how their interactions with others

can impact the natural environment and social well-being. This line of inquiry would also allow for further understanding of the key competencies required by planners who work in working landscapes and similar contexts of human-nature relations.

7.5.2 Learning across contexts

My research focused on a single case – the SoD region – except for Chapter 4 (the conceptual framework). The combination of the conceptual framework and the empirical investigation within a single case is advantageous for situating the results of the empirical investigation within a broader theoretical context. It also facilitates the production of actionable outcomes for the context under investigation. However, the use of a single case has its limitations: (1) it limits the ability to generalize about how to govern working landscapes and (2) it limits the ability to learn from similar contexts elsewhere to improve governance of working landscapes. These limitations are important because there is an increasing need for lessons to be learned across diverse contexts of working landscapes (Chapter 4) in order to advance sustainability. Therefore, future studies should apply the framework (Chapter 4) in other contexts to facilitate theorizing regarding how we can effectively govern working landscapes. In particular, researching the governance of working landscapes in developing countries where: (1) a large proportion of the population rely on natural resources for their livelihoods, (2) institutions are weak, and (3) there are relatively complex property rights regimes would provide useful insights for further advancing the working landscapes approach.

7.5.3 Connecting governance to social-ecological outcomes

An important feature of the working landscape approach, as shown in Chapter 4, is that working landscapes are managed to ultimately achieve social well-being and environmental protection outcomes. Yet, in applying the framework, I have only focused on how governance (key

ingredients) leads to management (collective action). While this is an important contribution to the literature, a key limitation with this approach is that there is no direct link between management and governance and outcomes (social well-being and environmental protection). Chapter 4 attempted to address this by indicating examples of activities that come under social well-being and environmental protection, and Chapters 5 and 6 treated species at risk management and livestock rearing as proxies of environmental protection and social well-being, respectively. However, this treatment still fails to provide any certainty that the governance processes and management actions taking place in the SoD result in tangible social well-being and environmental protection outcomes. Therefore, future studies should, for example, investigate the governance-management-outcomes pathway to understand how governance and management would lead to outcomes. This line of investigation would also require an in-depth understanding (e.g., by developing indicators) of social well-being and environmental protection as they apply to working landscapes.

7.6 Concluding remarks

This research contributes to an emerging body of scholarship on the governance of working landscapes. In doing so, I have also drawn useful lessons for planning sustainable human-nature relations in rural environments. My research emphasizes that the collective efforts of multiple actors determine the sustainability of working landscapes; however, the collective efforts of these actors can be influenced by putting in place appropriate governance arrangements (key ingredients and interacting mechanisms) that fit the social-ecological context of the working landscape in question. I have provided important insights regarding the governance processes that will help to improve the collective efforts of multiple actors in working landscapes. These insights can inform efforts to plan sustainable human-nature relations in rural environments.

My research also highlights the critical role of working landscapes in addressing global environmental challenges such as climate change and biodiversity loss. Indeed, an essential step towards sustainability is recognizing that working landscapes do not only drive environmental degradation but can also offer solutions. Such recognition can drive global efforts towards conserving working landscapes. This is particularly important as national and international commitments to foster sustainability through the designation of protected areas continue to lag current and future sustainability thresholds. However, an important next step in driving the sustainability of working landscapes is developing governance and institutional systems that address the unique challenges of working landscapes. These governance and institutional systems are already developing globally. Through this dissertation, I have begun the efforts to consolidate our understanding of the governance of working landscapes and to open new doors for further theoretical and empirical research.

References

Abrams, J., H. Huber-Stearns, H. Gosnell, A. Santo, S. Duffey, and C. Moseley. 2020. Tracking a Governance Transition: Identifying and Measuring Indicators of Social Forestry on the Willamette National Forest. *Society and Natural Resources* 33. Routledge: 504–523. doi:10.1080/08941920.2019.1605434.

Agrawal, A., A. Chhatre, and R. Hardin. 2008. Changing Governance of the World's Forests. *Science* 320: 1460–1462. doi:10.1126/science.1155369.

Alexander, J. S., B. Agvaantseren, E. Gongor, T. N. Mijiddorj, T. Piaopiao, S. Redpath, J. Young, and C. Mishra. 2021. Assessing the Effectiveness of a Community-based Livestock Insurance Program. *Environmental Management*. Springer US. doi:10.1007/s00267-021-01469-8.

An, S., M. Cheng, Z. Xue, and R. Ma. 2017. Current State of Multifunctional Use of Grasslands BT - Multifunctional Land-Use Systems for Managing the Nexus of Environmental Resources. In , ed. L. Zhang and K. Schwärzel, 69–77. Cham: Springer International Publishing. doi:10.1007/978-3-319-54957-6_5.

Ansell, C. 2001. Pragmatism. In *Handbook on Theories of Governance*, 392–401. Edward Elgar Publishing. doi:10.4337/9781782548508.00043.

Ansell, C., and A. Gash. 2008. Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory* 18: 543–571. doi:10.1093/jopart/mum032.

Armitage, D. 2007. Governance and the Commons in a Multi-Level World. *International Journal of the Commons* 2: 7. doi:10.18352/ijc.28.

Armitage, D., R. De Loë, and R. Plummer. 2012a. Environmental governance and its implications for conservation practice. *Conservation Letters* 5: 245–255. doi:10.1111/j.1755-263X.2012.00238.x.

Armitage, D., C. Béné, A. T. Charles, D. Johnson, and E. H. Allison. 2012b. The interplay of well-being and resilience in applying a social- ecological perspective. *Ecology and Society* 17. doi:10.5751/ES-04940-170415.

Armitage, D., P. Mbatha, E. Muhl, W. Rice, and M. Sowman. 2020. Governance principles for community-centered conservation in the post-2020 global biodiversity framework. *Conservation Science and Practice* 2: 1–18. doi:10.1111/csp2.160.

Ayambire, R. A., and J. Pittman. 2021. Adaptive co-management of environmental risks in result-based agreements for the provision of environmental services: A case study of the South of the Divide Conservation Action Program. *Journal of Environmental Management* 295. Elsevier Ltd: 113111. doi:10.1016/j.jenvman.2021.113111.

Ayambire, R. A., J. Pittman, and A. Olive. 2021. Incentivizing stewardship in a biodiversity hot spot: land managers in the grasslands. Edited by Karen Beazley. *FACETS* 6: 1307–1322. doi:10.1139/facets-2020-0071.

Ayambire, R. A., J. Pittman, M. Drescher, J., Moreno-Cruz and A. Olive. Forthcoming. Working Landscapes Approach: A Conceptual Framework.

Baird, J., L. Schultz, R. Plummer, D. Armitage, and Ö. Bodin. 2019. Emergence of Collaborative Environmental Governance: What are the Causal Mechanisms? *Environmental Management* 63. Springer US: 16–31. doi:10.1007/s00267-018-1105-7.

Barry, S., T. K. Schohr, and K. Sweet. 2007. The California rangeland conservation coalition. *Rangelands* 29. Elsevier: 31–34. doi:10.2111/1551-501X(2007)29[31:TCRCC]2.0.CO;2.

Baudron, F., J. Schultner, J. Y. Duriaux, S. E. Gergel, and T. Sunderland. 2019. Agriculturally productive yet biodiverse: human benefits and conservation values along a forest-agriculture gradient in Southern Ethiopia. *Landscape Ecology* 34: 341–356. doi:10.1007/s10980-019-00770-6.

Baumgärtner, S., and M. F. Quaas. 2010. Managing increasing environmental risks through agrobiodiversity and agrienvironmental policies. *Agricultural Economics* 41: 483–496. doi:10.1111/j.1574-0862.2010.00460.x.

Beach, D. 2016. It's all about mechanisms – what process-tracing case studies should be tracing. *New Political Economy* 21. Taylor & Francis: 463–472. doi:10.1080/13563467.2015.1134466.

Beach, D., and R. B. Pedersen. 2019. *Process Tracing Methods: Foundation and Guidelines*.

Ann Arbor, MI: The University of Michigan Press.

Bennett, A., and A. L. George. 1997. Process Tracing in Case Study Research. In *MacArthur Foundation Workshop on Case Study Methods*, 104–105.

Bennett, E. M., W. Cramer, A. Begossi, G. Cundill, S. Díaz, B. N. Egoh, I. R. Geijzendorffer, C. B. Krug, et al. 2015. Linking biodiversity, ecosystem services, and human well-being: three challenges for designing research for sustainability. *Current Opinion in Environmental Sustainability* 14: 76–85. doi:10.1016/j.cosust.2015.03.007.

Bennett, N. J., and T. Satterfield. 2018. Environmental governance: A practical framework to guide design, evaluation, and analysis. *Conservation Letters* 11: 1–13. doi:10.1111/conl.12600.

Bennett, N. J., T. S. Whitty, E. Finkbeiner, J. Pittman, H. Bassett, S. Gelcich, and E. H. Allison. 2018. Environmental Stewardship: A Conceptual Review and Analytical Framework. *Environmental Management* 61. Springer US: 597–614. doi:10.1007/s00267-017-0993-2.

Benneworth, P., and P. Roberts. 2002. Devolution, Sustainability and Local Economic Development: Impacts on Local Autonomy, Policymaking and Economic Development Outcomes. *Local Economy: The Journal of the Local Economy Policy Unit* 17: 239–252. doi:10.1080/02690940210152540.

Berdej, S., and D. Armitage. 2016. Bridging for better conservation fit in indonesia's coastal-marine systems. *Frontiers in Marine Science* 3. doi:10.3389/fmars.2016.00101.

Berdej, S., J. Silver, and D. Armitage. 2019. A Political Ecology Perspective on Bridging Organizations and Their Influence on Marine Conservation. *Society and Natural Resources* 32. Routledge: 1258–1275. doi:10.1080/08941920.2019.1626960.

Bergmann, S. A., and J. C. Bliss. 2004. Foundations of cross-boundary cooperation: Resource management at the public-private interface. *Society and Natural Resources* 17: 377–393. doi:10.1080/08941920490430142.

Berkes, F. 2009. Evolution of co-management: Role of knowledge generation, bridging organizations and social learning. *Journal of Environmental Management* 90. Elsevier Ltd: 1692–1702. doi:10.1016/j.jenvman.2008.12.001.

Berkes, F. 2010. Devolution of environment and resources governance: Trends and future. *Environmental Conservation* 37: 489–500. doi:10.1017/S037689291000072X.

Biénabe, E., and R. R. Hearne. 2006. Public preferences for biodiversity conservation and scenic beauty within a framework of environmental services payments. *Forest Policy and Economics* 9: 335–348. doi:10.1016/j.forpol.2005.10.002.

Biesbroek, G. R., C. J. A. M. Termeer, J. E. M. Klostermann, and P. Kabat. 2014. Rethinking barriers to adaptation: Mechanism-based explanation of impasses in the governance of an innovative adaptation measure. *Global Environmental Change* 26. Elsevier Ltd: 108–118. doi:10.1016/j.gloenvcha.2014.04.004.

Biesbroek, R., J. Dupuis, and A. Wellstead. 2017. Explaining through causal mechanisms: resilience and governance of social–ecological systems. *Current Opinion in Environmental Sustainability* 28. Elsevier B.V.: 64–70. doi:10.1016/j.cosust.2017.08.007.

Bodin, Ö. 2017. Collaborative environmental governance: Achieving collective action in social-ecological systems. *Science* 357. doi:10.1126/science.aan1114.

Bodin, Ö., J. Baird, L. Schultz, R. Plummer, and D. Armitage. 2020. The impacts of trust, cost and risk on collaboration in environmental governance. *People and Nature* 2: 734–749. doi:10.1002/pan3.10097.

Bonsal, B., and M. Regier. 2007. Historical comparison of the 2001/2002 drought in the Canadian Prairies. *Climate Research* 33: 229–242. doi:10.3354/cr033229.

Bonsal, B., Z. Liu, E. Wheaton, and R. Stewart. 2020. Historical and projected changes to the stages and other characteristics of severe canadian prairie droughts. *Water (Switzerland)* 12. doi:10.3390/w12123370.

Boyle, M., J. J. Kay, and B. Pond. 2001. Monitoring in support of policy: an adaptive ecosystem approach. *Encylopedia of Global Environmental Change* 4: 116–137.

Brockington, D., W. M. Adams, B. Agarwal, A. Agrawal, B. Büscher, A. Chhatre, R. Duffy, R. Fletcher, et al. 2018. Working governance for working land. Edited by Jennifer Sills. *Science* 362: 1257–1257. doi:10.1126/science.aav8452.

Brondizio, E. S., E. Ostrom, and O. R. Young. 2009. Connectivity and the governance of multilevel social-ecological systems: The role of social capital. *Annual Review of Environment and Resources* 34: 253–278. doi:10.1146/annurev.environ.020708.100707.

Brook, A., M. Zint, and R. De Young. 2003. Landowners' Responses to an Endangered Species Act Listing and Implications for Encouraging Conservation. *Conservation Biology* 17: 1638–1649. doi:10.1111/j.1523-1739.2003.00258.x.

Brown, L. D. 1991. Bridging Organizations and Sustainable Development. *Human Relations* 44: 807–831. doi:10.1177/001872679104400804.

Brueckner-Irwin, I., D. Armitage, and S. Courtenay. 2019. Applying a social-ecological well-being approach to enhance opportunities for marine protected area governance. *Ecology and Society* 24. doi:10.5751/ES-10995-240307.

Brundtland, G. H. 1987. *Report of the World Commission on Environment and Development: Our Common Future*. Oxford: Oxford University Press. doi:10.1080/07488008808408783.

Bryson, J. M., and B. C. Crosby. 2006. The Design and Implementation of Cross-Sector Collaborations : Propositions from the Literature. *Public Administration Review* 66: 44–55.

Buotte, P. C., B. E. Law, W. J. Ripple, and L. T. Berner. 2020. Carbon sequestration and biodiversity co-benefits of preserving forests in the western United States. *Ecological Applications* 30: 1–11. doi:10.1002/eap.2039.

Burton, R. J. F., and G. Schwarz. 2013. Result-oriented agri-environmental schemes in Europe and their potential for promoting behavioural change. *Land Use Policy*. Elsevier Ltd. doi:10.1016/j.landusepol.2012.05.002.

Busch, P. O., and H. Jörgens. 2005. The international sources of policy convergence: Explaining the spread of environmental policy innovations. *Journal of European Public Policy* 12: 860–884. doi:10.1080/13501760500161514.

Buxton, R. T., J. R. Bennett, A. J. Reid, C. Shulman, S. J. Cooke, C. M. Francis, E. A. Nyboer, G. Pritchard, et al. 2021. Key information needs to move from knowledge to action for biodiversity conservation in Canada. *Biological Conservation* 256. Elsevier Ltd: 108983. doi:10.1016/j.biocon.2021.108983.

Campbell, S. 1996. Green Cities, Growing Cities, Just Cities?: Urban Planning and the Contradictions of Sustainable Development. *Journal of the American Planning Association* 62: 296–312. doi:10.1080/01944369608975696.

Campbell, S. D., and M. Zellner. 2020. Wicked Problems, Foolish Decisions: Promoting Sustainability Through Urban Governance in a Complex World. *Vanderbilt Law Review* 73: 1643–1685.

Canadian Institute of Planners. 2011. *Competency Standards for the Planning Profession in Canada Final Report and Recommendation*.

Cannavò, P. F. 2007. *The working landscape: Founding, Preservation, and the politics of place*. 1st ed. Cambridge and London: MIT Press.

Cash, D. W., W. N. Adger, F. Berkes, P. Garden, L. Lebel, P. Olsson, L. Pritchard, and O. Young. 2006. Scale and Cross-Scale Dynamics: Governance and Information in a Multilevel World. *Ecology and Society* 11. doi:10.5751/es-01759-110208.

Cetas, E., and M. Yasue. 2016. A systematic review of motivational values and conservation success in and around protected areas. *Conservation Biology*. doi:10.1111/cobi.12770.

Chanchani, P., B. R. Noon, L. L. Bailey, and R. A. Warrier. 2016. Conserving tigers in working landscapes. *Conservation Biology* 30: 649–660. doi:10.1111/cobi.12633.

Charnley, S., A. P. Fischer, and E. T. Jones. 2007. Integrating traditional and local ecological knowledge into forest biodiversity conservation in the Pacific Northwest. *Forest Ecology and Management* 246: 14–28. doi:10.1016/j.foreco.2007.03.047.

Charnley, S., T. E. Sheridan, and N. F. Sayre. 2014. Status and Trends of Western Working Landscapes. In *Stitching the West Back Together*, ed. S. Charnley, T. E. Sheridan, and G. P. Nabhan, 13. Chicago: University of Chicago Press. doi:10.7208/chicago/9780226165851.003.0002.

Chazdon, R. L., C. A. Harvey, O. Komar, D. M. Griffith, B. G. Ferguson, M. Martínez-Ramos, H. Morales, R. Nigh, et al. 2009. Beyond reserves: A research agenda for conserving biodiversity in human-modified tropical landscapes. *Biotropica* 41: 142–153. doi:10.1111/j.1744-7429.2008.00471.x.

Ciuzio, E., W. L. Hohman, B. Martin, M. D. Smith, S. Stephens, A. M. Strong, and T. VerCauteren. 2013. Opportunities and challenges to implementing bird conservation on private lands. *Wildlife Society Bulletin* 37: 267–277. doi:10.1002/wsb.266.

Condor, J., and M. Wilson. 2013. The saskatchewan environmental code: A provincial approach for managing GHGs emissions. *Energy Procedia* 37. Elsevier B.V.: 7688–7695. doi:10.1016/j.egypro.2013.06.714.

Connor, J. D., J. R. Ward, and B. Bryan. 2008. Exploring the cost effectiveness of land conservation auctions and payment policies. *Australian Journal of Agricultural and Resource Economics* 52: 303–319. doi:10.1111/j.1467-8489.2007.00417.x.

Cooke, B., W. T. Langford, A. Gordon, and S. Bekessy. 2012. Social context and the role of collaborative policy making for private land conservation. *Journal of Environmental Planning and Management* 55: 469–485. doi:10.1080/09640568.2011.608549.

Cox, M. 2016. The pathology of command and control: a formal synthesis. *Ecology and Society* 21: art33. doi:10.5751/ES-08698-210333.

Cox, M., S. Villamayor-Tomas, G. Epstein, L. Evans, N. C. Ban, F. Fleischman, M. Nenadovic, and G. Garcia-Lopez. 2016. Synthesizing theories of natural resource management and governance. *Global Environmental Change* 39. Elsevier Ltd: 45–56. doi:10.1016/j.gloenvcha.2016.04.011.

Cragun, D., T. Pal, S. T. Vadaparampil, J. Baldwin, H. Hampel, and R. D. DeBate. 2016. Qualitative Comparative Analysis: A Hybrid Method for Identifying Factors Associated With Program Effectiveness. *Journal of Mixed Methods Research* 10: 251–272. doi:10.1177/1558689815572023.

Creswell, J. W. 2009. *Research Design: Qualitative, quantitative, and mixed methods approaches*. 3rd ed. Vol. 8. Los Angeles: Sage Publications Inc. doi:10.2307/1523157.

Crona, B. I., and J. N. Parker. 2012. Learning in support of governance: Theories, methods, and a framework to assess how bridging organizations contribute to adaptive resource governance. *Ecology and Society* 17. doi:10.5751/ES-04534-170132.

Daniels, T. 2000. Integrated Working Landscape Protection: The Case of Lancaster County,

Pennsylvania. *Society & Natural Resources* 13: 261–271. doi:10.1080/089419200279090.

Daniels, T. L. 1997. Where does cluster zoning fit in farmland protection? *Journal of the American Planning Association* 63: 129–137. doi:10.1080/01944369708975730.

Dawson, N. M., K. Grogan, A. Martin, O. Mertz, M. Pasgaard, and L. V. Rasmussen. 2017. Environmental justice research shows the importance of social feedbacks in ecosystem service trade-offs. *Ecology and Society* 22. doi:10.5751/ES-09481-220312.

DeCaro, D. A., and M. K. Stokes. 2013. Public participation and institutional fit: A social-psychological perspective. *Ecology and Society* 18. doi:10.5751/ES-05837-180440.

DeClerck, F. A. J., R. Chazdon, K. D. Holl, J. C. Milder, B. Finegan, A. Martinez-Salinas, P. Imbach, L. Canet, et al. 2010. Biodiversity conservation in human-modified landscapes of Mesoamerica: Past, present and future. *Biological Conservation* 143. Elsevier Ltd: 2301–2313. doi:10.1016/j.biocon.2010.03.026.

Dedeurwaerdere, T., A. Polard, and P. Melindi-Ghidi. 2015. The role of network bridging organisations in compensation payments for agri-environmental services under the EU Common Agricultural Policy. *Ecological Economics* 119. Elsevier B.V.: 24–38. doi:10.1016/j.ecolecon.2015.07.025.

DeFries, R., A. Hansen, B. L. Turner, R. Reid, and J. Liu. 2007. Land use change around protected areas: Management to balance human needs and ecological function. *Ecological Applications* 17: 1031–1038. doi:10.1890/05-1111.

Derissen, S., and M. F. Quaas. 2013. Combining performance-based and action-based payments to provide environmental goods under uncertainty. *Ecological Economics* 85. Elsevier B.V.: 77–84. doi:10.1016/j.ecolecon.2012.11.001.

Drescher, M., and J. C. Brenner. 2018. The practice and promise of private land conservation. *Ecology and Society* 23: art3. doi:10.5751/ES-10020-230203.

Drescher, M., G. K. Warriner, J. R. Farmer, and B. M. H. Larson. 2017. Private landowners and environmental conservation: a case study of social-psychological determinants of conservation program participation in Ontario. *Ecology and Society* 22: art44. doi:10.5751/ES-09118-220144.

Driessen, P. P. J., C. Dieperink, F. van Laerhoven, H. A. C. Runhaar, and W. J. V. Vermeulen. 2012. Towards a Conceptual Framework for The Study of Shifts in Modes of Environmental Governance - Experiences From The Netherlands. *Environmental Policy and Governance* 22: 143–160. doi:10.1002/eet.1580.

Eastburn, D. J., A. T. O'Geen, K. W. Tate, and L. M. Roche. 2017. Multiple ecosystem services in a working landscape. *PLoS ONE* 12: 11–13. doi:10.1371/journal.pone.0166595.

Ellis, B. E. C. 2019. Sharing the land between nature and people: Conserving the planet's ecological heritage requires a new level of societal engagement. *Conservation and Society* 364: 1226–1228.

Engel, S., S. Pagiola, and S. Wunder. 2008. Designing payments for environmental services in theory and practice: An overview of the issues. *Ecological Economics* 65: 663–674. doi:10.1016/j.ecolecon.2008.03.011.

Environment and Climate Change Canada. 2016. *Action Plan for Multiple Species at Risk in Southwestern Saskatchewan: South of the Divide [Proposed]*. *Species at Risk Act Action Plan Series*.

Environment and Climate Change Canada. 2018. Pan-Canadian Approach to Transforming Species at Risk Conservation in Canada. Gatineau.

Environment Canada. 2013. *Amended Recovery Strategy for the Greater Sage-Grouse (Centrocercus urophasianus urophasianus) in Canada*. vi + 49 pp. Species at Risk Act Recovery Strategy Series. Ottawa.

Epstein, G., J. Pittman, S. M. Alexander, S. Berdej, T. Dyck, U. Kreitmair, K. J. Rathwell, S. Villamayor-Tomas, et al. 2015. Institutional fit and the sustainability of social–ecological systems. *Current Opinion in Environmental Sustainability* 14. Elsevier B.V.: 34–40. doi:10.1016/j.cosust.2015.03.005.

Estrada-Carmona, N., A. K. Hart, F. A. J. DeClerck, C. A. Harvey, and J. C. Milder. 2014. Integrated landscape management for agriculture, rural livelihoods, and ecosystem conservation: An assessment of experience from Latin America and the Caribbean. *Landscape and Urban Planning* 129. Elsevier B.V.: 1–11.

doi:10.1016/j.landurbplan.2014.05.001.

Evans, B., and A. Wellstead. 2013. Policy dialogue and engagement between non-governmental organizations and government: A survey of processes and instruments of canadian policy workers. *Central European Journal of Public Policy* 7: 60–87. doi:10.3138/9781442668034-016.

Farley, K. A., K. C. Walsh, and A. S. Levine. 2017. Opportunities and obstacles for rangeland conservation in San Diego county, California, USA. *Ecology and Society* 22. doi:10.5751/ES-09077-220138.

Feilzer, M. Y. 2010. Doing mixed methods research pragmatically: Implications for the rediscovery of pragmatism as a research paradigm. *Journal of Mixed Methods Research* 4: 6–16. doi:10.1177/1558689809349691.

Fernández-Giménez, M. E., B. Batkhishig, B. Batbuyan, and T. Ulambayar. 2015. Lessons from the Dzud: Community-Based Rangeland Management Increases the Adaptive Capacity of Mongolian Herders to Winter Disasters. *World Development* 68: 48–65. doi:10.1016/j.worlddev.2014.11.015.

Ferranto, S., L. Huntsinger, C. Getz, M. Lahiff, W. Stewart, G. Nakamura, and M. Kelly. 2013. Management Without Borders? A Survey of Landowner Practices and Attitudes toward Cross-Boundary Cooperation. *Society and Natural Resources* 26: 1082–1100. doi:10.1080/08941920.2013.779343.

Ferranto, S., L. Huntsinger, and M. Kelly. 2014. Sustaining Ecosystem Services From Private Lands in California: The Role of the Landowner. *Rangelands* 36. Elsevier Masson SAS: 44–51. doi:10.2111/RANGELANDS-D-14-00023.1.

Ferraro, P. J. 2008. Asymmetric information and contract design for payments for environmental services. *Ecological Economics* 65: 810–821. doi:10.1016/j.ecolecon.2007.07.029.

Ferraro, P. J., and S. K. Pattanayak. 2006. Money for Nothing? A Call for Empirical Evaluation of Biodiversity Conservation Investments. *PLoS Biology* 4: e105. doi:10.1371/journal.pbio.0040105.

Filbee-Dexter, K., C. C. Symons, K. Jones, H. A. Haig, J. Pittman, S. M. Alexander, and M. J.

Burke. 2018. Quantifying ecological and social drivers of ecological surprise. *Journal of Applied Ecology* 55: 2135–2146. doi:10.1111/1365-2664.13171.

Fischer, F. 2012. *Participatory Governance: From Theory To Practice*. *The Oxford Handbook of Governance*. Oxford University Press. doi:10.1093/oxfordhb/9780199560530.013.0032.

Fischer, F., and J. Forester. 1993. *The Argumentative Turn in Policy Analysis and Planning*. Edited by Frank Fischer and John Forester. London: Duke University Press.

Folke, C., T. Hahn, P. Olsson, and J. Norberg. 2005. Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources* 30: 441–473. doi:10.1146/annurev.energy.30.050504.144511.

Forester, J. 2008. Are collaboration and participation more trouble than they're worth? *Planning Theory and Practice* 9: 299–304. doi:10.1080/14649350802277035.

Forester, J. 2013. On the theory and practice of critical pragmatism: Deliberative practice and creative negotiations. *Planning Theory* 12: 5–22. doi:10.1177/1473095212448750.

Forester, J. 2016. Cultivating surprise and the art of the possible. In *Readings in Planning Theory*, ed. S. S. Fainstein and J. Defilippis, 4th ed., 383–382. John Wiley & Sons, Ltd.

France, R. L., and J. B. Campbell. 2015. Payment for agro-ecosystem services: Developmental case-history descriptions of Canada's Grassroots "ALUS" Programs. *Research Journal of Agriculture and Environmental Management* 4: 405–431.

Frank, K. I., and M. Hibbard. 2016. Production, consumption, and protection: perspectives from North America on the multifunctional transition in rural planning. *International Planning Studies* 21. Taylor & Francis: 245–260. doi:10.1080/13563475.2016.1188685.

Frank, K. I., and M. Hibbard. 2017. Rural Planning in the Twenty-First Century: Context-Appropriate Practices in a Connected World. *Journal of Planning Education and Research* 37: 299–308. doi:10.1177/0739456X16655599.

Frank, K. I., and S. A. Reiss. 2014. The Rural Planning Perspective at an Opportune Time. *Journal of Planning Literature* 29: 386–402. doi:10.1177/0885412214542050.

Freestone, R. 2012. Futures Thinking in Planning Education and Research. *Journal for*

Education in the Built Environment 7: 8–38. doi:10.11120/jebe.2012.07010008.

Frei, B., C. Queiroz, B. Chaplin-Kramer, E. Andersson, D. Renard, J. M. Rhemtulla, and E. M. Bennett. 2020. A brighter future: Complementary goals of diversity and multifunctionality to build resilient agricultural landscapes. *Global Food Security* 26. Elsevier B.V.: 100407. doi:10.1016/j.gfs.2020.100407.

Frey, B. B. 2018. The SAGE Encyclopedia of Educational Research, Measurement, and Evaluation. *The SAGE Encyclopedia of Educational Research, Measurement, and Evaluation*. doi:10.4135/9781506326139.

Gallent, N., and M. Gkartzios. 2019. Defining rurality and the scope of rural planning. In *The Routledge Companion to Rural Planning*, 13–16. doi:10.4324/9781315102375.

Gaventa, J. 2002. Towards Participatory Local Governance: Six Propositions for Discussion. *Currents* 29: 29–35.

Gay, B., and S. Weaver. 2011. Theory building and paradigms: A primer on the nuances of theory construction. *American International Journal of Contemporary Research* 1: 24–32.

George, A. L., and A. Bennett. 2005. *Case Studies and Theory Development in the Social Sciences*. London: MIT Press.

Gibbons, J. M., E. Nicholson, E. J. Milner-Gulland, and J. P. G. Jones. 2011. Should payments for biodiversity conservation be based on action or results? *Journal of Applied Ecology* 48: 1218–1226. doi:10.1111/j.1365-2664.2011.02022.x.

Gibson, C. C., E. Ostrom, and T. K. Ahn. 2000. The concept of scale and the human dimensions of global change: A survey. *Ecological Economics* 32: 217–239. doi:10.1016/S0921-8009(99)00092-0.

Gigliotti, L. M., and L. A. Sweikert. 2019. Wildlife value orientation of landowners from five states in the upper midwest, USA. *Human Dimensions of Wildlife* 24. Routledge: 433–445. doi:10.1080/10871209.2019.1632991.

Glückler, J., and R. Lenz. 2018. Drift and Morphosis in Institutional Change: Evidence from the‘Walz’ and Public Tendering in Germany. In *Knowledge and Institutions*, ed. J.

Glückler, R. Suddaby, and R. Lenz, 111–134. Springer Open.

Gooden, J., and R. Grenyer. 2019. The psychological appeal of owning private land for conservation. *Conservation Biology* 33: 339–350. doi:10.1111/cobi.13215.

Goverment of Saskatchewan. 2014. Changing How We Do Business: An Introduction to Results-based Regulations and The Saskatchewan Environmental Code. Regina: Saskatchewan Ministry of Environment.

Graham, S. 2014. A new perspective on the trust power nexus from rural Australia. *Journal of Rural Studies* 36. Elsevier Ltd: 87–98. doi:10.1016/j.jrurstud.2014.06.010.

Gripne, S. L. 2005. Grassbanks: Bartering for Conservation. *Rangelands* 27: 24–28. doi:10.2458/azu_rangelands_v27i1_gripne.

Hamm, J. A. 2017. Trust, Trustworthiness, and Motivation in the Natural Resource Management Context. *Society & Natural Resources* 30. Taylor & Francis: 919–933. doi:10.1080/08941920.2016.1273419.

Hamm, J. A., L. Hoffman, A. J. Tomkins, and B. H. Bornstein. 2016. On the influence of trust in predicting rural land owner cooperation with natural resource management institutions. *Journal of Trust Research*. doi:10.1080/21515581.2015.1108202.

Hanley, N., S. Banerjee, G. D. Lennox, and P. R. Armsworth. 2012. How should we incentivize private landowners to "produce" more biodiversity? *Oxford Review of Economic Policy* 28: 93–113. doi:10.1093/oxrep/grs002.

Hansen, A. J., and R. DeFries. 2007. Ecological mechanisms linking protected areas to surrounding lands. *Ecological Applications* 17: 974–988. doi:10.1890/05-1098.

Harrison, J., and J. Heley. 2015. Governing beyond the metropolis: Placing the rural in city-region development. *Urban Studies* 52: 1113–1133. doi:10.1177/0042098014532853.

Hasselman, L. 2017. Adaptive management; adaptive co-management; adaptive governance: what's the difference? *Australasian Journal of Environmental Management* 24. Taylor & Francis: 31–46. doi:10.1080/14486563.2016.1251857.

Hasund, K. P. 2013. Indicator-based agri-environmental payments: A payment-by-result model

for public goods with a Swedish application. *Land Use Policy* 30. Elsevier Ltd: 223–233. doi:10.1016/j.landusepol.2012.03.011.

Healey, P. 2009. The pragmatic tradition in planning thought. *Journal of Planning Education and Research* 28: 277–292. doi:10.1177/0739456X08325175.

Healey, P. 2016. The Planning Project. In *Readings in Planning Theory*, ed. S. S. Fainstein and J. Defilippis, 4th ed., 139–155. John Wiley & Sons, Ltd.

Hedström, P., and P. Ylikoski. 2010. Causal mechanisms in the social sciences. *Annual Review of Sociology* 36: 49–67. doi:10.1146/annurev.soc.012809.102632.

Hellerstein, D., N. Higgins, and M. Roberts. 2015. Options for improving conservation programs: Insights from auction theory and economic experiments.

Henderson, A. E., M. Reed, and S. K. Davis. 2014. Voluntary Stewardship and the Canadian Species at Risk Act: Exploring Rancher Willingness to Support Species at Risk in the Canadian Prairies. *Human Dimensions of Wildlife* 19: 17–32. doi:10.1080/10871209.2013.819595.

Henle, K., D. Alard, J. Clitherow, P. Cobb, L. Firbank, T. Kull, D. McCracken, R. F. A. Moritz, et al. 2008. Identifying and managing the conflicts between agriculture and biodiversity conservation in Europe–A review. *Agriculture, Ecosystems and Environment* 124: 60–71. doi:10.1016/j.agee.2007.09.005.

Hermoso, V., A. Morán-Ordóñez, S. Canessa, and L. Brotons. 2019a. Four ideas to boost EU conservation policy as 2020 nears. *Environmental Research Letters* 14. IOP Publishing: 101001. doi:10.1088/1748-9326/ab48cc.

Hermoso, V., A. Morán-Ordóñez, S. Canessa, and L. Brotons. 2019b. Realising the potential of Natura 2000 to achieve EU conservation goals as 2020 approaches. *Scientific Reports* 9: 1–10. doi:10.1038/s41598-019-52625-4.

Hernes, G. 2005. Inhabitants of two worlds. In *Social mechanisms: An analytical approach to social theory*, ed. P. Hedstrom and R. Swedberg. New York: Cambridge University Press.

Hibbard, M., and K. I. Frank. 2019. Notes for a Substantive Theory of Rural Planning: Evidence

from the US Experience. *Planning Theory and Practice* 20. Routledge: 339–357. doi:10.1080/14649357.2019.1627572.

Hibbard, M., L. Senkyr, and M. Webb. 2015. Multifunctional Rural Regional Development: Evidence from the John Day Watershed in Oregon. *Journal of Planning Education and Research* 35: 51–62. doi:10.1177/0739456X14560572.

Holling, C. S., and G. K. Meffe. 1996. Command and control and the pathology of natural resource management. *Conservation Biology* 10: 328–337. doi:10.1046/j.1523-1739.1996.10020328.x.

Holmes, J. 2012. Cape York Peninsula, Australia: A frontier region undergoing a multifunctional transition with indigenous engagement. *Journal of Rural Studies*. doi:10.1016/j.jrurstud.2012.01.004.

Hossu, C. A., I. C. Ioja, L. E. Susskind, D. L. Badiu, and A. M. Hersperger. 2018. Factors driving collaboration in natural resource conflict management: Evidence from Romania. *Ambio*. doi:10.1007/s13280-018-1016-0.

Huntsinger, L., and N. F. Sayre. 2007. Introduction: The working landscapes special issue. *Rangelands* 29: 3–4. doi:10.2111/1551-501X(2007)29[3:ITWLSI]2.0.CO;2.

HYSING, E. 2009. From Government to Governance? A Comparison of Environmental Governing in Swedish Forestry and Transport. *Governance* 22: 647–672. doi:10.1111/j.1468-0491.2009.01457.x.

Ingram, S. 2018. Policy development to support ecosystem services on pasture systems in Saskatchewan. University of Saskatchewan.

Innes, R., and G. Frisvold. 2009. The Economics of Endangered Species. *Annual Review of Resource Economics* 1: 485–512. doi:10.1146/annurev.resource.050708.144207.

Johnston, J. S. 2009. *Deweyan inquiry : from education theory to practice*. Albany: State University of New York Press, Albany.

Jones, K. R., O. Venter, R. A. Fuller, J. R. Allan, S. L. Maxwell, P. J. Negret, and J. E. M. Watson. 2018. One-third of global protected land is under intense human pressure. *Science*

360: 788–791. doi:10.1126/science.aap9565.

Kaimowtz, D. 2008. The prospects for Reduced Emissions from Deforestation and Degradation (REDD) in Mesoamerica. *International Forestry Review* 10: 485–495. doi:10.1505/ifor.10.3.485.

Kaushik, V., and C. A. Walsh. 2019. Pragmatism as a research paradigm and its implications for Social Work research. *Social Sciences* 8. doi:10.3390/socsci8090255.

Kitt, S., J. Axsen, Z. Long, and E. Rhodes. 2021. The role of trust in citizen acceptance of climate policy: Comparing perceptions of government competence, integrity and value similarity. *Ecological Economics* 183. Elsevier B.V.: 106958. doi:10.1016/j.ecolecon.2021.106958.

Kral, K. C., R. F. Limb, T. J. Hovick, D. A. McGranahan, A. L. Field, and P. L. O'Brien. 2015. Simulating grassland prescribed fires using experimental approaches. *Fire Ecology* 11: 34–44. doi:10.4996/fireecology.1103034.

Kremen, C., and A. M. Merenlender. 2018. Landscapes that work for biodiversity and people. *Science* 362. doi:10.1126/science.aau6020.

Law, E. A., N. J. Bennett, C. D. Ives, R. Friedman, K. J. Davis, C. Archibald, and K. A. Wilson. 2018. Equity trade-offs in conservation decision making. *Conservation Biology* 32: 294–303. doi:10.1111/cobi.13008.

Lawless, S., A. M. Song, P. J. Cohen, and T. H. Morrison. 2020. Rights, equity and justice: A diagnostic for social meta-norm diffusion in environmental governance. *Earth System Governance* 6. Elsevier Ltd: 100052. doi:10.1016/j.esg.2020.100052.

Lawrence, T. B., and R. Suddaby. 2006. Institutions and institutional work. In *The SAGE Handbook of Organization Studies*, ed. S. R. Clegg, C. Hardy, T. B. Lawrence, and W. R. Nord, 2nd ed., 215–254. London: SAGE Publications Ltd. doi:10.4135/9781848608030.n7.

Lemos, M. C., and A. Agrawal. 2006. Environmental governance. *Annual Review of Environment and Resources* 31: 297–325. doi:10.1146/annurev.energy.31.042605.135621.

Lindblom, C. 1959. The Science of "Muddling Through." *Public Administration Review* 19.

Routledge: 79–88. doi:10.4324/9781351179522-4.

Loch-Temzelides, T. 2021. Conservation, risk aversion, and livestock insurance: The case of the snow leopard. *Conservation Letters*: 1–10. doi:10.1111/conl.12793.

Lockwood, M. 2010. Good governance for terrestrial protected areas: A framework, principles and performance outcomes. *Journal of Environmental Management* 91. Elsevier Ltd: 754–766. doi:10.1016/j.jenvman.2009.10.005.

Lockwood, M., J. Davidson, A. Curtis, E. Stratford, and R. Griffith. 2009. Multi-level Environmental Governance: Lessons from Australian natural resource management. *Australian Geographer* 40: 169–186. doi:10.1080/00049180902964926.

Lockwood, M., J. Davidson, A. Curtis, E. Stratford, and R. Griffith. 2010. Governance principles for natural resource management. *Society and Natural Resources* 23: 986–1001. doi:10.1080/08941920802178214.

Loisel, P., and B. Elyakime. 2006. Incentive contract and weather risk. *Environmental and Resource Economics* 35: 99–108. doi:10.1007/s10640-006-9009-z.

Long, H., J. Liu, C. Tu, and Y. Fu. 2018. From State-controlled to Polycentric Governance in Forest Landscape Restoration: The Case of the Ecological Forest Purchase Program in Yong'an Municipality of China. *Environmental Management* 62: 58–69. doi:10.1007/s00267-017-0972-7.

Ludwig, D. 2001. The era of management is over. *Ecosystems* 4: 758–764. doi:10.1007/s10021-001-0044-x.

Mackenzie, N., and S. Knipe. 2006. Research Paradigms, Methods and Methodology. *Issues in Educational Research* 16: 213–231.

Mahoney, J. 2001. Beyond Correlational Analysis: Recent Innovations in Theory and Method. *Sociological Forum* 16: 575–593.

Martin, A., A. Akol, and N. Gross-Camp. 2015. Towards an Explicit Justice Framing of the Social Impacts of Conservation. *Conservation and Society* 13: 166–178. doi:10.4103/0972-4923.164200.

Martin, A., B. Coolsaet, E. Corbera, N. M. Dawson, J. A. Fraser, I. Lehman, and I. Rodriguez. 2016. Justice and conservation: The need to incorporate recognition. *Biological Conservation* 197. Elsevier Ltd: 254–261. doi:10.1016/j.biocon.2016.03.021.

Martinet, V., and F. Barraquand. 2012. Trade-offs between food production and biodiversity conservation: some economic aspects. *INRA, UMR210 Economie Publique* 5357: 28p.

Matzdorf, B., and J. Lorenz. 2010. How cost-effective are result-oriented agri-environmental measures?-An empirical analysis in Germany. *Land Use Policy* 27: 535–544. doi:10.1016/j.landusepol.2009.07.011.

McAdam, D., S. Tarrow, and C. Tilly. 2008. Methods for measuring mechanisms of contention. *Qualitative Sociology* 31: 307–331. doi:10.1007/s11133-008-9100-6.

McCarthy, J. 2005. Rural geography: Multifunctional rural geographies - Reactionary or radical? *Progress in Human Geography* 29: 773–782. doi:10.1191/0309132505ph584pr.

McCune, J. L., A. M. Carlsson, S. Colla, C. Davy, B. Favaro, A. T. Ford, K. C. Fraser, and E. G. Martins. 2017. Assessing public commitment to endangered species protection: A Canadian case study. *FACETS* 2: 178–194. doi:10.1139/facets-2016-0054.

McGee, G., A. Cullen, and T. Gunton. 2010. A new model for sustainable development: A case study of The Great Bear Rainforest regional plan. *Environment, Development and Sustainability* 12: 745–762. doi:10.1007/s10668-009-9222-3.

McGinnis, M. D., and E. Ostrom. 2014. Social-ecological system framework: Initial changes and continuing challenges. *Ecology and Society* 19. doi:10.5751/ES-06387-190230.

McGranahan, D. A. 2008. Managing private, commercial rangelands for agricultural production and wildlife diversity in Namibia and Zambia. *Biodiversity and Conservation* 17: 1965–1977. doi:10.1007/s10531-008-9339-y.

Meek, C. L. 2013. Forms of collaboration and social fit in wildlife management: A comparison of policy networks in Alaska. *Global Environmental Change* 23. Elsevier Ltd: 217–228. doi:10.1016/j.gloenvcha.2012.10.003.

Meine, C., and G. P. Nabhan. 2015. Historic Precedents to Collaborative Conservation in

Working Landscapes. In *Stitching the West Back Together*, 77–80. University of Chicago Press. doi:10.7208/chicago/9780226165851.003.0005.

Ménard, C. 2011. A new institutional economics perspective on environmental issues. *Environmental Innovation and Societal Transitions* 1: 115–120. doi:10.1016/j.eist.2011.04.002.

Michael, J. A. 2000. The endangered species act and private landowner incentives. *Human Conflicts with Wildlife: Economic Considerations* 3.

Michel, L. 2011. Combining Focus Groups and Interviews: Telling How It Is; Telling How It Feels. *Developing Focus Group Research*: 36–46. doi:10.4135/9781849208857.n3.

Miller, K., E. Chang, and N. Johnson. 2001. Defining common ground for the Mesoamerican Biological Corridor. Washington DC, USA.

Mitchell, M. G. E., E. M. Bennett, and A. Gonzalez. 2013. Linking Landscape Connectivity and Ecosystem Service Provision: Current Knowledge and Research Gaps. *Ecosystems* 16: 894–908. doi:10.1007/s10021-013-9647-2.

Moos, M. 2017. The velocity of density: Can we build more sustainable cities fast enough? *Sustainability (Switzerland)* 9. doi:10.3390/su9122326.

Moos, M. 2020. Locally , Planning Explains Two-Thirds of Demography. *Y magazine*.

Morgan, D. L. 2014. Pragmatism as a Paradigm for Social Research. *Qualitative Inquiry* 20: 1045–1053. doi:10.1177/1077800413513733.

Morse, C. E. 2010. *Strategies for Promoting Working Landscapes in North America and Europe Strategies for Promoting Working Landscapes in North America and Europe Table of Contents*.

MRWCC, M. R. W. C. C. 2013. *Milk River Transboundary State of the Watershed Report*. *Compiled by Palliser Environmental Services Ltd. and prepared for Mil River Watershed Council of Canada (Alberta) in collaboration with the Milk River Watershed Alliance (Montana).* 2nd ed.

Muradian, R. 2013. Payments for Ecosystem Services as Incentives for Collective Action.

Society and Natural Resources 26: 1155–1169. doi:10.1080/08941920.2013.820816.

Muradian, R., and L. Rival. 2012. Between markets and hierarchies: The challenge of governing ecosystem services. *Ecosystem Services* 1. Elsevier: 93–100. doi:10.1016/j.ecoser.2012.07.009.

Murray, B. C., B. Sohngen, and M. T. Ross. 2007. Economic consequences of consideration of permanence, leakage and additionality for soil carbon sequestration projects. *Climatic Change* 80: 127–143. doi:10.1007/s10584-006-9169-4.

Naidoo, R., A. Balmford, P. J. Ferraro, S. Polasky, T. H. Ricketts, and M. Rouget. 2006. Integrating economic costs into conservation planning. *Trends in Ecology and Evolution* 21: 681–687. doi:10.1016/j.tree.2006.10.003.

Namugumya, B. S., J. J. L. Candel, E. F. Talsma, and C. J. A. M. Termeer. 2020. A mechanisms-based explanation of nutrition policy (dis)integration processes in Uganda. *Food Policy* 92. Elsevier: 101878. doi:10.1016/j.foodpol.2020.101878.

Nature United. 2019. *Impact report 2019*.

Naugle, D. E., B. W. Allred, M. O. Jones, D. Twidwell, and J. D. Maestas. 2020. Coproducing Science to Inform Working Lands: The Next Frontier in Nature Conservation. *BioScience* 70: 90–96. doi:10.1093/biosci/biz144.

Van Noordwijk, M., B. Leimona, R. Jindal, G. B. Villamor, M. Vardhan, S. Namirembe, D. Catacutan, J. Kerr, et al. 2012. Payments for environmental services: Evolution toward efficient and fair incentives for multifunctional landscapes. *Annual Review of Environment and Resources* 37: 389–420. doi:10.1146/annurev-environ-042511-150526.

OECD. 2007. Glossary of Statistical Terms. OECD.

Olive, A. 2015. Urban and Rural Attitudes Toward Endangered Species Conservation in the Canadian Prairies: Drawing Lessons From the American ESA. *Human Dimensions of Wildlife* 20. Routledge: 189–205. doi:10.1080/10871209.2015.1004207.

Olive, A. 2016. It is just not fair: The endangered species act in the United States and Ontario. *Ecology and Society* 21: art13. doi:10.5751/ES-08627-210313.

Olive, A., and J. L. McCune. 2017. Wonder, ignorance, and resistance: Landowners and the stewardship of endangered species. *Journal of Rural Studies* 49. Elsevier Ltd: 13–22. doi:10.1016/j.jrurstud.2016.11.014.

Olive, A., and A. Rabe. 2016. Indigenous Environmental Justice: Comparing the United States and Canada's Legal Frameworks for Endangered Species Conservation. *American Review of Canadian Studies* 46. Routledge: 496–512. doi:10.1080/02722011.2016.1255654.

Olson, M. 1965. *The Logic of Collective Action: Public Goods and the Theory of Groups*. *Sociology*. Vol. 1. Cambridge and London: Harvard University Press.

Osbeck, M., G. Schwarz, and Z. Morkvenas. 2013. Dialogue on ecosystem services , payments and outcome based approaches: background brief: 1–16.

Ostrom, E. 2014. Collective action and the evolution of social norms. *Journal of Natural Resources Policy Research* 6: 235–252. doi:10.1080/19390459.2014.935173.

Ostrom, E., and X. Basurto. 2011. Crafting analytical tools to study institutional change. *Journal of Institutional Economics* 7: 317–343. doi:10.1017/S1744137410000305.

Ouellet, F., P. Mundler, J. Dupras, and J. Ruiz. 2020. "Community developed and farmer delivered." An analysis of the spatial and relational proximities of the Alternative Land Use Services program in Ontario. *Land Use Policy* 95. Elsevier: 104629. doi:10.1016/j.landusepol.2020.104629.

Paavola, J. 2007. Institutions and environmental governance: A reconceptualization. *Ecological Economics* 63: 93–103. doi:10.1016/j.ecolecon.2006.09.026.

Paavola, J. 2016. Multi-Level Environmental Governance: Exploring the economic explanations. *Environmental Policy and Governance* 26: 143–154. doi:10.1002/eet.1698.

Pahl-Wostl, C. 2009. A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. *Global Environmental Change* 19: 354–365. doi:10.1016/j.gloenvcha.2009.06.001.

Pahl-Wostl, C., D. Tàbara, R. Bouwen, M. Craps, A. Dewulf, E. Mostert, D. Ridder, and T. Taillieu. 2008. The importance of social learning and culture for sustainable water

management. *Ecological Economics* 64: 484–495. doi:10.1016/j.ecolecon.2007.08.007.

Palomo, I., C. Montes, B. Martín-López, J. A. González, M. García-Llorente, P. Alcorlo, and M. R. G. Mora. 2014. Incorporating the social-ecological approach in protected areas in the anthropocene. *BioScience* 64: 181–191. doi:10.1093/biosci/bit033.

Parkhurst, G. M., J. F. Shogren, C. Bastian, P. Kivi, J. Donner, and R. B. W. Smith. 2002. Agglomeration bonus: An incentive mechanism to reunite fragmented habitat for biodiversity conservation. *Ecological Economics* 41: 305–328. doi:10.1016/S0921-8009(02)00036-8.

Parrott, L., C. Kyle, V. Hayot-Sasson, C. Bouchard, and J. A. Cardille. 2019. Planning for ecological connectivity across scales of governance in a multifunctional regional landscape. *Ecosystems and People* 15. Taylor & Francis: 204–213. doi:10.1080/26395916.2019.1649726.

Partelow, S., A. Schlüter, D. Armitage, M. Bavinck, K. Carlisle, R. L. Gruby, A. K. Hornidge, M. Le Tissier, et al. 2020. Environmental governance theories: A review and application to coastal systems. *Ecology and Society* 25: 1–21. doi:10.5751/ES-12067-250419.

Pascual, U., J. Phelps, E. Garmendia, K. Brown, E. Corbera, A. Martin, E. Gomez-Baggethun, and R. Muradian. 2014. Social equity matters in payments for ecosystem services. *BioScience*. doi:10.1093/biosci/biu146.

Pates, N. J., and N. P. Hendricks. 2020. Additionality from Payments for Environmental Services with Technology Diffusion. *American Journal of Agricultural Economics* 102: 281–299. doi:10.1093/ajae/aaz028.

Patterson, J. J., and R. Beunen. 2019. Institutional work in environmental governance. *Journal of Environmental Planning and Management* 62. Routledge: 1–11. doi:10.1080/09640568.2018.1538328.

Pierre, J. 1999. Models of urban governance: The institutional dimension of urban politics. *Urban Affairs Review* 34: 372–396. doi:10.1177/10780879922183988.

Pittman, J. 2016. Governance across the land-sea interface. University of Waterloo.

Pittman, J. 2019. The struggle for local autonomy in biodiversity conservation governance. *Journal of Environmental Planning and Management* 62. Routledge: 172–188. doi:10.1080/09640568.2018.1511416.

Pittman, J., and D. Armitage. 2016. Governance across the land-sea interface: A systematic review. *Environmental Science and Policy* 64. Elsevier Ltd: 9–17. doi:10.1016/j.envsci.2016.05.022.

Pittman, J., and R. Ayambire. 2020. *Interim Report : Ranchers ' Perceptions of the Costs Associated with Conservation*. Regina.

Pittman, J., D. Armitage, S. Alexander, D. Campbell, and M. Alleyne. 2015. Governance fit for climate change in a Caribbean coastal-marine context. *Marine Policy* 51. Elsevier: 486–498. doi:10.1016/j.marpol.2014.08.009.

Plummer, R., and J. Fitzgibbon. 2004. Co-management of natural resources. A proposed framework. *Environmental Management* 33: 876–885. doi:10.1007/s00267-003-3038-y.

Plummer, R., B. Crona, D. R. Armitage, P. Olsson, M. Tengö, and O. Yudina. 2012. Adaptive comanagement: A systematic review and analysis. *Ecology and Society* 17. doi:10.5751/ES-04952-170311.

Plummer, R., D. R. Armitage, and R. C. de Loë. 2013. Adaptive Comanagement and Its Relationship to Environmental Governance. *Ecology and Society* 18: art21. doi:10.5751/ES-05383-180121.

Polasky, S., E. Nelson, E. Lonsdorf, P. Fackler, A. Starfield, S. E. Applications, and N. Aug. 2005. Conserving Species in a Working Landscape : Land Use with Biological and Economic Objectives. *Ecological Applications* 15: 1387–1401.

Polhill, J. G., A. Gimona, and N. M. Gotts. 2013. Nonlinearities in biodiversity incentive schemes: A study using an integrated agent-based and metacommunity model. *Environmental Modelling and Software* 45. Elsevier Ltd: 74–91. doi:10.1016/j.envsoft.2012.11.011.

Potoski, M., and A. Prakash. 2013. Green clubs: Collective action and voluntary environmental programs. *Annual Review of Political Science* 16: 399–419. doi:10.1146/annurev-polisci-

032211-211224.

Rathwell, K. J., D. Armitage, and F. Berkes. 2015. Bridging knowledge systems to enhance governance of the environmental commons: A typology of settings. *International Journal of the Commons* 9: 851–880. doi:10.18352/ijc.584.

Raymond, L. 2006. Cooperation without Trust : Overcoming Collective. *Policy Studies* 34: 37–57.

Reed, M. G., A. E. Henderson, and S. Mendis-Millard. 2013. Shaping Local Context and Outcomes: The Role of Governing Agencies in Collaborative Natural Resource Management. *Human Dimensions of Wildlife* 18: 292–306. doi:10.1080/10871209.2013.801003.

Reed, M. S. 2008. Stakeholder participation for environmental management: A literature review. *Biological Conservation* 141: 2417–2431. doi:10.1016/j.biocon.2008.07.014.

Rees, W. E. 2010. Getting Serious about Urban Sustainability: Eco-Footprints and the Vulnerability of 21st Century Cities. In *Canadian Cities in Transition: New Directions in the Twenty-First Century*, ed. P. Filion, M. Moos, T. Vinodrai, and R. Walker, 5th ed., 51–66. Don Mills: Oxford Univetsity Press.

Reese, G., and L. Jacob. 2015. Principles of environmental justice and pro-environmental action: A two-step process model of moral anger and responsibility to act. *Environmental Science and Policy* 51. Elsevier Ltd: 88–94. doi:10.1016/j.envsci.2015.03.011.

Reiter, D., L. Parrott, and J. Pittman. 2021. Species at risk habitat conservation on private land: the perspective of cattle ranchers. *Biodiversity and Conservation*. Springer Netherlands. doi:10.1007/s10531-021-02199-3.

Rocco, S. T., and S. M. Plakhotnik. 2009. Literature reviews, conceptual frameworks, and theoretical frameworks: Terms, functions, and distinctions. *Human Resource Development Review* 8: 120–130. doi:10.1177/1534484309332617.

Roche, L. M., T. K. Schohr, J. D. Derner, M. N. Lubell, B. B. Cutts, E. Kachergis, V. T. Eviner, and K. W. Tate. 2015. Sustaining Working Rangelands: Insights from Rancher Decision Making. *Rangeland Ecology and Management* 68. Society for Range Management: 383–

389. doi:10.1016/j.rama.2015.07.006.

Rolfe, J., S. Schilizzi, P. Boxall, U. Latacz-Lohmann, S. Iftekhar, M. Star, and P. O'Connor. 2018. Identifying the causes of low participation rates in conservation tenders. *International Review of Environmental and Resource Economics* 12: 1–45. doi:10.1561/101.00000098.

Roth, R. J., and W. Dressler. 2012. Market-oriented conservation governance: The particularities of place. *Geoforum* 43. Elsevier Ltd: 363–366. doi:10.1016/j.geoforum.2012.01.006.

Russi, D., H. Margue, R. Oppermann, and C. Keenleyside. 2016. Result-based agri-environment measures: Market-based instruments, incentives or rewards? The case of Baden-Württemberg. *Land Use Policy* 54. Elsevier Ltd: 69–77. doi:10.1016/j.landusepol.2016.01.012.

Sandler, T. 2015. Collective action: fifty years later. *Public Choice* 164. Springer US: 195–216. doi:10.1007/s11127-015-0252-0.

Saylor, C. R., K. A. Alsharif, and H. Torres. 2017. The importance of traditional ecological knowledge in agroecological systems in peru. *International Journal of Biodiversity Science, Ecosystem Services and Management* 13. Taylor & Francis: 150–161. doi:10.1080/21513732.2017.1285814.

Sayre, N. F. 2007. A History of Working Landscapes: The Altar Valley, Arizona, USA: How ranchers have shaped the West—and continue to do so. *Rangelands* 29. Elsevier: 41–45. doi:https://doi.org/10.2111/1551-501X(2007)29[41:AHOWLT]2.0.CO;2.

Sayre, N. F., and D. Seibert. 2015. Beyond "Stakeholders"and The Zero-Sum Game. In *Stitching the West Back Together*, 53–76. University of Chicago Press. doi:10.7208/chicago/9780226165851.003.0004.

Schlager, E. 2002. Rationality, Cooperation, and Common Pool Resources. *American Behavioral Scientist* 45: 801–819. doi:10.1177/0002764202045005005.

Schön, D. A. 2017. *The Reflective Practitioner*. *The Reflective Practitioner: How Professionals Think in Action*. Routledge. doi:10.4324/9781315237473.

Selinske, M. J., B. Cooke, N. Torabi, M. J. Hardy, A. T. Knight, and S. A. Bekessy. 2017.

Locating financial incentives among diverse motivations for long-term private land conservation. *Ecology and Society* 22: art7. doi:10.5751/ES-09148-220207.

Selman, P. 1995. Theories for Rural-Environmental Planning. *Planning Practice & Research* 10: 5–14. doi:10.1080/02697459550036784.

Selman, P. 2002. Multi-function landscape plans: A missing link in sustainability planning? *Local Environment* 7: 283–294. doi:10.1080/1354983022000001651.

Shackelford, G. E., P. R. Steward, R. N. German, S. M. Sait, and T. G. Benton. 2015. Conservation planning in agricultural landscapes: Hotspots of conflict between agriculture and nature. *Diversity and Distributions* 21: 357–367. doi:10.1111/ddi.12291.

Sikor, T., A. Martin, J. Fisher, and J. He. 2014. Toward an Empirical Analysis of Justice in Ecosystem Governance. *Conservation Letters* 7: 524–532. doi:10.1111/conl.12142.

da Silva, R. N., M. A. G. Brandão, and M. de A. Ferreira. 2020. Integrative Review as a Method to Generate or to Test Nursing Theory. *Nursing Science Quarterly* 33: 258–263. doi:10.1177/0894318420920602.

Smith, J. T., J. S. Evans, B. H. Martin, S. Baruch-Mordo, J. M. Kiesecker, and D. E. Naugle. 2016. Reducing cultivation risk for at-risk species: Predicting outcomes of conservation easements for sage-grouse. *Biological Conservation* 201. The Authors: 10–19. doi:10.1016/j.biocon.2016.06.006.

Smith, M., and A. Sterritt. 2007. *From Conflict to Collaboration: The Story of the Great Bear Rainforest*. WWF Papers. San Francisco, California.

Snilstveit, B., J. Stevenson, L. Langer, J. Polanin, I. Shemilt, J. Eyers, and P. J. Ferraro. 2019. Incentives for climate mitigation in the land use sector: a mixed-methods systematic review of the effectiveness of payment for environment services (PES) on environmental and socio-economic outcomes in low- and middle-income countries. *Campbell Systematic Reviews* 15: e1045. doi:10.1002/cl2.209.

Snyder, H. 2019. Literature review as a research methodology: An overview and guidelines. *Journal of Business Research* 104. Elsevier: 333–339. doi:10.1016/j.jbusres.2019.07.039.

Soares-filho, B., R. Rajão, M. Macedo, A. Carneiro, W. Costa, M. Coe, H. Rodrigues, and A. Alencar. 2014. Cracking Brazil ' s Forest Code Supplemental. *Science* 344: 363–364.

SODCAP Inc. 2016. *Providing Habitat on a Working Landscape*. *Providing Habitat on a Working Landscape*. Regina.

SODCAP Inc. 2017. *The South of the Divide Conservation Action Program Inc.'s annual report (2017-2018)*. Regina.

SODCAP Inc. 2018. *The South of the Divide Conservation Action Program Inc.'s annual report (2017-2018)*. Regina.

Sorice, M. G. 2012. Retooling the Traditional Approach to Studying the Belief-Attitude Relationship: Explaining Landowner Buy-In to Incentive Programs. *Society and Natural Resources* 25: 499–512. doi:10.1080/08941920.2011.603143.

Sorice, M. G., and J. R. Conner. 2010. Predicting private landowner intentions to enroll in an incentive program to protect endangered specie. *Human Dimensions of Wildlife* 15: 77–89. doi:10.1080/10871200903551985.

Sorice, M. G., C. O. Oh, T. Gartner, M. Snieckus, R. Johnson, and C. J. Donlan. 2013. Increasing participation in incentive programs for biodiversity conservation. *Ecological Applications* 23: 1146–1155. doi:10.1890/12-1878.1.

Sorice, M. G., W. Haider, J. R. Conner, and R. B. Ditton. 2011. Incentive Structure of and Private Landowner Participation in an Endangered Species Conservation Program. *Conservation Biology* 25: 587–596. doi:10.1111/j.1523-1739.2011.01673.x.

Spijkers, J., and W. J. Boonstra. 2017. Environmental change and social conflict: the northeast Atlantic mackerel dispute. *Regional Environmental Change* 17. Regional Environmental Change: 1835–1851. doi:10.1007/s10113-017-1150-4.

Stoker, G. 1998. Governance as theory: five propositions. *International Social Science Journal* 68: 15–24. doi:10.1111/issj.12189.

Stoker, G. 2018. Governance as theory: five propositions. *International Social Science Journal* 68: 15–24. doi:10.1111/issj.12189.

Stroman, D., and U. P. Kreuter. 2016. Landowner Satisfaction with the Wetland Reserve Program in Texas: A Mixed-Methods Analysis. *Environmental Management* 57. Springer US: 97–108. doi:10.1007/s00267-015-0596-8.

Suddaby, R. 2006. From the Editors: What Grounded Theory is Not. *Academy of Management Journal* 49: 633–642. doi:10.5465/amj.2006.22083020.

Sweikert, L. A. 2017. Human Dimensions of Habitat Loss in the Plains and Prairie Potholes Ecoregion. South Dakota State University.

Tack, J. D., A. F. Jakes, P. F. Jones, J. T. Smith, R. E. Newton, B. H. Martin, M. Hebblewhite, and D. E. Naugle. 2019. Beyond protected areas: Private lands and public policy anchor intact pathways for multi-species wildlife migration. *Biological Conservation* 234. Elsevier: 18–27. doi:10.1016/j.biocon.2019.03.017.

Talen, E., and C. Ellis. 2002. Beyond relativism: Reclaiming the search for good city form. *Journal of Planning Education and Research* 22: 36–49. doi:10.1177/0739456X0202200104.

Torraco, R. J. 2005. Writing Integrative Literature Reviews: Guidelines and Examples. *Human Resource Development Review* 4: 356–367. doi:10.1177/1534484305278283.

UNEP-WCMC, and IUNC. 2016. *Protected Planet Report 2016: How protected areas contribute to achieving global targets for biodiversity*. Cambridge and Gland.

UNEP. 2002. *Global Environment Outlook 3*. *United Nations Environment Programme*.

Uphoff, N., and J. Langholz. 1998. Incentives for avoiding the Tragedy of the Commons. *Environmental Conservation* 25: 251–261.

Wark, G. 2020. Seven years into an Emergency Protection Order, are Sage Grouse any Greater? *WLA*, September.

Warrier, R., B. R. Noon, and L. Bailey. 2020. Agricultural lands offer seasonal habitats to tigers in a human-dominated and fragmented landscape in India. *Ecosphere* 11. doi:10.1002/ecs2.3080.

Weber, R., and R. Crane. 2012. Planning as Scholarship: Origins and Prospects. In *The Oxford*

Handbook of Urban Planning, ed. R. Crane and R. Weber, 2–20. Oxford University Press. doi:10.1093/oxfordhb/9780195374995.013.0001.

Wheeler, S. M. 2004. *Planning for sustainability: Creating livable, equitable and ecological communities*. *Planning for Sustainability: Creating Livable, Equitable and Ecological Communities*. Vol. 9780203300. New York: Routledge. doi:10.4324/9780203300565.

Wheeler, S. M. 2016. Sustainability planning as paradigm change. *Urban Planning* 1: 55–58. doi:10.17645/up.v1i3.740.

White, B., and R. Sadler. 2012. Optimal conservation investment for a biodiversity-rich agricultural landscape*. *Australian Journal of Agricultural and Resource Economics* 56: 1–21. doi:10.1111/j.1467-8489.2011.00567.x.

White, S. C. 2010. Analysing wellbeing: A framework for development practice. *Development in Practice* 20: 158–172. doi:10.1080/09614520903564199.

Whittemore, R., and K. Knafl. 2005. The integrative review: Updated methodology. *Journal of Advanced Nursing*. doi:10.1111/j.1365-2648.2005.03621.x.

Whitten, S., R. Gorddard, A. Knight, A. Reeson, and D. Stevens. 2007. Designing and testing an outcome focused conservation auction: evidence from a field trial targeting ground nesting birds. In *The Effectiveness and Efficiency of Biodiversity Conservation Instruments*, 1–19. Canberra: CSIRO.

Wong, T.-C., and C. Goldblum. 2008. Sustainability Planning and Its Theory and Practice: An Introduction. In *Spatial Planning for a Sustainable Singapore*, ed. T.-C. Wong, B. Yuen, and C. Goldblum, 1–16. Dordrecht: Springer Netherlands. doi:10.1007/978-1-4020-6542-2_11.

Wuerthner, G. 2014. *Why the working landscape isn't working*. *Keeping the Wild: Against the Domestication of Earth*. doi:10.5822/978-1-61091-559-5_14.

Wunder, S. 2005. *Payments for environmental services: some nuts and bolts*. 42. CIFOR Occasional Paper. Jakarta. doi:10.17528/cifor/001760.

WWF. 2016a. *2016 Plowprint report: F a c t s & f i g u r e s*. Bozeman.

WWF. 2016b. *2016 Plowprint report*. Bozeman.

Young, O. R. 2003. Environmental Governance: The Role of Institutions in Causing and Confronting Environmental Problems. *International Environmental Agreements: Politics, Law and Economics* 3: 377–393. doi:10.1023/b:inea.0000005802.86439.39.

Zabel, A., and B. Roe. 2009. Optimal design of pro-conservation incentives. *Ecological Economics* 69: 126–134. doi:10.1016/j.ecolecon.2009.08.001.

Appendices

Appendix A. Interview Guide

A. Background information about operations

1) Please describe your current ranching/farming operation**?**

Prompts

- Total size of land
- Ownership type
- Size of livestock
- Length of time in operation

B. Species at risk management

2) Are you aware of any species on your land? Which species are present on your land?

Prompt: species at risk

3) Do you think your lands currently meet habitat requirement for these species? Why?
4) How do you manage these lands to promote habitat?

Prompts

- Stocking
- Herding cattle to promote heterogeneous grazing
- Access to alternative lands for seasonally-deferred grazing
- Researching, observing, learning about, etc. species at risk, and

- Volunteering with organizations or going to meetings, etc.

C. Cost information

5) Please provide cost estimates for the different management activities you undertake to promote habitat for SAR

Type of cost/activity	Estimated annual non-labor expenses ($)	Estimated annual labor expenses (hours)	Description
Stocking			
Resting parcels			
Herding or luring			
Deferred grazing			
Opportunity costs			
Learning about SAR			
Meetings & volunteering			
Others			

D. Drought and species at risk management

6) How would you describe your experience with drought in this region?

Prompt: last time you experienced drought, intensity

7) How does drought affect your operation generally?

Prompts

- Effects on livestock

- Effects on SAR management

8) Did your knowledge of drought affect your participation in SODCAP's RBCA program? How?
9) Could you explain how drought affects your participation in the RBA?

Prompt: Describe instances where you would not be paid compensation as a result of drought.

10) How are these instances managed?

Prompt: is compensation paid when drought makes it impossible for you to meet habitat targets? How?

11) What do you recommend?

Governance conditions and SAR management

12) What made you sign up for SODCAP's conservation program?

Prompt: Incentives, leadership, equity, trust, autonomy

13) Are there other conditions you wished were present?
14) Describe in detail how these conditions came about.

Prompt

- History
- Actors
- Role you played
- Outcome

Appendix B. Observation Guide

Land manager recruitment

1) How are land managers recruited into SODCAP's programs?

2) What do land managers consider important in deciding to participate in SODCAP's programs?

Habitat monitoring and result determination

3) How are results determined out in the field?

Appendix C. List of Provincial Legislations relevant working landscapes

Provincial Legislation	Description	What it does
The Wildlife Act, 1998	"An Act respecting the Protection of Wildlife and Wild Species at Risk and making consequential amendments to other Acts."	Establishes procedures for the administration, licensing, and prohibition of all wild species Set procedures that determine the at-risk status of species, establishing recovery plans, monitoring and enforcement.
The Wild Species at Risk Regulations	Regulations based on the Wildlife Act. "These regulations apply to all wild species at risk in Saskatchewan."	Provides a list of SAR in Saskatchewan and their respective levels of risks
The provincial lands act, 2016	"An Act respecting Provincial Lands, repealing certain Acts and making consequential amendments to certain Acts."	Establishes the terms for the disposition (i.e., sale, lease, or transfer) of provincial land (Division 2 & 5, Part 2) Establishes the terms for taxation related to provincial lands (Division 3, Part 2) Establishes the terms for improvements and restoration of provincial lands (Division 4, Part 2) Establishes the terms for the designation, disposition or use of ecological reserves (Division 1, Part 3)
The wildlife habitat protection act	"An Act respecting the Protection and Management of	Sets the terms for the designation of Crown lands as wildlife habitat and ecological lands.

	Crown Lands for Agriculture and Wildlife.”	Determines the management and use, and disposition of lands classified as wildlife habitat and ecological lands
The Pastures Act	“An Act respecting the Operation of Pastures and making consequential amendments to The Department of Agriculture Act.”	Sets out conditions for the designation, acquisition, use and maintenance of Pastures

Appendix D: Background data of interviews and Focus Groups

Variable	**% Of participants**
Co-op/Corp 1 (interviews)	
Land ownership (private land only)	N/A
Land ownership (leased land)	37.5
Land ownership (private and leased land)	62.5
	Female (12.5), Male (87.5)
Co-op/Corp 2 (interviews)	
Land ownership (private land)	N/A
Land ownership (leased land)	33.3
Land ownership (private and leased land)	66.7
	Female (N/A), Male (100)
Co-op/Corp 3 (FGD)	
Land ownership (private land)	N/A
Land ownership (leased land)	100
Land ownership (private and leased land)	N/A
	Female (50), Male (50)
Co-op/Corp 4 (FGD)	
Land ownership (private land)	N/A
Land ownership (leased land)	40
Land ownership (private and leased land)	60
	Female (20), Male (80)
Total number of participants	**23**

Appendix E: List of papers included in the integrative review

Number	Reference
1.	An S, Cheng M, Xue Z, Ma R (2017) Current State of Multifunctional Use of Grasslands BT - Multifunctional Land-Use Systems for Managing the Nexus of Environmental Resources. In: Zhang L, Schwärzel K (eds). Springer International Publishing, Cham, pp 69–77
2.	Armitage D, Béné C, Charles AT, et al (2012a) The interplay of well-being and resilience in applying a social- ecological perspective. Ecol Soc 17:. https://doi.org/10.5751/ES-04940-170415
3.	Armitage D, De Loë R, Plummer R (2012b) Environmental governance and its implications for conservation practice. Conserv Lett 5:245–255. https://doi.org/10.1111/j.1755-263X.2012.00238.x
4.	Ayambire RA, Pittman J, Olive A (2021) Incentivizing Stewardship in a Biodiversity Hotspot: Land Managers in the Grasslands. FACETS. https://doi.org/https://dx.doi.org/10.1139/facets-2020-0071
5.	Baudron F, Schultner J, Duriaux JY, et al (2019) Agriculturally productive yet biodiverse: human benefits and conservation values along a forest-agriculture gradient in Southern Ethiopia. Landsc Ecol 34:341–356. https://doi.org/10.1007/s10980-019-00770-6
6.	Baumgärtner S, Quaas MF (2010) Managing increasing environmental risks through agrobiodiversity and agrienvironmental policies. Agric Econ 41:483–496. https://doi.org/10.1111/j.1574-0862.2010.00460.x
7.	Bennett EM, Cramer W, Begossi A, et al (2015) Linking biodiversity, ecosystem services, and human well-being: three challenges for designing research for sustainability. Curr Opin Environ Sustain 14:76–85. https://doi.org/10.1016/j.cosust.2015.03.007
8.	Bennett NJ, Whitty TS, Finkbeiner E, et al (2018) Environmental Stewardship: A Conceptual Review and Analytical Framework. Environ Manage 61:597–614. https://doi.org/10.1007/s00267-017-0993-2
9.	Bergmann SA, Bliss JC (2004) Foundations of cross-boundary cooperation: Resource management at the public-private interface. Soc Nat Resour 17:377–393. https://doi.org/10.1080/08941920490430142
10.	Berkes F (2010) Devolution of environment and resources governance: Trends and future. Environ Conserv 37:489–500. https://doi.org/10.1017/S037689291000072X
11.	Berkes F (2009) Evolution of co-management: Role of knowledge generation, bridging organizations and social learning. J Environ Manage 90:1692–1702. https://doi.org/10.1016/j.jenvman.2008.12.001
12.	Biénabe E, Hearne RR (2006) Public preferences for biodiversity conservation and scenic beauty within a framework of environmental services payments. For Policy Econ 9:335–348. https://doi.org/10.1016/j.forpol.2005.10.002
13.	Bodin Ö (2017) Collaborative environmental governance: Achieving collective action in social-ecological systems. Science (80-) 357:. https://doi.org/10.1126/science.aan1114

14.	Bodin Ö, Baird J, Schultz L, et al (2020) The impacts of trust, cost and risk on collaboration in environmental governance. People Nat 2:734–749. https://doi.org/10.1002/pan3.10097
15.	Brockington D, Adams WM, Agarwal B, et al (2018) Working governance for working land. Science (80-) 362:1257–1257. https://doi.org/10.1126/science.aav8452
16.	Brook A, Zint M, De Young R (2003) Landowners' Responses to an Endangered Species Act Listing and Implications for Encouraging Conservation. Conserv Biol 17:1638–1649. https://doi.org/10.1111/j.1523-1739.2003.00258.x
17.	Bryson JM, Crosby BC (2006) The Design and Implementation of Cross-Sector Collaborations : Propositions from the Literature. Public Adm Rev 66:44–55
18.	Buotte PC, Law BE, Ripple WJ, Berner LT (2020) Carbon sequestration and biodiversity co-benefits of preserving forests in the western United States. Ecol Appl 30:1–11. https://doi.org/10.1002/eap.2039
19.	Buxton RT, Bennett JR, Reid AJ, et al (2021) Key information needs to move from knowledge to action for biodiversity conservation in Canada. Biol Conserv 256:108983. https://doi.org/10.1016/j.biocon.2021.108983
20.	Cannavò PF (2007) The working landscape: Founding, Preservation, and the politics of place, 1st edn. MIT Press, Cambridge and London
21.	Cash DW, Adger WN, Berkes F, et al (2006) Scale and Cross-Scale Dynamics: Governance and Information in a Multilevel World. Ecol Soc 11:. https://doi.org/10.5751/es-01759-110208
22.	Cetas E, Yasue M (2016) A systematic review of motivational values and conservation success in and around protected areas. Conserv Biol. https://doi.org/10.1111/cobi.12770
23.	Chanchani P, Noon BR, Bailey LL, Warrier RA (2016) Conserving tigers in working landscapes. Conserv Biol 30:649–660. https://doi.org/10.1111/cobi.12633
24.	Charnley S, Fischer AP, Jones ET (2007) Integrating traditional and local ecological knowledge into forest biodiversity conservation in the Pacific Northwest. For Ecol Manage 246:14–28. https://doi.org/10.1016/j.foreco.2007.03.047
25.	Charnley S, Sheridan TE, Sayre NF (2014) Status and Trends of Western Working Landscapes. In: Charnley S, Sheridan TE, Nabhan GP (eds) Stitching the West Back Together. University of Chicago Press, Chicago, p 13
26.	Chazdon RL, Harvey CA, Komar O, et al (2009) Beyond reserves: A research agenda for conserving biodiversity in human-modified tropical landscapes. Biotropica 41:142–153. https://doi.org/10.1111/j.1744-7429.2008.00471.x
27.	Cooke B, Langford WT, Gordon A, Bekessy S (2012) Social context and the role of collaborative policy making for private land conservation. J Environ Plan Manag 55:469–485. https://doi.org/10.1080/09640568.2011.608549
28.	Crona BI, Parker JN (2012) Learning in support of governance: Theories, methods, and a framework to assess how bridging organizations contribute to adaptive resource governance. Ecol Soc 17:. https://doi.org/10.5751/ES-04534-170132
29.	Dawson NM, Grogan K, Martin A, et al (2017) Environmental justice research shows the importance of social feedbacks in ecosystem service trade-offs. Ecol Soc 22:. https://doi.org/10.5751/ES-09481-220312
30.	DeClerck FAJ, Chazdon R, Holl KD, et al (2010) Biodiversity conservation in human-modified landscapes of Mesoamerica: Past, present and future. Biol Conserv

	143:2301–2313. https://doi.org/10.1016/j.biocon.2010.03.026
31.	DeFries R, Hansen A, Turner BL, et al (2007) Land use change around protected areas: Management to balance human needs and ecological function. Ecol Appl 17:1031–1038. https://doi.org/10.1890/05-1111
32.	Drescher M, Brenner JC (2018) The practice and promise of private land conservation. Ecol Soc 23:art3. https://doi.org/10.5751/ES-10020-230203
33.	Drescher M, Warriner GK, Farmer JR, Larson BMH (2017) Private landowners and environmental conservation: a case study of social-psychological determinants of conservation program participation in Ontario. Ecol Soc 22:art44. https://doi.org/10.5751/ES-09118-220144
34.	Eastburn DJ, O'Geen AT, Tate KW, Roche LM (2017) Multiple ecosystem services in a working landscape. PLoS One 12:11–13. https://doi.org/10.1371/journal.pone.0166595
35.	Estrada-Carmona N, Hart AK, DeClerck FAJ, et al (2014) Integrated landscape management for agriculture, rural livelihoods, and ecosystem conservation: An assessment of experience from Latin America and the Caribbean. Landsc Urban Plan 129:1–11. https://doi.org/10.1016/j.landurbplan.2014.05.001
36.	Farley KA, Walsh KC, Levine AS (2017) Opportunities and obstacles for rangeland conservation in San Diego county, California, USA. Ecol Soc 22:. https://doi.org/10.5751/ES-09077-220138
37.	Fernández-Giménez ME, Batkhishig B, Batbuyan B, Ulambayar T (2015) Lessons from the Dzud: Community-Based Rangeland Management Increases the Adaptive Capacity of Mongolian Herders to Winter Disasters. World Dev 68:48–65. https://doi.org/10.1016/j.worlddev.2014.11.015
38.	Ferranto S, Huntsinger L, Getz C, et al (2013) Management Without Borders? A Survey of Landowner Practices and Attitudes toward Cross-Boundary Cooperation. Soc Nat Resour 26:1082–1100. https://doi.org/10.1080/08941920.2013.779343
39.	Ferranto S, Huntsinger L, Kelly M (2014) Sustaining Ecosystem Services From Private Lands in California: The Role of the Landowner. Rangelands 36:44–51. https://doi.org/10.2111/RANGELANDS-D-14-00023.1
40.	Ferraro PJ (2008) Asymmetric information and contract design for payments for environmental services. Ecol Econ 65:810–821. https://doi.org/10.1016/j.ecolecon.2007.07.029
41.	Ferraro PJ, Pattanayak SK (2006) Money for Nothing? A Call for Empirical Evaluation of Biodiversity Conservation Investments. PLoS Biol 4:e105. https://doi.org/10.1371/journal.pbio.0040105
42.	France RL, Campbell JB (2015) Payment for agro-ecosystem services: Developmental case-history descriptions of Canada's Grassroots "ALUS" Programs. Res J Agric Environ Manag 4:405–431
43.	Frei B, Queiroz C, Chaplin-Kramer B, et al (2020) A brighter future: Complementary goals of diversity and multifunctionality to build resilient agricultural landscapes. Glob Food Sec 26:100407. https://doi.org/10.1016/j.gfs.2020.100407
44.	Gigliotti LM, Sweikert LA (2019) Wildlife value orientation of landowners from five states in the upper midwest, USA. Hum Dimens Wildl 24:433–445. https://doi.org/10.1080/10871209.2019.1632991
45.	Gooden J, Grenyer R (2019) The psychological appeal of owning private land for

	conservation. Conserv Biol 33:339–350. https://doi.org/10.1111/cobi.13215
46.	Graham S (2014) A new perspective on the trust power nexus from rural Australia. J Rural Stud 36:87–98. https://doi.org/10.1016/j.jrurstud.2014.06.010
47.	Gripne SL (2005) Grassbanks: Bartering for Conservation. Rangelands 27:24–28. https://doi.org/10.2458/azu_rangelands_v27i1_gripne
48.	Hamm JA (2017) Trust, Trustworthiness, and Motivation in the Natural Resource Management Context. Soc Nat Resour 30:919–933. https://doi.org/10.1080/08941920.2016.1273419
49.	Hamm JA, Hoffman L, Tomkins AJ, Bornstein BH (2016) On the influence of trust in predicting rural land owner cooperation with natural resource management institutions. J. Trust Res. 6:37–62
50.	Hanley N, Banerjee S, Lennox GD, Armsworth PR (2012) How should we incentivize private landowners to "produce" more biodiversity? Oxford Rev Econ Policy 28:93–113. https://doi.org/10.1093/oxrep/grs002
51.	Hansen AJ, DeFries R (2007) Ecological mechanisms linking protected areas to surrounding lands. Ecol Appl 17:974–988. https://doi.org/10.1890/05-1098
52.	Hasund KP (2013) Indicator-based agri-environmental payments: A payment-by-result model for public goods with a Swedish application. Land use policy 30:223–233. https://doi.org/10.1016/j.landusepol.2012.03.011
53.	Henderson AE, Reed M, Davis SK (2014) Voluntary Stewardship and the Canadian Species at Risk Act: Exploring Rancher Willingness to Support Species at Risk in the Canadian Prairies. Hum Dimens Wildl 19:17–32. https://doi.org/10.1080/10871209.2013.819595
54.	Holling CS, Meffe GK (1996) Command and control and the pathology of natural resource management. Conserv Biol 10:328–337. https://doi.org/10.1046/j.1523-1739.1996.10020328.x
55.	Hossu CA, Ioja IC, Susskind LE, et al (2018) Factors driving collaboration in natural resource conflict management: Evidence from Romania. Ambio 47:816–830
56.	Huntsinger L, Sayre NF (2007) Introduction: The working landscapes special issue. Rangelands 29:3–4. https://doi.org/10.2111/1551-501X(2007)29[3:ITWLSI]2.0.CO;2
57.	Innes R, Frisvold G (2009) The Economics of Endangered Species. Annu Rev Resour Econ 1:485–512. https://doi.org/10.1146/annurev.resource.050708.144207
58.	Kaimowtz D (2008) The prospects for Reduced Emissions from Deforestation and Degradation (REDD) in Mesoamerica. Int For Rev 10:485–495. https://doi.org/10.1505/ifor.10.3.485
59.	Kitt S, Axsen J, Long Z, Rhodes E (2021) The role of trust in citizen acceptance of climate policy: Comparing perceptions of government competence, integrity and value similarity. Ecol Econ 183:106958. https://doi.org/10.1016/j.ecolecon.2021.106958
60.	Kremen C, Merenlender AM (2018) Landscapes that work for biodiversity and people. Science (80-) 362:. https://doi.org/10.1126/science.aau6020
61.	Law EA, Bennett NJ, Ives CD, et al (2018) Equity trade-offs in conservation decision making. Conserv Biol 32:294–303. https://doi.org/10.1111/cobi.13008
62.	Lawless S, Song AM, Cohen PJ, Morrison TH (2020) Rights, equity and justice: A diagnostic for social meta-norm diffusion in environmental governance. Earth Syst Gov 6:100052. https://doi.org/10.1016/j.esg.2020.100052

63.	Lemos MC, Agrawal A (2006) Environmental governance. Annu Rev Environ Resour 31:297–325. https://doi.org/10.1146/annurev.energy.31.042605.135621
64.	Lockwood M, Davidson J, Curtis A, et al (2009) Multi-level Environmental Governance: Lessons from Australian natural resource management. Aust Geogr 40:169–186. https://doi.org/10.1080/00049180902964926
65.	Loisel P, Elyakime B (2006) Incentive contract and weather risk. Environ Resour Econ 35:99–108. https://doi.org/10.1007/s10640-006-9009-z
66.	Martin A, Akol A, Gross-Camp N (2015) Towards an Explicit Justice Framing of the Social Impacts of Conservation. Conserv Soc 13:166–178. https://doi.org/10.4103/0972-4923.164200
67.	Matzdorf B, Lorenz J (2010) How cost-effective are result-oriented agri-environmental measures?-An empirical analysis in Germany. Land use policy 27:535–544. https://doi.org/10.1016/j.landusepol.2009.07.011
68.	McCune JL, Carlsson AM, Colla S, et al (2017) Assessing public commitment to endangered species protection: A Canadian case study. FACETS 2:178–194. https://doi.org/10.1139/facets-2016-0054
69.	McGee G, Cullen A, Gunton T (2010) A new model for sustainable development: A case study of The Great Bear Rainforest regional plan. Environ Dev Sustain 12:745–762. https://doi.org/10.1007/s10668-009-9222-3
70.	McGranahan DA (2008) Managing private, commercial rangelands for agricultural production and wildlife diversity in Namibia and Zambia. Biodivers Conserv 17:1965–1977. https://doi.org/10.1007/s10531-008-9339-y
71.	Meek CL (2013) Forms of collaboration and social fit in wildlife management: A comparison of policy networks in Alaska. Glob Environ Chang 23:217–228. https://doi.org/10.1016/j.gloenvcha.2012.10.003
72.	Meine C, Nabhan GP (2015) Historic Precedents to Collaborative Conservation in Working Landscapes. In: Stitching the West Back Together. University of Chicago Press, pp 77–80
73.	Ménard C (2011) A new institutional economics perspective on environmental issues. Environ Innov Soc Transitions 1:115–120. https://doi.org/10.1016/j.eist.2011.04.002
74.	Miller K, Chang E, Johnson N (2001) Defining common ground for the Mesoamerican Biological Corridor. 55
75.	Muradian R (2013) Payments for Ecosystem Services as Incentives for Collective Action. Soc Nat Resour 26:1155–1169. https://doi.org/10.1080/08941920.2013.820816
76.	Muradian R, Rival L (2012) Between markets and hierarchies: The challenge of governing ecosystem services. Ecosyst Serv 1:93–100. https://doi.org/10.1016/j.ecoser.2012.07.009
77.	Naidoo R, Balmford A, Ferraro PJ, et al (2006) Integrating economic costs into conservation planning. Trends Ecol Evol 21:681–687. https://doi.org/10.1016/j.tree.2006.10.003
78.	Naugle DE, Allred BW, Jones MO, et al (2020) Coproducing Science to Inform Working Lands: The Next Frontier in Nature Conservation. Bioscience 70:90–96. https://doi.org/10.1093/biosci/biz144
79.	Olive A (2016) It is just not fair: The endangered species act in the United States and Ontario. Ecol Soc 21:art13. https://doi.org/10.5751/ES-08627-210313

80.	Olive A (2015) Urban and Rural Attitudes Toward Endangered Species Conservation in the Canadian Prairies: Drawing Lessons From the American ESA. Hum Dimens Wildl 20:189–205. https://doi.org/10.1080/10871209.2015.1004207
81.	Olive A, Rabe A (2016) Indigenous Environmental Justice: Comparing the United States and Canada's Legal Frameworks for Endangered Species Conservation. Am Rev Can Stud 46:496–512. https://doi.org/10.1080/02722011.2016.1255654
82.	Ostrom E (2014) Collective action and the evolution of social norms. J Nat Resour Policy Res 6:235–252. https://doi.org/10.1080/19390459.2014.935173
83.	Ouellet F, Mundler P, Dupras J, Ruiz J (2020) "Community developed and farmer delivered." An analysis of the spatial and relational proximities of the Alternative Land Use Services program in Ontario. Land use policy 95:104629. https://doi.org/10.1016/j.landusepol.2020.104629
84.	Paavola J (2016) Multi-Level Environmental Governance: Exploring the economic explanations. Environ Policy Gov 26:143–154. https://doi.org/10.1002/eet.1698
85.	Parkhurst GM, Shogren JF, Bastian C, et al (2002) Agglomeration bonus: An incentive mechanism to reunite fragmented habitat for biodiversity conservation. Ecol Econ 41:305–328. https://doi.org/10.1016/S0921-8009(02)00036-8
86.	Parrott L, Kyle C, Hayot-Sasson V, et al (2019) Planning for ecological connectivity across scales of governance in a multifunctional regional landscape. Ecosyst People 15:204–213. https://doi.org/10.1080/26395916.2019.1649726
87.	Pascual U, Phelps J, Garmendia E, et al (2014) Social equity matters in payments for ecosystem services. Bioscience 64:1027–1036
88.	Pates NJ, Hendricks NP (2020) Additionality from Payments for Environmental Services with Technology Diffusion. Am J Agric Econ 102:281–299. https://doi.org/10.1093/ajae/aaz028
89.	Pittman J (2019) The struggle for local autonomy in biodiversity conservation governance. J Environ Plan Manag 62:172–188. https://doi.org/10.1080/09640568.2018.1511416
90.	Plummer R, Fitzgibbon J (2004) Co-management of natural resources. A proposed framework. Environ Manage 33:876–885. https://doi.org/10.1007/s00267-003-3038-y
91.	Polasky S, Nelson E, Lonsdorf E, et al (2005) Conserving Species in a Working Landscape : Land Use with Biological and Economic Objectives. Ecol Appl 15:1387–1401
92.	Potoski M, Prakash A (2013) Green clubs: Collective action and voluntary environmental programs. Annu Rev Polit Sci 16:399–419. https://doi.org/10.1146/annurev-polisci-032211-211224
93.	Rathwell KJ, Armitage D, Berkes F (2015) Bridging knowledge systems to enhance governance of the environmental commons: A typology of settings. Int J Commons 9:851–880. https://doi.org/10.18352/ijc.584
94.	Raymond L (2006) Cooperation without Trust : Overcoming Collective. Policy Stud 34:37–57
95.	Reed MG, Henderson AE, Mendis-Millard S (2013) Shaping Local Context and Outcomes: The Role of Governing Agencies in Collaborative Natural Resource Management. Hum Dimens Wildl 18:292–306. https://doi.org/10.1080/10871209.2013.801003
96.	Reed MS (2008) Stakeholder participation for environmental management: A

	literature review. Biol Conserv 141:2417–2431. https://doi.org/10.1016/j.biocon.2008.07.014
97.	Reese G, Jacob L (2015) Principles of environmental justice and pro-environmental action: A two-step process model of moral anger and responsibility to act. Environ Sci Policy 51:88–94. https://doi.org/10.1016/j.envsci.2015.03.011
98.	Reiter D, Parrott L, Pittman J (2021) Species at risk habitat conservation on private land: the perspective of cattle ranchers. Biodivers Conserv. https://doi.org/10.1007/s10531-021-02199-3
99.	Rolfe J, Schilizzi S, Boxall P, et al (2018) Identifying the causes of low participation rates in conservation tenders. Int Rev Environ Resour Econ 12:1–45. https://doi.org/10.1561/101.00000098
100	Sayre NF (2007) A History of Working Landscapes: The Altar Valley, Arizona, USA: How ranchers have shaped the West—and continue to do so. Rangelands 29:41–45. https://doi.org/https://doi.org/10.2111/1551-501X(2007)29[41:AHOWLT]2.0.CO;2
101	Sayre NF, Seibert D (2015) Beyond "Stakeholders"and The Zero-Sum Game. In: Stitching the West Back Together. University of Chicago Press, pp 53–76
102	Selinske MJ, Cooke B, Torabi N, et al (2017) Locating financial incentives among diverse motivations for long-term private land conservation. Ecol Soc 22:art7. https://doi.org/10.5751/ES-09148-220207
103	Sikor T, Martin A, Fisher J, He J (2014) Toward an Empirical Analysis of Justice in Ecosystem Governance. Conserv Lett 7:524–532. https://doi.org/10.1111/conl.12142
104	Smith M, Sterritt A (2007) From Conflict to Collaboration: The Story of the Great Bear Rainforest. San Francisco, California
105	Sorice MG (2012) Retooling the Traditional Approach to Studying the Belief-Attitude Relationship: Explaining Landowner Buy-In to Incentive Programs. Soc Nat Resour 25:499–512. https://doi.org/10.1080/08941920.2011.603143
106	Sorice MG, Oh CO, Gartner T, et al (2013) Increasing participation in incentive programs for biodiversity conservation. Ecol Appl 23:1146–1155. https://doi.org/10.1890/12-1878.1
107	Stroman D, Kreuter UP (2016) Landowner Satisfaction with the Wetland Reserve Program in Texas: A Mixed-Methods Analysis. Environ Manage 57:97–108. https://doi.org/10.1007/s00267-015-0596-8
108	Tack JD, Jakes AF, Jones PF, et al (2019) Beyond protected areas: Private lands and public policy anchor intact pathways for multi-species wildlife migration. Biol Conserv 234:18–27. https://doi.org/10.1016/j.biocon.2019.03.017
109	Warrier R, Noon BR, Bailey L (2020) Agricultural lands offer seasonal habitats to tigers in a human-dominated and fragmented landscape in India. Ecosphere 11:. https://doi.org/10.1002/ecs2.3080
110	Wuerthner, G. 2014. Why the working landscape isn't working. In Keeping the Wild: Against the Domestication of Earth. doi:10.5822/978-1-61091-559-5_14.