DISSERTATION

LEADERSHIP IN CONSERVATION: INTEGRATING A CONCEPTUAL FRAMEWORK, PRACTICE, AND CAPACITY BUILDING

Submitted By

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ABSTRACT

LEADERSHIP IN CONSERVATION: INTEGRATING A CONCEPTUAL FRAMEWORK, PRACTICE, AND CAPACITY BUILDING

As the urgency of global biodiversity loss, ecosystem degradation, and climate change intensifies, leadership is increasingly recognized as essential to advancing conservation outcomes—yet it remains underexamined in both research and practice. This dissertation helps address that gap through a three-part, mixed-methods inquiry that expands our understanding of conservation leadership by developing a conceptual framework, testing its application in a real-world species recovery program, and evaluating graduate conservation leadership capacity building outcomes.

Chapter 2 presents a framework for conceptualizing leadership in conservation, structured around five leadership domains—*stakeholder engagement, vision, trust, individual champion, and excellence in internal attributes*—and fifteen associated leadership practices. The framework emerges from a systematic review of 59 peer-reviewed articles across diverse conservation contexts and offers a structured yet flexible tool for researchers, practitioners, and leadership educators. It contributes to a clarified understanding of conservation leadership as comprising skills to motivate, positively interact with and inspire others toward a shared conservation outcome.

Chapter 3 applies and tests the framework through a qualitative case study of the Mountain Plover Nest Conservation Program, a private lands species recovery initiative. Using in-depth interviews and deductive thematic analysis, the study reveals how practices such as trust-building, local leadership, and collaborative landowner partnerships and engagement drive program success. The findings confirm the efficacy of the framework domains and leadership practices from Chapter 2 and build on the corresponding domains of *stakeholder engagement and individual champion,* while offering insights into the value of stakeholder incentives and the benefits of a local versus external champion.

Chapter 4 assesses self-reported competencies, and job relevance of leadership practices aligned with the Chapter 2 framework among alumni of a graduate conservation leadership program. Drawing on quantitative survey data and statistical analyses, findings revealed consistently strong competency and relevance ratings for the leadership practices across time since graduation, and job sectors, with only limited variation. Notable differences were found for three leadership practices—*adaptability, perseverance, and leading shared goals*—among early alumni of the program and those working in public versus other sector settings. The results support the long-term value and applicability of the leadership domains and practices presented in Chapter 2.

Collectively, this dissertation advances understanding of conservation leadership by providing evidence of how it is conceptualized, applied, practiced, and cultivated in emerging conservation professionals working in complex, rapidly changing social-ecological systems.

ACKNOWLEDGEMENTS

A decade. That is how long it has taken me to complete my PhD. At times it felt like a trail marathon or mountain climbing expedition, full of grueling switchbacks, false summits and moments of doubt. I needed aid stations and rest days more than once, a couple times for extended stops. I tried to break it up into manageable stages, achievable steps. Maintaining some level of constant forward motion, of progress, slow and minimal as it was at times, got me to the finish line and the summit. It has been a lesson in perseverance and humility. Above all, it is the people that shared this journey and supported me that I must thank for helping me finish this endeavor.

Tara, I had your class my first semester, which helped lay the foundation for everything I've accomplished since. I hadn't been a graduate student for well over a decade, and you helped me learn how to be one again.

Ernesto, you and I had a connection and a shared passion for the mountains long before I started my PhD. That you agreed to serve on my committee and be my resident qualitative methods expert has been so appreciated. My only regret is that we have never gone on an expedition together.

Sarah, though you agreed to be on my committee near the end, you were really part of my experience early on, serving as an author on our manuscript that got published in 2022, adding your critical insights to strengthen the final product. Thank you so much.

Brett, what can I say other than you're absolutely the best advisor I could have asked for—a colleague, mentor, and friend. As my core support crew member, you kept pushing and

challenging me yet walked along side me every stage of the process. You graciously maintained your patience with me, allowing for the flexibility, time and space I needed when I started a new job or had an unexpected twist in my professional or personal life. I am forever indebted to you and will fondly remember our sessions at Mugs and the Mummy Traverse hike we did, talking dissertation strategy most of the way down.

To my kids Logan and Willa, my PhD was just part of your childhood, but you offered support in ways that were sometimes intangible and always appreciated when I had to bow out of family time. To the rest of my family and close friends, who despite the lengthy timeline, continued to check in on my progress and offer encouragement, I am grateful.

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Note on Authorship

While my name is the lone one on this dissertation, part of it is a product of a collaborative team process. My co-authors are listed in the peer-reviewed publication from this dissertation and include the following: Chapter 2 is co-authored by Brett Bruyere, Matt Halladay, and Sarah Walker.

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CHAPTER 1: INTRODUCTION

Background for Study

Whether it's in the context of government, business and industry, politics, non-profit organizations, communities, sports teams or other organized groups, we often hear about the need for leadership and its presence or absence in these settings. Leadership and what constitutes capable leadership have been studied for decades. Yet as a global society we still yearn, search for and consider its meaning and the approaches and practices of being a competent leader.

Within conservation, contemporary global challenges such as climate change and rapidly accelerating species and biodiversity loss are complex and require a deep understanding of social-ecological systems. This interdependence of the social and ecological components of systems necessitates not only discipline-specific scientific knowledge and technical expertise but also requires a suite of competencies to effectively lead organizations, programs and groups that design solutions to sustain livelihoods, communities and the natural environment.

Although conservation scientists and practitioners have increasingly recognized leadership as essential to achieve conservation goals, clarity about the term leadership remains elusive in terms of specific practices and behaviors. For more than two decades, researchers have determined that "good leadership" was important conservation practice, but it often remained abstract and impractical to translate into action. For example, leadership was declared by Dietz et al. (2004) as one of the most critical competencies for conservation biologists, and Manolis et al. (2009) noted a deficiency of understanding about what makes

conservation leaders effective. More recently, Black (2021) concluded that many attributes of existing conservation leadership frameworks remain untested, and no empirically derived model of conservation leadership exists to aid in the professional development of conservation scientists and practitioners. Missing from these examples and others is clarification about the term "leadership." This dissertation aims to contribute to the community of scholars seeking to define "conservation leadership" in actual behaviors by individuals and teams.

Nearly all conservation work will span geographic, cultural, social and/or economic boundaries, requiring leaders of projects to be proficient in working cooperatively with stakeholders possessing diverse values and belief systems. Related boundary spanning skills include building relationships and trust, effectively communicating technical and scientific information, and exhibiting the ability to motivate and lead others to achieve a mutual goal (Burbach et al., 2023). Metcalf & Benn (2013) and Bruyere (2015) emphasize leadership as a social process of influencing others and pursuing a defined goal or vision. A distinction is made in the literature between *leader development* as focusing on building the capacity and competency of individuals, whereas *leadership development* concentrates on building the capacity of a leadership system within an organization (Day et al., 2014). Given the complex context of conservation, leadership capacity building must take place at both the individual and broader organizational scales. Borrowing from others' work and from the definition proposed by Webb et al. (2022) in Chapter 2, for the purposes of this dissertation effective conservation leadership is defined as "positively influencing others to engage in behaviors that contribute to a shared goal to protect and conserve social-ecological systems for the long-term health of the planet." To help meet the grand conservation challenges we face as a global society, we need

competent conservation leadership that inspires, motivates, and empowers others to act, builds relationships and trust, and involves a diverse group of people to accomplish a common goal.

Lastly, few conservation scientists or practitioners receive practical training in leadership or modern leadership theory (Manolis et al., 2009; Motzer et al., 2021). An investment in training the next generation of diverse, interculturally competent conservation scientists and practitioners skilled in the practices and behaviors of leadership is a crucial issue for those in the biological and social science disciplines. It could be argued that this is true for all disciplines, but that is not the intent of this dissertation.

Purpose of Study

The purpose of this dissertation research was to conceptualize leadership in conservation by (1) constructing a framework to inform leadership practices that contribute to successful outcomes in conservation programs (2) apply the framework to identify specific and salient leadership practices that support species recovery on private lands and (3) examine if the leadership self-assessments of alumni of a conservation leadership graduate program differ by job sector, and if they change over time as they move through their conservation career.

Guiding Research Questions and Objectives

To achieve my research purpose noted above, the following research questions and objectives guided this dissertation:

Research Questions

1. What are the practices that positively influence other people and lead to positive conservation outcomes? (Chapter 2)

2. What were the leadership practices that led to effective private landowner participation in the Mountain Plover Nest Conservation Program? (Chapter 3)
3. Do self-reported competency and relevance of leadership practices change over time for Master of Conservation Leadership alumni? (Chapter 4)
4. Do self-reported competency and relevance of leadership practices differ by job sector for Master of Conservation Leadership alumni? (Chapter 4)

Objectives

The objectives of this dissertation were to conduct a systematic review to determine the leadership practices and behaviors that contribute to positive conservation outcomes, and from the results, construct a conceptual framework for conservation practitioners and scientists to be applied to future research, and that may lead to the development of context-relevant models for conservation leadership practice (Chapter 2); to test the framework from Chapter 2 by retrospectively exploring leadership in species recovery on private lands via a thematic analysis of semi-structured interview transcripts from administrators of and participants in the Mountain Plover Nest Conservation Program (Chapter 3); and finally, to help define how we build the capacity for the next generation of conservation leaders by examining specific components of the framework and determining whether self-assessments of leadership relevance and competencies change over time and by job sector for alumni of a graduate program in conservation leadership (Chapter 4). Chapters 2, 3 and 4 are stand-alone manuscripts, yet share some common threads of conservation leadership literature, and Chapters 3 and 4 directly integrate the findings and framework presented in Chapter 2.

Contribution of Study

The intended scholarly contribution of this dissertation was to add to knowledge about leadership in conservation by summarizing the practices that influence others to achieve positive conservation outcomes and by constructing a framework to inform these practices. A demonstrable contribution of my research is the published review article and resulting conceptual framework by Webb et al. (2022) constituting Chapter 2. Secondly, by identifying the leadership practices that led to effective participation by private landowners in species recovery in a rural, community-based conservation program, this research may contribute valuable insights about species conservation on private lands and help determine how applicable and transferable the framework is to the success of real-world conservation programs. These results have the potential to be generalizable to other private lands species conservation programs that rely on community engagement to carry out their work. Lastly, this study has implications for educating, training, and building the capacity of future generations of leaders with the requisite competencies needed to solve today's complex conservation challenges and for gaining a better understanding of whether conservation leadership master's program alumni assessments of leadership relevance and competencies change over time and by job sector.

Positionality Statement

In this dissertation, I draw on the qualitative research paradigm of constructivism, which holds that knowledge, ways of knowing and meaning making are socially constructed and contextually situated (Bazeley, 2020; Newing et al., 2011). My personal background, identities, experiences and potential biases inevitably shape my research perspective and interpretation

of the findings. This statement is intended to acknowledge and examine how these factors actively influenced the research process described in the following chapters.

I am a white male in my mid-50s, raised in a suburban Front-Range Colorado city within a lower middle-class household. I hold a deep belief in the power of education to enrich lives and livelihoods, and I have built my academic and professional career on the conviction that humans can and will engage in environmental sustainability if they feel a meaningful connection to nature. My strong values around environmental preservation and conservation, and my bias toward pro-environmental outcomes shaped both the types of research questions I asked and the ways I interpreted data related to conservation success. I also believe in conservation strategies that emphasize mutual thriving for people and nature—a perspective that informed my conceptual framing and emphasis on leadership that drives positive outcomes for both.

Professionally, I have spent over two-thirds of my 30-year career in higher education, largely within academic disciplines and leadership roles historically dominated by white male perspectives, and Western scientific worldviews. These experiences have shaped the epistemological lens I bring to this work, particularly my trust in structured models, systems thinking, and the development of competencies over time. As a practitioner and educator of leadership, I am grounded in the philosophy that leadership is an inherent capacity within everyone and that it can be cultivated through intentional, experiential learning—a belief that directly influenced the design and analysis in Chapter 4.

My training in higher education and the social sciences shaped how we conducted the systematic review in Chapter 2. For instance, we selected peer-reviewed articles from a

Western academic database, which, while methodologically rigorous, may have excluded non-Western or Indigenous perspectives on conservation leadership. Our interpretation of the data and the resulting framework reflects this bias toward formalized, institutionalized forms of leadership knowledge.

In Chapter 3, I examined a species recovery program situated in a rural agricultural community—a setting in which I have limited lived experience. My suburban upbringing and limited understanding of the farming lifestyle required me to approach interviews with heightened awareness and humility. While I drew on my background in social science to analyze the qualitative data, I recognize that my lack of biological science training may have influenced the salience I assigned to social dynamics over ecological processes. This positional distance made it essential for me to check assumptions, seek clarification in interviews, and reflect carefully on stakeholder perspectives.

In Chapter 4, my positionality as both a researcher and a doctoral student in conservation leadership directly shaped how I engaged with and interpreted alumni survey data. My belief in the value of leadership competencies and their development over time influenced my expectations and interpretations of trends in self-reported competency. This dual role—as both an evaluator and a participant in the broader field of conservation leadership—required ongoing reflexivity to guard against confirmation bias and to critically assess variation in the data, even when it challenged my assumptions.

Throughout the research process, I worked to maintain a critical and reflexive stance, continuously interrogating how my positionality affects the questions I ask, the interpretations I make, and the conclusions I draw. I have been engaging in ongoing learning around my white

male identity and privilege for the past 24 years, and this journey continues to inform my approach to ethical and inclusive scholarship and practice.

CHAPTER 2: A FRAMEWORK FOR CONCEPTUALIZING LEADERSHIP IN CONSERVATION

Abstract

Conservation challenges occur in complex social-ecological systems that require scientists and practitioners to recognize and embrace that humans are active agents within these systems. This interdependence of the social and ecological components of systems necessitates effective leadership to address and solve conservation problems successfully. Although conservation practitioners increasingly recognize leadership as critical to achieve conservation goals, clarity about the term leadership remains elusive in terms of specific strategies and behaviors. Our objective in this review of conservation leadership scholarship was to build on prior literature to conceptualize and define the behavioral leadership strategies that lead to successful conservation outcomes. Following an initial review of more than 1,200 peer-reviewed publications, we conducted a systematic review of 59 articles utilizing an inductive analysis approach and identified a set of five leadership domains that contribute to positive conservation outcomes: (1) stakeholder engagement, (2) trust, (3) vision, (4) individual champion, and (5) excellence in internal attributes. Each domain is defined by two to four behaviors that we consider leadership practices. To sustain meaningful progress toward global conservation of biodiversity, conservation scientists and practitioners must embrace and invest in leadership as an integral component of solving our collective conservation challenges [1].

[1] Webb, S. A., Bruyere, B., Halladay, M., & Walker, S. (2022). A framework for conceptualizing leadership in conservation. *Oryx,* 56(5), 664-670.

Introduction

Contemporary conservation issues are complex and require a deep understanding of social-ecological systems to design solutions that sustain both livelihoods and the natural environment. Conservation science, an interdisciplinary field that encompasses social and natural systems and their interactions and interdependencies (Kareiva & Marvier, 2012), recognizes that people are active agents in the functioning of these systems, and thus conservation professionals need to build an understanding of both the organizational and ecological systems in which they carry out their work (Black & Groombridge, 2010; Black et al., 2013). Successfully integrating conservation science with processes that effectively mobilize people to achieve a conservation goal is largely a social challenge, involving human attitudes, values, beliefs and behaviors, and requires leaders that understand and embrace this reality (Manolis et al., 2009).

The study of leadership is rooted in management, education and organizational studies spanning more than six decades of scholarly work (Bruyere, 2015; Evans et al., 2015). However, although the field of conservation is a well-established discipline, the integration of leadership with conservation in academic research is relatively sparse. In addition, the term conservation leadership lacks a shared understanding, and broader leadership theories from non-conservation disciplines have been underused in their application to conservation and environmental sciences (Dietz et al., 2004; Manolis et al., 2009; Bruyere, 2015; Case et al., 2015; Englefield et al., 2019). Yet, leadership has been considered one of 'the most important attributes in the tool kit of a conservation biologist' (Dietz et al., 2004, p. 274).

In addition, there are numerous programs in postsecondary and non-governmental institutions specifically named ‘conservation leadership’, and more published research about the topic, especially since 2015 (Bruyere, 2015; Black, 2019). Black (2019) searched multiple research databases using leadership and psychology keywords (the inclusion of ‘psychology’ is a key distinction from other conservation leadership literature) and applied a four-part leadership framework (Black et al., 2011) to analyze the results. The framework included broad categories of vision, hands-on management, big picture and details, and learning and improvement; this framework was supported in a subsequent literature search using the same terms ‘leadership and psychology’. Black et al. (2013) followed up the framework by advocating for systems-thinking in effective conservation practice.

Although competent leaders have risen among the ranks of conservation professionals, there is a deficiency of understanding about what makes them effective (Manolis et al., 2009). Furthermore, although conservation leadership is an important topic of study, the scholarship on this subject generally still lacks a clear and concise definition of the term, with some exceptions (Manolis et al., 2009). Our definition of conservation leadership for the purpose of this review is ‘positively influencing others to engage in behaviors that contribute to a shared goal to protect and conserve social-ecological systems for the long-term health of the planet’. This definition borrows from others’ work that emphasizes leadership as influencing others and pursuing a defined goal or vision (Metcalf & Benn, 2013; Bruyere, 2015). To examine how an individual can be effective as a conservation leader, the guiding question for this systematic review was: What are the practices that positively influence other people and lead to positive conservation outcomes?

Methods

Literature Search and Inclusion Criteria

For our systematic review, we chose Web of Science (Clarivate Analytics, Philadelphia, USA) as the database for our literature search because of its comprehensiveness within the field of conservation. We used the search terms 'conservation leader*' OR 'natural resource leader*' (performed on 5 July 2018 and again on 13 April 2020 following revision). We intentionally limited the search terms to specifically ascertain how leadership is conceptualized in contemporary conservation and natural resource programs. The search was restricted to peer-reviewed proceedings and articles published during 2000-2020. This time range was chosen to capture the more recent research about leadership, which we presume would reflect leadership for more current conservation issues such as climate change and biodiversity loss.

Two authors reviewed the titles and abstracts of all articles in the initial search to determine further inclusion in the systematic review using exclusion criteria described below. When uncertain, an article was retained. The full text of all retained articles was reviewed by the same two researchers, for a second determination of further inclusion in the review. We excluded articles that did not appear to include a conservation context. We also excluded articles that only mentioned or discussed leadership superficially or failed to provide any depth of discussion or behavioral explanation of leadership or generally about the means for positively influencing others. Finally, if an article focused on outcomes that were only indirectly related to conservation, we did not include it. For example, an article about leadership to increase landowner participation in collaborative meetings would not be included as meeting

participation is not a conservation outcome, but an article about increasing landowner participation in restoration projects would be (Figure 1).

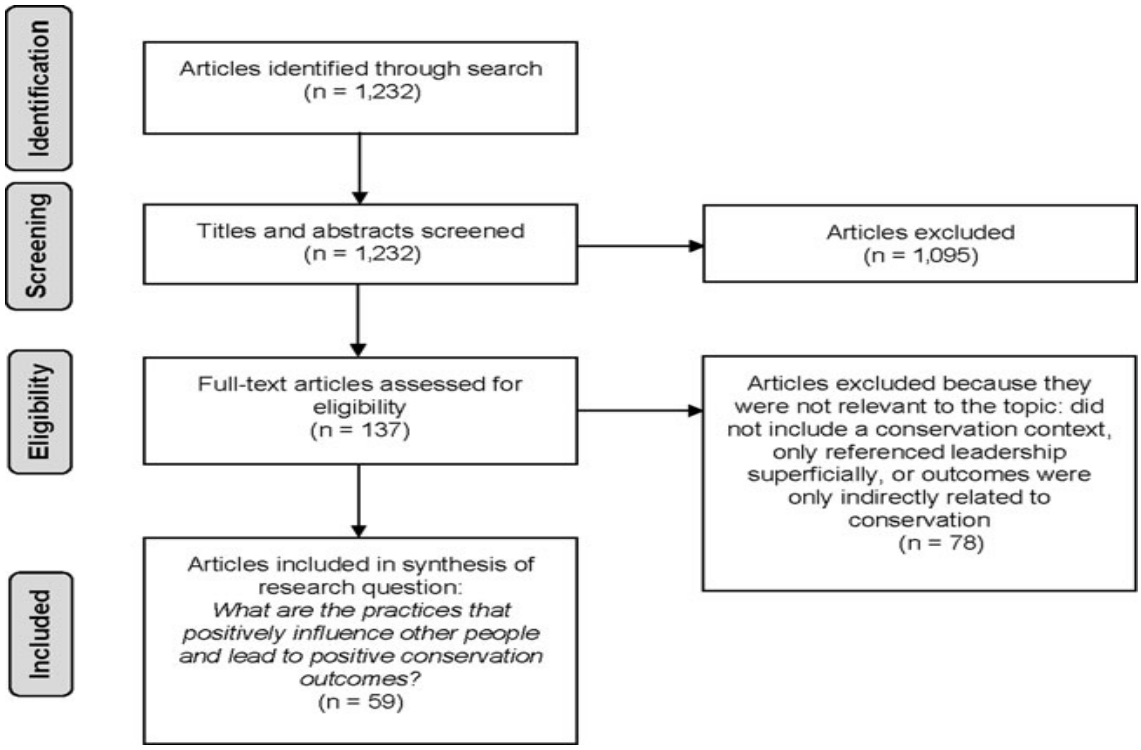

Figure 1

A flow diagram of the Web of Science literature search. The number of studies that were located, retained and excluded are shown at each stage.

Data Coding and Analysis

Employing an inductive approach during the full-text review, the articles retained were independently examined by two of us, and each independently noted leadership practices discussed in the papers. This led to two initial lists of leadership practices. These were compared (agreement between the two was 90%) and a final list of 15 leadership practices was then compiled. These practices were then grouped based on similarities, often involving re-examination of the leadership concepts presented in the articles. This process led to five

categories, or domains, to which each of the 15 practices were assigned. This inductive approach allowed the research findings to emerge from the frequent, dominant or significant themes inherent in the collection of articles, without influence by pre-determined models, preconceptions or assumptions, which we felt was the best approach given the lack of substantial relevant literature (Thomas, 2006). A third author conducted an additional deductive analysis of the articles, using the list of 15 practices to code them. This provided an additional measure of reliability.

Quantitative analysis included numeric summaries of how frequently the 15 practices were present, to determine how often each specific leadership practice was discussed in the set of retained articles. In addition, the articles were tallied by year of publication to examine the distribution and any temporal trend.

Results

The initial Web of Science search yielded 1,232 articles. Of these, 1,095 were excluded after the initial review of titles and abstracts. The most common rationale for exclusion was the mention of leadership only in passing or in a context inconsistent with the notion of leadership as a strategy for influencing people (e.g., leaders as good technicians or statisticians). The full-text review of the remaining 137 articles resulted in a final set of 59 articles for use in the systematic review (Figure 1, see Appendix 1: Supplementary Table 1). These articles usually described original research (two articles were systematic reviews) and were published in a range of journals, including some with the highest impact factors in this field. Articles included both quantitative and qualitative studies and represented many of the major areas of conservation (e.g., fisheries, forestry, marine protected areas, wildlife). The search comprised

articles published over 21 years, from 2000 to mid-April 2020. Of the 59 articles, 55 (93%) were published during 2008–2019 and only four (7%) during 2000–2007 (Figure 2). The period 2014–2019 accounted for 60% of articles (35).

Each of the five leadership domains comprised two to four of the 15 leadership practices that involve influencing others to achieve positive conservation outcomes. The five domains were stakeholder engagement (47 of 59 articles, 80%), trust (43, 73%), vision (32, 54%), individual champion (30, 51%), and excellence in internal attributes (28, 47%) (see Appendix 1: Supplementary Table 1).

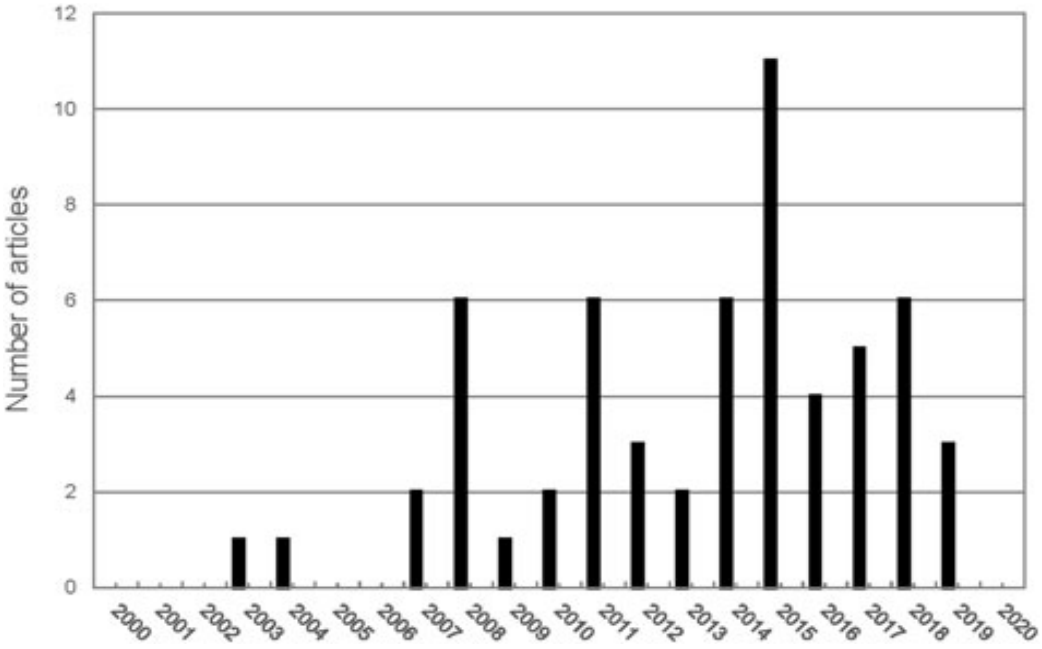

Figure 2

Number of articles (of a total of 59 reviewed; Fig. 1) on leadership in conservation and natural resources published from 2000 to mid-April 2020.

Stakeholder Engagement

Nearly 80% of the articles emphasized the importance of working effectively with others to achieve goals. The four specific leadership practices that emerged from our review for the stakeholder engagement domain were extending access to stakeholders to influence decision-making, sufficient communication with stakeholders, addressing conflict effectively and establishing clear roles for partners. The stakeholder engagement domain represents the skills for working with diverse stakeholder groups and the importance of sharing decision-making with constituents who have something to gain or lose by conservation action. It also encompasses skills related to conflict management and partnership-building; the former is often inevitable given the contention, history, diverse values and other common aspects of conservation issues, and the latter is often a prerequisite for successful action, as conservation issues typically span borders of different landowners and/or land users.

Trust

Almost three-quarters of the 59 articles described activities around building trust among stakeholders and communities as critical for successful conservation programs. Leadership practices included investing time to become familiar with local context and culture; taking time to build relationships and understand stakeholders' needs, values and concerns; and facilitating a two-way exchange of knowledge with the local community. The trust domain also encompasses interpersonal and cross-cultural skills needed to bridge spheres of knowledge and understanding, which ultimately helps to foster relationships with reciprocity and mutuality.

Vision

Vision is well-established in leadership literature from the business and education sectors, understood as an explicitly defined and often aspirational goal for what a team is working towards (Kouzes & Posner, 2012). In 54% of the articles, vision was noted as important for building and achieving effective conservation effort, which aligns with aspects of leadership in other disciplines. The vision domain included two practices: defining a vision about what is to be achieved and integrating the input of external groups/stakeholders to build the vision. This domain embodies the need to collaboratively develop and articulate a vision that fosters innovation, as well as commitment and ownership among stakeholders, and helps define the scope of the work to be accomplished and a path for achieving the goals.

Individual Champion

The significance of a strong and steadfast leader to champion the conservation cause was cited in just over 50% of the articles. An individual who embodies persistence and passion, and inspires and influences those around them to act, can be important to achieve successful conservation outcomes. The individual champion domain included the practices of persisting through challenging periods, demonstrating unwavering passion for the conservation cause, and inspiring others to act. Someone who is able to engage and inspire partners and stakeholders, catalyze support, build and maintain trusting relationships, and persist through the fluctuations of conservation action, typifies the notion of the individual champion.

Excellence in Internal Attributes

This domain was represented in 48% of the articles and focuses on the attributes of how a conservation organization or collaborative group functions internally. Conservation

organizations and leaders must be adaptable to the fluctuating forces that shape their work. In this domain the practices included exhibiting clear and effective communication with staff or team members, demonstrating the ability to understand and/or address the conservation issue at different scales, and adapting to changing circumstances.

Discussion

Conservation leadership is an emerging area of interest to scholars. Although our review covered articles published during 2000–2020, more than half of the articles were published from 2014 onwards, indicating the recent interest in this subject. This trend is consistent with the rise in training initiatives from universities and NGOs with 'conservation leadership' in the title, such as the Conservation Leadership master's program at the University of Cambridge (UK), the Conservation Leadership Programme offered jointly by BirdLife International, the Wildlife Conservation Society and Fauna & Flora International, the Conservation Leadership through Learning master's program at Colorado State University (USA), and the MBA for Conservation Leaders at the African Leadership University (Rwanda). These and other recent programs focus on the skills needed to influence others to work collectively towards conservation goals. The increase in scholarship on this subject and the simultaneous rise in training programs indicates that conservation leadership is receiving unprecedented attention.

One of our goals was to examine what conservation leadership means. Several articles in our review noted the lack of consensus around a clear definition of conservation leadership (Dietz et al., 2004; Manolis et al., 2009; Black et al., 2011; Bruyere, 2015; Case et al., 2015), and Bruyere (2015) called on conservation academics and practitioners to work towards a shared understanding of conservation leadership as a term with a specific definition and suite of

practices. In a separate anecdotal review of programs, we found leadership programs that were mostly focused on technical skills (e.g., mapping, field-based data collection skills), and others that were focused on skills we associate more with leadership, such as motivating others, establishing vision, and working collaboratively. The latter programs are more consistent with how leadership has been historically conceptualized in other sectors (Grint, 2011).

Our review brings us closer to a clarified understanding of conservation leadership. The framework of our five leadership domains (*stakeholder engagement, trust, vision, individual champion and excellence in internal attributes*) helps conceptualize what conservation leadership means and is consistent with aspects of leadership theories more broadly. For example, most of the domains and practices in our results are accounted for in Mango's (2018) synthesis of non-conservation leadership theories, such as trust (in Mango's character domain); adaptability, vision and passion (characteristics domain); conflict, communication, inspiration/ motivation (people practices domain); and knowing local context, stakeholder engagement (context domain). Overall, what it means to be a conservation leader overlaps with how many scholars in fields with a longer history of studying leadership have described it (Grint, 2011; Kouzes & Posner, 2012).

Stakeholder Engagement

Some of our results were not surprising. Many of them are consistent with prior research that points to the importance of approaches such as collaborative conservation, local involvement, stakeholder participation, and similar concepts for conservation success (Brooks, 2017; Sterling et al., 2017). Consequently, the inclusion of stakeholder engagement in 80% of the articles we reviewed is consistent with more widely studied and accepted best practices of contemporary conservation, practices that fit under the term conservation leadership. Few

conservation problems can be addressed within a single organization or group (Dietz et al., 2004; Manolis et al., 2009), which further highlights the importance of stakeholder input for designing solutions, and partnerships for helping solutions come to fruition. Leadership with a focus on stakeholder engagement values diverse interests and perspectives in conservation decision-making, characterized by the practice of bridging differences and bringing diverse parties together to jointly solve problems and make shared decisions (Ardoin et al., 2015). For example, in an examination of three community-based natural resource management projects in southern Africa, Dyer et al. (2014) found direct links between engagement with community members and conservation outcomes. Best practices in the study's community-based natural resource management encompassed regular communication, mutual respect, and clarity of roles and responsibilities. Their findings also suggested that community understanding and ownership of the project goals and empowerment in the implementation of the project can lead to successful project outcomes. Similarly, a quantitative analysis of 48 mammalian recovery programs concluded that community support and stakeholder agreement were key factors in successful species recovery outcomes (Crees et al., 2016), with effective stakeholder coordination and informal collaboration connected to the capacity and ability of partners to influence decision making.

Trust

Our trust domain aligns with our findings on stakeholder engagement: building trust is a logical prerequisite to collaborating effectively with stakeholder groups. Trust is particularly important given that conservation action often involves behavior change, and prior to advocating for behavior change, conservationists need to establish credibility and trust. To do this, our

results indicated that knowing the local culture, building relationships, and exchanging knowledge are critical investments. Investigating effective leadership competencies and qualities through the perspective of followers within conservation initiatives, Englefield et al. (2019) discovered that the ability to build trust between individuals was the most important competency and played a foundational role in other critical competencies such as collaboration among stakeholders. Similarly, in an analysis of social science research on large carnivore governance and management in Sweden, a fundamental requirement for building relationships among stakeholders and decision-makers was the establishment of trust, particularly when the issue at hand can appear to have significant competing values and interests (Sjolander-Lindqvist et al., 2015). In evaluating community support for locally managed coral reef restoration projects in Bali, local leaders who integrated scientific knowledge with local spiritual beliefs were able to garner trust, positive perceptions and robust participation of the community (Trialfhianty & Suadi, 2017). An examination of 18 case studies of small-scale fisheries concluded that when facilitation is conducted by an individual or an organization from outside the local community (e.g., a research institution or governmental entity), an exchange and integration of science with local ecological knowledge was crucial for building trust and promoting mutual respect between the local community and scientists (Sutton & Rudd, 2016). A review of 15 studies from various areas concluded that although concepts such as trust may be universally important, strategies for building trust can vary widely; an effective strategy in one region could be detrimental in another (Straka et al., 2018).

Vision

In a qualitative study to examine what motivates people to understand and adopt sustainable, pro-environmental behaviors, transformational and collaborative leaders inspired new ways of conceptualizing a problem and invoked a commitment to work collectively towards a common vision and shared goals (Ardoin et al., 2015). In a case study examining wetland ecology and a citizen science program in Maine (USA), a visionary leader who helped stakeholders define clear goals also provided sustained motivation and continuity between program phases (McGreavy et al., 2016). In an exploratory analysis of the elements behind the effectiveness of a long-term community-based conservation and development project in South Africa, the vision of a strong tribal leader was a major factor contributing to success (Davenport & Hassan, 2019).

Individual Champion

Our individual champion domain resonates with older models of leadership as a behavior of a singular individual, often a person at or towards the top of an organizational hierarchy, or an individual with charisma (Sankar, 2003). This is counter to more contemporary views of leadership (Mango, 2018), in which individuals can lead from anywhere within a group, and leadership can be practiced quietly (e.g., by example). Nevertheless, we recognize that leading a group sometimes requires inspirational words delivered with enthusiasm and emotion by a positional leader. There can be a role for charisma in conservation, to mobilize support and action. However, as contemporary leadership models posit, such characteristics are not required to be effective leaders (Kouzes & Posner, 2012; Mango, 2018). Comparing two case studies of programs that attempted to protect rapidly declining iconic species in Australia, a key difference between successful and unsuccessful species recovery initiatives was the presence of a leader

who had intimate ecological knowledge of the species, guided the management and implementation processes, and advocated for the urgent need to act (Martin et al., 2012). Likewise, in an examination of 130 comanaged fisheries in a variety of countries, the presence of a respected and entrepreneurial local community leader who was highly motivated and committed to the co-management implementation process was essential for success (Gutièrrez et al., 2011). Diverging from the finding that an individual champion typically arises from the local community, Sutton & Rudd (2014) noted that in community-based fisheries management it is more important that a project champion exists.

Excellence in Internal Attributes

In their study of wetland restoration in Sweden, Blicharska & Rönnbäck (2018) identified several essential internal attributes of project leaders that contributed to successful implementation of conservation projects. These encompassed several strategies represented in our domains, including the need for an adaptive management approach, a collaborative mindset and exchange of knowledge. Highlighting the need to be accommodating to changing circumstances, through interviews with conservation practitioners around the world, Bruyere (2015) concluded that adaptive management requires leaders to be adjustable and willing to change course when external forces or organizational priorities shift, and to operate in a context of uncertainty. On an organizational level, Bartlett (2018) identified effective communication and dissemination of knowledge, program implementation flexibility, monitoring and review, and a willingness to innovate as frequently cited factors for success in collaborative forestry research projects in Papua New Guinea.

Conclusion

Overall, our review is consistent with what Englefield et al. (2019) labelled "interpersonal competencies." Our findings have some consistencies with Black's (2019) review: there are parallels about vision, partnerships, clearly defined roles and effective internal communication. Comparing our findings with those of Englefield et al. (2019) and Black (2019), there is a shared understanding of conservation leadership as comprising skills to motivate effectively and positively and interact with and inspire others toward a shared conservation outcome.

In addition, similar to the conclusions of Straka et al. (2018), we note that conservation leadership needs to be researched and applied with attention to culture and context. The importance of our individual domains will vary depending on context: some domains will be more important than others, and other strategies may be successful that we did not capture in our review, depending on the specific nuances of a situation. This need to take a case-specific approach, as illustrated by interviews with female conservation leaders, which included findings that were not captured in our review, related to inequalities and the importance of supportive networks of peers (Jones & Solomon, 2019).

Leadership is lauded as a critical tool for conservation scientists and practitioners, although this is still an emerging area of research. The findings of our review indicate there is some agreement regarding the strategies and behaviors associated with effective leadership and positive conservation outcomes. A continued reflective and empirical focus on leadership is essential for further developing the impact leadership can have in helping to advance the goals of conservation science. Clearly defining the term and further linking the practices that individuals must employ to have a positive influence on others to achieve conservation outcomes, are

among the most pressing topics for research on conservation leadership. The framework we have presented here could be applied to future research on this relationship and lead to the development of context-relevant models for conservation leadership practice.

CHAPTER 3: EXPLORING LEADERSHIP IN PRIVATE LANDS SPECIES RECOVERY: THE MOUNTAIN PLOVER NEST CONSERVATION PROGRAM

Introduction

Rapidly accelerating species loss is one of the more critical conservation issues throughout the world, and much of the literature on species conservation programs have ascribed failures to deficiencies in biological knowledge (Sutton, 2015). Researchers have increasingly recognized that ecological knowledge alone is insufficient to address the full complexity of conservation challenges and have advocated for capacity-building and competent leadership to achieve more impactful biodiversity conservation outcomes for species and systems (Bruyere et al., 2022; Nery Silva et al., 2022). Across other literature, scholars have emphasized that conservation outcomes are equally shaped by *human dimensions* that extend beyond leadership, including the diverse social, cultural, institutional, governance, and political factors that influence conservation success (Bennett et al., 2017; Mascia, 2003). However, despite increasing attention to these factors, conservation practice has often struggled to fully integrate social science perspectives due to historical disciplinary biases favoring natural sciences, institutional silos, and the inherent complexity of managing social-ecological systems (Bennett et al., 2017; Sandbrook et al., 2013).

Within this broad category of human dimensions, leadership has emerged as a particularly important, but underexamined factor shaping conservation outcomes (Bruyere et al., 2022; Nery Silva et al., 2022; Webb et al., 2022). Conservation leadership encompasses a wide range of interpersonal and behavioral competencies that enable individuals to influence

others, foster collaboration, and advance shared conservation goals (Black, 2019; Englefield et al., 2019; Webb et al., 2022). Effective conservation leaders must engage diverse stakeholders, build partnerships across institutional and cultural boundaries, communicate visions for shared outcomes, and foster trust among actors with varying interests (Abu-Bakarr et al., 2022; Burbach et al., 2023; Davenport & Hassan, 2020).

Recent studies have examined how leadership competencies—such as relationship-building, communication, boundary-spanning, and trust-building—contribute to success in species recovery and community-based conservation programs (Burbach et al., 2023; Davenport & Hassan, 2020; Koch et al., 2023). Trust is especially important in species conservation because implementing conservation actions and solutions involves behavior change and is often carried out on private lands, requiring the participation of landowners (Davenport & Hassan, 2020; Englefield et al., 2019; Webb et al., 2022). Equally significantly are the contributions of an individual leader who inspires and influences those around them to act. The presence of a motivated and respected local leader to champion the cause often determines whether collaborative management efforts succeed or fail (Gutièrrez et al., 2011; Webb et al., 2022).

Despite these growing insights, gaps remain in understanding how leadership behaviors function in specific species recovery programs. There is a growing need for research to translate to real-world, on the ground impacts and for researchers and practitioners to engage with conservation social science (Sabo et al., 2024). Private lands play an increasingly critical role in biodiversity conservation, and more research is needed to examine how leadership

competencies manifest within and contribute to successful voluntary species conservation programs on working landscapes.

Conceptual Framework

The c*onceptualizing leadership in conservation* framework developed by Webb et al. (2022; see Chapter 2) serves as the theoretical basis of this chapter on the Mountain Plover Nest Conservation Program. The authors reviewed 59 articles utilizing an inductive thematic analysis approach and identified five leadership domains that contribute to positive conservation outcomes: (1) stakeholder engagement, (2) trust, (3) vision, (4) individual champion, and (5) excellence in internal attributes. Each domain is defined by two to four leadership behaviors (Figure 3). This framework helps clarify and define conservation leadership by linking the domains to specific practices individuals can employ to positively influence others to achieve conservation outcomes. It also provides a lens for understanding the human dimension of leadership within conservation programs and is consistent with aspects of leadership theories more broadly.

As discussed in Chapter 2, most of the domains and behavioral practices in the Webb et al. (2022) conceptual framework are accounted for in other leadership frameworks, such as Mango's (2018) synthesis of 22 non-conservation leadership theories that included trust, adaptability, vision and passion, conflict, communication, inspiration and motivation, knowing local context, and stakeholder engagement. Further, many of the leadership practices are consistent with what Englefield et al. (2019) labeled "interpersonal competencies" And Black's (2019) categories of vision, partnerships, clearly defined roles and effective internal communication.

Figure 3

A framework for conceptualizing leadership in conservation. Leadership domains and practices (Webb et al., 2022).

This study is also grounded in the premise that leadership behaviors can be fostered and developed in individuals; they are not traits one inherently possesses or not and are independent of positional or expert power. Roberts (2007) noted that in the 19th and early 20th centuries, the prevailing wisdom about leadership relied on the "Great Man" theories that suggested leaders were born and that leadership ability was inherited or innate. Conversely, Mango (2018) found that over 80 percent of leadership theories describe the importance of what leaders do, not who they are or what traits they inherently possess, that determines their ability to positively influence others to contribute to a shared goal and achieve desired outcomes.

Purpose of Study

The purpose of this study was to apply the *conceptualizing leadership in conservation* framework by Webb et al. (2022) to a case in order to explore how leadership practices function within a voluntary private lands species recovery program. While the framework synthesized leadership practices across multiple conservation contexts, there remains a need to apply and test these domains in specific, real-world cases to better understand how they manifest in practice, particularly within programs that rely on voluntary participation from private landowners. This study focused on a singular outcome: landowner participation. While landowner engagement contributed to successful outcomes—such as greater nest protection and helping to prevent the Mountain Plover from being listed as an endangered species—exploring the biological aspects of species recovery was not the study's aim. Rather, the purpose was to examine the social and interpersonal dimensions of leadership practices among program administrators and participants. Understanding these processes is essential to implementing biodiversity and species conservation measures on private lands.

The Mountain Plover Nest Conservation Program provided an ideal case study to examine the relevance and application of the Webb et al. (2022) framework. The program, administered by Bird Conservancy of the Rockies in partnership with farmers in southwestern Nebraska, represents a successful voluntary, incentive-based approach to species conservation on working agricultural landscapes. Because successful implementation of the program required navigating complex relationships between conservation professionals and private landowners, this case offered a valuable opportunity to investigate the interpersonal leadership practices that shaped landowner engagement and participation. In this way, the study serves

not only to explore leadership in this particular program, but also to contribute to the broader understanding of how leadership functions in private lands conservation efforts more generally. The research question that guided this study was: *What were the leadership practices that led to effective private landowner participation in the Mountain Plover Nest Conservation Program?*

Study Area

This study was conducted in the town and county of Kimball, Nebraska (Figure 4), a small (population ~2,500), rural, farming community located in the southwestern panhandle region and is the primary habitat for Mountain Plovers in the state. Mountain Plovers make their nests and fledge their young on flat, dry, open, bare ground. Fallow or recently planted agricultural fields, which are abundant in this area, provide ideal habitat because the cultivated land mimics their natural shortgrass prairie habitat (Bird Conservancy of the Rockies, n.d.).

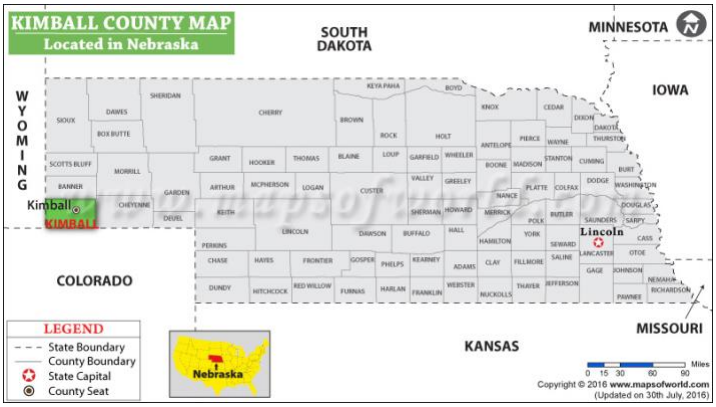

Figure 4

Mountain Plover Nest Conservation Program Study Area.

Mountain Plover Nest Conservation Program

In 2001, BCR partnered with the Nebraska Game and Parks Commission to create and coordinate a nest-marking program with farmers in western Nebraska. The Nebraska Prairie

Partners (NPP) program trained private landowners in locating and marking Mountain Plover nests and enabled farmers to avoid inadvertently plowing over plover nests during cultivation. A financial incentive was offered for each nest marked until the program's funding was exhausted. Thousands of Mountain Plover chicks and their nests have been saved since the program's inception in western Nebraska, primarily in Kimball County. BCR's research shows a hatching rate of 83% for Mountain Plovers on marked nests. This compares to a 22% hatching rate on unmarked, dummy nests on crop fields.

The Mountain Plover is classified as a threatened bird in Nebraska. The state's wildlife action plan identifies it as a Tier I at-risk species (Bird Conservancy of the Rockies, n.d.). While there were other partners in the program (e.g., Nebraska Game and Parks Commission, funding agency, local tourism board), the on-the-ground conservation work was carried out by BCR employees and the participating private landowners. As noted above, a local BCR project manager who was also a farmer and landowner in Kimball served as BCR's community liaison working directly with the landowners, while a BCR wildlife biologist and habitat coordinator handled program logistics.

Methods

A qualitative, retrospective case study design and method was utilized as it provides an optimal opportunity to contextually examine the consequences of the human response or the actions and interactions of key individuals involved in the program at the height of its successful implementation in Kimball, Nebraska (see Corbin & Strauss, 2015). This social constructivist epistemological approach (i.e., theory of knowledge; ways of knowing and making meaning of the world) to the inquiry was chosen because the research question is centered around

leadership practices that are socially constructed and contextually situated within a conservation program, organization and a rural farming community (Bazeley, 2020; Newing et al., 2011). Since leadership is comprised of human behaviors and interpersonal interactions among various actors, this study explored the complexity of the perspectives and interpretations of the administrators, scientists, and landowners who participated in implementing the program and conservation action (Merriam & Tisdell, 2016; Newing et al., 2011). The Mountain Plover Nest Conservation Program was investigated via the analysis of on-site, semi-structured interviews with BCR staff and private landowners.

Data-gathering Methods

The sites for the interviews were the BCR main office located in Fort Collins, Colorado, and in Kimball, Nebraska. Eight semi-structured interviews were conducted. In June 2017 two BCR program staff were interviewed: one administrator and one wildlife biologist. In November 2017 five private landowner participants were interviewed in addition to the local project manager who had been involved in the program for 15 years and is also a farmer and landowner in Kimball. Given the study's focus on understanding successful landowner participation, interviewees were selected from among the most engaged BCR partners. Selection was based on the local project manager's relationships and recommendations, as well as the individuals' willingness to participate. This approach aligns with recommended qualitative methods, which emphasize relationship-building to support richer, more reliable data (Newing et al., 2011). The project manager's strong rapport with interviewees facilitated a positive dynamic, aided by his role in recruiting participants and attending the interviews.

Interviews were audio recorded on an iPad and transcribed verbatim by a third-party service. The length of interviews ranged from 20 to 90 minutes. A total of 10 questions guided the interviews and were centered on topics such as their individual roles and participation in the project, characteristics of landowners' partnership with BCR, communication, conflict resolution (if relevant), and their perceived greatest challenges to and successes in the project (see Appendix 2: Chapter 3 Interview Protocol). The questions were grounded in the conceptual framework guiding the study, and were selected to help understand and illuminate how the program was successful at gaining participation from landowners who had limited to no knowledge about the Mountain Plover and the reasons to farm around a small, ground nesting bird. A CSU Institutional Review Board coordinator reviewed and approved this project (IRB ID: 064-18H, Review Date: April 11, 2017).

Data Analysis Procedures

I employed a thematic analysis method to identify, analyze, and report patterns or themes within the data (see Bazeley, 2020; Braun & Clark, 2006; Corbin & Strauss, 2015), an approach in which the researcher is positioned as active in the process and facilitates the construction of frequent, dominant, or significant themes in the interview transcripts (Braun & Clark, 2006; Thomas, 2006). Analysis drew from the domains and practices from the *framework for conceptualizing leadership in conservation* (Webb et al., 2022, Figure 4) using a deductive approach to build a comprehensive, contextualized, and integrated understanding (Bazeley, 2020). The goal was to examine if the findings from the framework are represented in the interview transcript data, and if so, in what contexts. All coding was conducted manually by hand, without the assistance of qualitative analysis software.

Though the framework served as the primary guide for analysis, I remained open to the possibility of other explanations and themes emerging via abductive analysis, an inferential approach and process that is exploratory, creative, and speculative (Rinehart, 2021). I also conducted a poetic analysis, a form of arts-based inquiry, as a creative addition to my thematic analysis to present and interpret aspects of the human experience among the stakeholders in the project (see Fernandez-Gimènez et al., 2019). Through this process I examined a particular transcript segment and reduced the data by selecting key statements and phrases to create an original poem and then analyzed it to reveal insights and meanings that were not as apparent in the transcript before the data was presented as a poem.

Results

In coding and comparing the interview transcripts, three major themes emerged that are consistent with domains from the Webb et al. (2022) conceptual framework—*trust*, *individual champion,* and *stakeholder engagement*—but offer some new dimensions. The domain names have been modified slightly to reflect their application in the Mountain Plover Nest Conservation Program, and findings are organized in sections according to the three major themes. In each section, the dimensions of the theme are defined, the salience is described, and illustrative examples from the transcripts are provided. While the results for each theme are discussed individually, it is important to note they are closely interconnected. To build a visual understanding of the linked leadership practices found within the Mountain Plover Nest Conservation Program, the themes are presented as a diagram, with *local champion* representing the primary cog that advances the other themes forward (Figure 5).

Figure 5

Diagram of the major leadership themes.

Trust

The formation of trust between BCR and the landowners was critical for successful participation and implementation of the nest conservation actions carried out on farmers' cultivated fields. The theme and practices of *trust* included understanding the local farming context and culture, building relationships that consider the landowners' needs, values, and concerns, and facilitating a two-way exchange of understanding with the program participants by integrating science with practical knowledge, which are all evident in the Webb et al. (2022) framework (Table 1). These practices encompass the skills needed to bridge spheres of knowledge and understanding, and ultimately helped foster landowner relationships built on reciprocity and mutuality.

The findings clearly indicate that across all interviews, but especially among the farmer participants, trust was mentioned and emerged as a foundational condition for landowner participation in the Mountain Plover Nest Conservation Program. It was one of the most essential elements to the success of the program. The process of building trust was greatly aided by a single local leader who was already a long-time respected member of the community and was hired by BCR to serve as a landowner liaison.

Table 1

Leadership practices of Trust.

Trust
Understand local farming context and culture
Build relationships
Integrate science and practical knowledge

Understand local farming context and culture. The local BCR employee's deep roots in and understanding of the context and culture of this Western Nebraska farming community, and local knowledge as a landowner himself, played a central role in building trust and overcoming some of the farmer's initial skepticism about government regulation:

> *Well, he knows how he wants his land treated, so he's going to treat the other farmers land the same way, with the same respect. I think that makes a difference, that the person they have in charge is a person everybody can trust, rely on.*
>
> *And the community who trust [him]. And maybe that's because we've had [him] as that key person there for like 15 years, so they trust whoever we bring in under [his] wing.*
>
> *If they would've been put on an endangered species list, we would've had a lot more issues with farming the ground where they were at. It kept the government from getting involved in it too.*
>
> *Landowners moved from a 'shovel and shut up' mindset (hiding wildlife presence to avoid regulations) to embracing conservation when they realized the benefits of protecting species like the Mountain Plover.*

Build relationships. The results indicate that the practice of building and maintaining reciprocal relationships helped facilitate the implementation of this community-based conservation project and was a central element that contributed to collaborative landowner engagement. The local leader's existing relationships and involvement in the social fabric of the community significantly aided his ability to gain the confidence of the landowners:

> *That [BCR liaison's involvement] was probably the leading reason that we did it [participated]. Mm-hmm, it was because we had a local representative that was interested enough to take the time to, to get into it and kind of work with us a little bit to get us familiar with what was going on.*
>
> *Knowing him, he could come talk to us and you don't have a stranger sitting there…and someone that's in the community that is doing the same thing that we're doing and has the same goals and risks and everything that we've got. I think that was probably a plus…it makes a lot of difference.*
>
> *And when he brought us, you know, into these meetings and that why we could trust, trust what he was telling us. And, uh, and I think, you know, the, the trust was there. So that was the, the big thing there that, uh, everybody respected him and trusted what he was telling us.*
>
> *I think in a small, pretty tight-knit community like we have here, it's real important [to have trust and respect]. It made it easy for me to do my job, my position in contacting and recruiting landowners. It really made it easy.*

Integrate science with practical knowledge. Through the efforts of the BCR field technicians, and particularly the local leader, they were able to raise awareness about the Mountain Plover and the need for its conservation on cultivated fields by integrating scientific knowledge about the species and its habitat with practical farming realities:

> *I had no idea that these birds were even around. I am sure I'd seen one, but I didn't know what it was and didn't know that they were in trouble.*
>
> *Yeah, so there was always trying to get everybody on the same page, the field technicians and the farmers, get them trained in nest marking techniques.*

A lot of this came from him, just because he had the farm background, he had the bird knowledge…to help adapt the trainings and the methodology a little bit to increase our opportunities to find the nests.

He would call us and ask us what land we wanted them to check and, and, uh, if he got to it before we, you know, was farming it, why they'd have it checked, or if they didn't get to it, why we, you know, if we seen some nests, we'd go around 'em, then I'd give him a call and let him know where we, where we located the nests.

When I get behind on farming, there's sometimes that you hop on the tractor and it's like, I am gonna go and if I see something, I see it. If I don't, I don't.

I should wait till tomorrow in the daylight. No, I can go slow. I can watch for 'em.

These passages underscore the ease with which the BCR field teams were able to carry out their work because of the confidence in a local and trusted individual, and that had been earned and developed over time themselves. It took authentic community engagement, which fostered trust and strengthened relationships, and the blending of scientific information with practical farming knowledge, to help ensure conservation strategies were feasible and effective.

Local Champion

Leveraging a trusted and passionate community figure to act as a liaison, facilitate relationships and communication, engage and inspire participation of landowners, and ensure alignment of conservation goals with farming needs typified the necessary role of a local leader in this community-based species recovery program on private cultivated lands. The theme and practices of *local champion* included demonstrating an unwavering passion, inspiring others to act and become involved in the conservation effort and persisting through the challenges of aligning conservation goals with agricultural needs and realities (Table 2). These practices had a positive impact on building trust and securing landowner participation.

Local champion was the most salient and observed theme in the interview transcripts. Across all interviews, participants highlighted the local BCR liaison's involvement as the most integral element to the success of the program. His name was mentioned 116 times in the interviews. The results are clear that without a local leader to champion the conservation cause, the process of building trust would not have been accomplished as readily, and landowner engagement may not have been as successful or at least would likely have taken a more significant amount of time and effort.

Table 2

Leadership practices of Local Champion.

Local Champion
Unwavering passion
Inspire others to participate
Persist through challenges

Unwavering passion. The findings suggest that the BCR liaison's ability to inspire others to become active and engaged in the program was advanced by his prior standing in the community and a result of how he carried out his work. He embodied passion for the project, influenced other landowners to buy into the vision and offer their acreage for data collection and persisted through the fluctuations of conservation action. His involvement in the community fabric in addition to his farming livelihood, helped him bridge the social and physical divide of the various landowners:

> *[He] has a very charismatic personality that I think is infectious if you're inclined to receive him in that way. So, I could see him easily enticing others, and not everyone, I mean there's certainly people he's grown up with and known is whole life that have no interest, and that's fine. And he knows how to interact with certain people in certain ways, and there's some people that don't really ever want to talk to us, but they're*

totally happy to let us access their fields, so he obviously deals with all that and needs no guidance from me.

Definitely the best guy for the job. I couldn't imagine anybody else doing it.

I think it's his gregariousness, he's very active in the community, in 4H, some of the local shooting clubs, he coaches a lot of things like that, he plays pool, he does everything. So, at a social level he's sort of the opposite of a lot of the local landowners. He doesn't live close to town, but he's always in town. And he likes interacting with people, and so it doesn't take much to I think to like [him] because he's a nice enough guy and he's reasonable, so he's pretty even keeled and level-headed which I think helps.

Inspire others to participate. As a local leader, the BCR liaison catalyzed support and concern for Mountain Plover conservation and built and maintained trusting relationships. Several of the landowners talked about how he played a critical role in their participation, helped them feel comfortable joining the conservation effort, and was the right person to lead the initiative:

It definitely helped…A total stranger come up, you know, it would've been a little harder for him to have got his foot in the door to have his start 'cause total stranger, you know.

Knowing him, he could come talk to us and you don't have a stranger sitting there saying, hey, do you know, we want you to do this and this and this and this.

If somebody would've came into the area that a lot of people didn't know, they probably wouldn't have had it near the response.

Get somebody locally in charge of it too. That way, you know, that knows the area.

Well, I guess he contacted us, so it's, I dunno, it's been quite a few years ago and asked if we'd be interested in participating and, and, uh, we said yes.

It just kept growing and growing and growing. Back when we first started the project and were looking for acres for nest markers, all I did for two weeks was call guys and visit with them about the project and see if we can get permission on the acres before the field season started. The numbers just kept growing and growing and growing and

growing of people that would be willing to let us come on their property. It was just amazing.

Persist through challenges. The nest marking implementation strategies balanced conservation with farming needs, aiming to minimize disruption to daily landowner activities. A collaborative approach by the local champion assisted the landowners in persisting through the fluctuations of conservation action. His intimate understanding of both the necessary conservation techniques and local farming practices helped foster a willingness to protect Mountain Plover nests and adapt farming practices, despite on-the-ground challenges:

A lot of it's just getting an eye for what to watch for after you see a few, you just kind of you get self-trained, I guess.

The biggest challenge was spotting the nests. That was probably the biggest challenge, was spotting the nests. By doing it more and more years, you got better at it.

With his intimate knowledge of farming practices as a landowner himself, the BCR liaison helped adapt the programs' nest-spotting methodology to increase opportunities to find the nests. He held Mountain Plover ecology trainings so that landowners could learn how to locate the birds and nests on their own and regularly visited and assisted them as needed to reinforce the trainings.

Well, since I do a lot of farming at night, I was real big on having him come out and look for him before I would farm. You know, if you're working with lights and the dust comes up and gets in the lights, it's, you know, sometimes it's harder to see.

It really didn't take anything out of production either. It was all in the summer fallow and you went around it until the eggs hatched and then, I mean, then you were, you, then you could put it back in production right away.

And I think it's brought the awareness, you know, that there are other, you know, there are birds that are out there in, in our ground that, you know, we weren't, you know, we weren't really paying attention to before.

These quotes paint the picture and tell the story of someone who has always been involved in his community and has developed the capacity to work with others cooperatively. Becoming involved in the Mountain Plover Nest Conservation Program as a landowner, and as the BCR liaison working with his own community was simply a natural progression of his prior community engagement and laid the foundation for his success as a local champion for the project.

Poetic Analysis Results

The process of creating a poem from the interview transcript confirmed the patterns and meanings from my thematic analysis that led to the most salient theme of *local champion*. This poem, *Hire a Leo**, tells a story in a way that would not have been readily captured without fragmenting and extracting the data. Through iterative refinement of the verbatim interview transcript, I was able to distill and articulate the central theme regarding the pivotal role of a local champion in the project's success.

Hire a Leo

Most projects can’t afford a Leo.
A lot of communities do this without hiring local help.
The most successful ones are landowner lead,
Or at least have landowner buy in, landowner support.
What we’re trying to do has to work for the landowner.

Imagine no Leo?

Yeah, that would have sucked.

So much time on the phone with landowners,

Answering questions, connecting.

Determining the order of field operations.

No way I would know that,

It would have been madness,

You know?

So many in-kind contributions,

Using his dad's trailer to

Transport our ATVs.

Using his brother's property

For ATV training and practice.

Figuring out where we would have permission to mark nests.

We would have had to spend more time up there,

Meeting with landowners.

He held Mountain Plover ecology training,

Training landowners how to find birds on their own.

He has been a key person for 15 years,

They trust whoever we bring in under Leo's wing.

They see these trucks driving around with ATVs on the back,

And they just know who we are, and nobody bugs us.

(*the real name of the BCR liaison was not used to protect privacy)

In this poem the BCR biologist is responding to the question of imagining "not having a Leo" as part of the program, part of their team. She is expressing and affirming the value of having a local farmer who was hired by BCR to recruit and work with landowners in the nest conservation program. Not all conservation organizations or programs are as fortunate, and landowner buy-in is critical for successful conservation efforts that are implemented on private lands. She goes on to describe all the tasks and roles that he played that she or others on her team would have had to do and/or that would not likely have existed without his involvement, for example, the in-kind contributions and local farming and ecological knowledge. Finally, she speaks to the benefits of having a local who is implicitly trusted by other landowners because of his standing in the community. This greatly enabled the accomplishment of their work.

Landowner Engagement

Results from the *landowner engagement* theme represented the principal elements of engaging with and building coalitions of landowners to encourage their participation in the Mountain Plover Nest Conservation Program. The *landowner engagement* theme emphasizes the significance of working effectively with others to achieve conservation goals and embodies the skills for working with individual landowners who have something to gain or lose by the conservation action carried out on their private property. This final theme included the practices of establishing partner roles, incentivizing participation, and communicating effectively (Table 3). The practice of incentivizing participation was not part of the domain from

the Webb et al. (2022) conceptual framework and is a new dimension to *stakeholder engagement*.

Landowner involvement was consistently and explicitly mentioned as a critical factor in the program in all three of the BCR employee transcripts, and implicitly by all the landowner participants themselves. The findings from the interview analysis indicate that the level of landowner participation in the program may not have been possible without the practices of building trust and the actions carried out by the local leader. As such, the practices of *landowner engagement*, in particular the processes of establishing clear partner roles, mimics those of building trust.

Table 3

Leadership practices of Landowner Engagement.

Landowner Engagement
Establish partner roles
Incentivize participation
Communicate effectively

Establish partner roles. The sequence of fostering and developing landowner relationships and participation in the program characterizes the practice of establishing clear partner roles. The local landowner leader and BCR employee was more involved in the steps and stages of developing landowner partnerships than the principal BCR wildlife biologist. The landowner's role was centered on "boots on the ground" conservation program implementation, whereas the wildlife biologist's role was centered on program oversight (e.g., administrative and fiscal tasks, logistics and outcomes):

I honestly didn't do much of that (landowner interaction). A little bit, like to the point of if we're surveying a field, and the landowner's also out in the field starting to till, and some of them would wait, 'oh, I'll go till this field you guys', so just little chit chat. But I didn't have a ton of interaction that really was just his role, and he was good at it, and it was just, 'you just do it'.

The initial step was outreach, creating landowner buy-in and gaining permission to access their property. Establishing rapport by conducting individual visits with landowners, sharing the vision of the program, the basic science about and importance of the species and its status, and the role they would play was critical to create this buy-in and develop the relationships. This approach balanced the farmers' agricultural practices and needs with non-regulatory engagement in the conservation measures implemented. The early stages of implementing the voluntary program (enrolling nearly 80 landowners), involved facilitated discovery and familiarity with the species for the landowners. As they gained awareness of the birds, new knowledge and skills by actively participating in looking for and farming around the nests, often alongside the assistance of the BCR field technicians, a clear role was established for the landowners in the nest conservation program and led to a change in their farming practices to "farm around the nests":

From the beginning, I was just getting permission from them, letting them know what we were doing. Had a bird pocket ID guide that the Bird Conservancy put together, show them what a Mountain Plover looked like. Then once we started finding Mountain Plover nests on these guys' property and they were farming around them, so they had a visual of that bird either on the nest or near that nest while they were farming around that nest, really helped in getting their active participation in, and gave them an eye for locating those birds out in the field. Then they started finding more and more.

My role as a landowner farming, um, just as we did our tillage work, we watched for the plovers, contacted him to make sure that if we weren't gonna be out there looking, that somebody would be out there ahead of us looking as much as we could.

As soon as we found something, we farmed around it, got word to him where, what the strip that was on and, you know, so they could go out. His spotters could go out and stake it.

It was always kind of a competition to see who got more nests on the ground than the others.

Joining the farmers in the early stages of their participation demonstrated a collaborative approach to partnering with them and an acknowledgment that involvement in the program would have an impact on their farming practices. This underscores that developing landowner relationships and building partnerships required time spent together, initially in one-on-one meetings and discussions about the species and the program, but also time in the field together. As noted in the following quotes, maintaining active landowner relationships and participation was nurtured by regular visits to the landowner properties and the continuation of these one-on-one meetings:

So, we had the meetings to draw them in. A lot of it was one-on-one. I travel and visit with landowners, meeting with landowners while we were getting permission to work on these guys' property, visit with them about the species. The one-on-one is still the best. Probably the best time spent on keeping landowners active and involved is that one-on-one.

The biggest benefit I saw was getting everybody together and getting on the same line and just knowing what everybody else was doing and where things overlapped where we could work together on projects. That was probably the biggest thing.

Not even a couple hours after I would call and tell him, he'd have either him personally or one of the people working for him out there on the four-wheeler.

Incentivize participation. As a practice of *stakeholder engagement*, incentivizing stakeholder participation is not reflected in the Webb et al. (2022) framework but is a key feature of BCR's program and helped develop landowner willingness to take part in the program. For example, by appealing to and fostering the landowners shared concern for the

species or wildlife in general and their local ecological landscape, they could “do good” by participating and helping to save the Mountain Plover as an at-risk species in Nebraska. Initially these intrinsic rewards were successful in recruiting participation and several landowners signed on at the beginning with only a desire to support the cause. However, some of the individuals were more cautious, less optimistic, and low-level participating landowners who lacked the motivation to take the time to look for the birds and their nests. They may have altered their farming practices by stopping their equipment to watch for the birds but would not intentionally seek to find them outside of their farming activities.

Recognizing that these landowners may benefit from an additional extrinsic reason to participate actively, other than to avoid regulatory intervention in their farming activities, the program began to incentivize landowner participation by providing financial compensation for each nest identified and marked. Assistance with implementation, particularly when landowners had to prioritize their own farming needs, and providing ongoing support and collaboration added value to the financial incentive. The results illustrate that the nest marking financial incentive did work as intended for some landowners, and increased participation and therefore the number of nests marked and farmed around (thus saving birds and eggs), but as indicated in this participant quote below, it failed to offer a strong enough extrinsic reward for others to fully engage and then the funding for the incentive disappeared:

> *So, we started offering an incentive, and our nest numbers, landowners, the number of landowner nests found was higher percentage that next year of the total nests that we were monitoring in a year…The nest incentive did help for that next year, it was much larger, and then it started tapering off again. I think those landowners made an effort, and some of them weren't successful as they wanted to be. So, they just kind of backed off. They weren't as excited about it as they were before. Even with the incentive, after that first year. We lost funding for the support of the nest payments and nest conservation continued, but at a lower rate.*

Conversely, other farmers were motivated less by the incentive and instead by a strong personal conservation ethic and connection to the land, especially once they had awareness of the bird on their cultivated fields:

> *I look at myself as a conservationist. I think that we are here to farm with the wildlife, and you know, the plant species and everything else that's here. I think that's our job to preserve what we've got here. So, I mean, when they came and said there was something we could do to preserve something, I was all for it. If they [Mountain Plovers] would've been put on the endangered species list, we would have had a lot more issues with farming the ground where they were at. But the biggest benefit was saving the plover and keeping them off the endangered list because we need the species of animals around for our children and grandchildren to see.*

> *I mean, if there was no money in this deal, if they would've come to me and said, hey come to the meeting and we're looking for these birds and we want you to farm around them, I would've farmed around them.*

> *I think it was good definitely at the start of the program, I think it's an incentive to get more people involved, but as it went on, it just kind of became a more of a habit than it was about the finance.*

> *Not keep 'em off the endangered list because we don't want to bother with them farming but keep 'em off the endangered list because we need the species of animals around for our children and grandchildren to see.*

Communicate effectively. This practice comprises the means of disseminating information about the practical and logistical elements of the program, providing updates, and sharing scientific outcomes with the various stakeholders (e.g., landowners, agency partners, local tourism board, and the public), though the primary target of information was the landowners who were actively looking for and marking nests in their fields. Most of the landowner communication was carried out by the local landowner and BCR liaison and greatly aided the field work. Multiple methods were employed to communicate with the landowners, including sending newsletters and holding individual and group meetings. Several landowners

noted that consistent and frequent outreach from BCR was effective in helping them understand the purpose of the program, and keeping them informed, underscoring the importance of clear and regular communication. Educational materials and technical trainings added skills and knowledge acquisition opportunities for the landowners. Pre-season and post-season workshops were highlighted as primary examples of communicating about the project:

> *He came out and told me what the project was, and I think he had some handouts from the bird conservatory and the project and explained it and I think they explained it very well.*

> *Then the landowners the next spring, we're always sharing information with them, either one-on-one or within our newsletters, giving them updates.*

> *His informal things he had early spring, you know, they told us what was going on and how many birds that they had banded and were tracking and, you know, I was just amazed at some of 'em, the distance that they go.*

> *So, after every field season, generally about this time of year, November, December, we would host a workshop. We would invite the local paper to come. So sometimes they did, sometimes they didn't do a write-up for us in the paper, but definitely the tourism center would visit, would come. We'd try to get a Game and Parks employee there, and RCS and NRD employees there, of course the landowners, and general public attend basically an informational workshop. That's how we share most of our data.*

These practices were facets of managing landowner relationships and partially intended to maintain participation in the program. If landowners could 'see' the positive impacts of their efforts in written or other communication, they may be more prone to continue doing the conservation work.

Discussion

Findings in this study point to noteworthy leadership themes and practices that were effective in garnering landowner support of and participation in the Mountain Plover Nest

Conservation Program. These include the importance of landowner partnerships and engagement in species conservation efforts that take place on private lands, the advantages of a local leader who inspires and encourages participation and fosters trust among the landowners on whom implementation of the conservation program relied. The results are well-aligned with the c*onceptualizing leadership in conservation* framework developed by Webb et al. (2022), specifically the framework's domains of *trust, individual champion*, and *stakeholder engagement*. All three of these domains and most of their practices were evident in the results, but the theme that emerged most strongly was that of *individual champion*. Without the local leader, it is hard to imagine the program experiencing the same level of success.

Several initial challenges were identified by participants in this study. They included skepticism by landowners, funding and resource limitations, difficulties with modern farming machinery and nest identification amidst dense crops or large areas of land, and minor conflicts between conservation and agricultural needs. Yet, the interconnected leadership practices within the three major themes helped overcome these challenges, led to successful landowner participation, and likely contributed to the species not being listed as an Endangered Species, the ultimate goal. Broader impacts of this outcome were the avoidance of regulatory burdens being imposed on the farmers by the government and the spawning of a community legacy of awareness, stewardship and voluntary conservation.

Local Champion

Many conservation programs may find it necessary to operate without a local champion to lead the cause and on-the-ground implementation. The findings from this study are supported by previous research (Gutièrrez et al., 2011; Koch et al., 2023; Webb et al., 2022)

and indicate that the success of the nest marking program was closely tied to the presence of a steadfast local leader from the community who carried the joint role of BCR employee and was critical to gaining private landowner buy-in and willingness to participate in the conservation efforts. This leader held ultimate credibility and influence among the community of participating landowners. In this study, the *local champion* could be characterized as all three types of leaders presented by Koch et al. (2023), a *popular leader* by virtue of his many professional and social connections throughout the community of Kimball and the surrounding area, a *trusted leader* because he leveraged his standing in the community to build trust and a sentiment of solidarity—the other landowners knew that he (and by association the other BCR employees) would treat their land with the same care and respect he had for his own—and a *brokerage leader* who was able to bridge the gap between disparate landowners who were initially skeptical and the BCR project administrator and field technicians.

Aligned with Webb et al.'s (2022) domain and practices of an *individual champion*, a *local champion*, who is also a farmer and landowner, and knows the community culture and context intimately, understands the landscape and localized ecology in a way that someone coming from the outside may be unable to achieve. It is not impossible; it takes time and effort spent in the community and on the landscape. This extends the Webb et al. (2022) conceptual framework domain of *individual champion* to consider the benefits of a local versus an outsider providing this role and raises the question of whether it is more important that a project champion arises from the local community or simply that a champion with some level of local knowledge and familiarity exists in the program.

Trust

The results for this theme align with findings from other research on the significance of trust among actors in conservation efforts (Englefield et al., 2019; Webb et al., 2022). The relationships, values, norms and mutual understanding that allowed for cooperation among the landowners and BCR was critical to the Mountain Plover Nest Conservation Program's success. Trust served as the core condition from which landowner engagement was cultivated. The local champion possessed a high degree of social capital, a critical element in community-based conservation (Davenport & Hassan 2020), which helped lay the groundwork for sustained collaboration with the participating landowners. A local leader who integrates scientific knowledge with local beliefs, and in the case of the Mountain Plover, with local farming practices and needs, can garner trust, positive perceptions and robust participation from the landowners (Trialfhianty & Suadi, 2017). This was particularly true for the Mountain Plover Nest Conservation Program since the conservation issue at hand had seemingly competing interests between species recovery and agricultural practices (Sjolander-Lindqvist et al., 2015).

Landowner Engagement

The results for this theme, particularly the practices of building clear roles for partners are consistent with what Burbach et al. (2023) frame as boundary spanning, or a range of skills necessary for building connections that transcend institutional organizational, professional, cultural or related boundaries. The BCR employee and local landowner was undoubtedly a boundary spanner, as evidenced by his ability to easily establish rapport with his fellow farmers, create buy-in for participation, share the vision of the nest marking program and communicate the basic science of Mountain Plover conservation, resulting in the maintenance of not only

participation in the program but ongoing relationships with the other landowners. Successfully reversing the status of a threatened bird species required working with organizations, communities and individuals, highlighting the importance of building clearly defined roles for local landowners who are integral to implementing the conservation solution and action on private land. Webb et al.'s (2022) findings on *stakeholder engagement* reinforces this result that emphasizes the importance of landowner input for designing farming solutions that contributed to the Mountain Plover's recovery.

The financial incentive utilized to encourage and maintain landowner participation was a distinguishing feature of the Mountain Plover Nest Conservation Program. Prior to this research on the program, Ramsdell et al. (2015) conducted a study exploring the possible effects of the financial incentive by surveying the 77 farmers who initially participated in the program and found that on average farmers reported their choice to participate was based on intrinsic motivation, not because of the extrinsic financial reward. This is consistent with the findings that some farmers would have participated regardless of an incentive being offered, and even after the incentive ended, many landowners continued to protect nests and adapt their farming practices voluntarily. This reflected a sense of stewardship and a shift toward valuing biodiversity conservation alongside agricultural productivity (Dayer et al., 2018).

The results are also consistent with research findings from Koch et al. (2023) that noted communication is at the heart of environmental co-management and found direct links between frequent opportunities for communication with stakeholders and establishing a shared understanding and common narrative. In the Mountain Plover Nest Conservation Program, this was accomplished by a variety of means, both formal and informal, that were

consistent and predictable for the landowners and helped them understand the project's objectives and encouraged their active participation.

As visualized in the diagram (Figure 5) and previously described in the results, these major themes are unmistakably linked and not mutually exclusive but rather coalesce as complimentary elements that contributed to the success of the Mountain Plover Nest Conservation Program. The *local champion* "cog" is what facilitated the practices within the other themes of *trust* and *landowner engagement*. The same practices that build partnerships and relationships also build trust. Given how interdependent they are, the lines between *trust* and *local champion* begin to blur and nearly collapse into one another. The local leader was able to perform these roles because he had the trust of his fellow farmers and BCR colleagues, and he held the trust of his peers and colleagues because of who he was as a local community member and leader. Likewise, effective *landowner engagement* was possible because of the level of trust among the landowners and the local leader, and the leadership practices he implemented in carrying out his dual roles in the program.

Limitations

The interviews captured the three key BCR staff involved in implementing the program and the five farmer landowners who actively participated in marking nests and were willing to participate in the interviews retrospectively. Asking the interviewees to reflect on their participation and experience with the program from several years ago may have been impacted by memory decay (LePeau, 2015). Additionally, generalizations to other species conservation programs may be limited by the small sample size of the data, the localized study area and brevity of time onsite.

Implications for Future Research

I was limited in the examination of the program to a few BCR employees, and some of the most active private landowners who participated in the program. However, there are other stakeholders who could be included in a future study (e.g. additional landowners who were not active, federal and state agencies, tourism board members, community members). Additionally, an understanding of the conservation leadership practices involved in community-based species conservation work could be aided by conducting a comparative case analysis that included both successful and unsuccessful program outcomes. A social psychology approach could further examine how and why incentives either work or do not work for encouraging and increasing participation in species conservation. Additional future research could investigate whether a conservation leader needs to consciously decide to attempt to inspire others to act or can they by their own personality characteristics (e.g., charisma, strong interpersonal skills) and behaviors inspire others unintentionally. Lastly, further comparative examinations of species programs without a local champion could add to understanding the value and significance of an unwavering local leader.

Conclusion

This retrospective case study primarily investigated the social and interpersonal leadership practices of the BCR employee and farmer-landowner project manager that led to effective private landowner participation in the Mountain Plover Nest Conservation Program. The results indicate that his actions were successful in developing landowner partnerships and empowering them to be part of the solution. The implementation of the conservation efforts on private farming land was greatly aided by the presence and direct involvement of this

trusted local leader who championed the cause and acted as a liaison between BCR and the landowners. Additional cornerstones of the program were its focus on proactive and non-regulatory engagement with landowners, implementation that relied on flexible and innovative strategies that balanced conservation goals with agricultural realities, and fostering a cultural shift toward voluntary stewardship, conservation and community ownership.

Together, the coupled leadership themes and practices of *trust, local champion,* and *landowner engagement* helped BCR deliver positive conservation outcomes for the Mountain Plover on cultivated fields in Kimball, Nebraska. The collective findings from this study affirm the c*onceptualizing leadership in conservation* framework developed by Webb et al. (2022), and build on the corresponding domains of *trust, individual champion* and *stakeholder engagement*.

This expanded understanding may inform best practices and illustrates how species conservation programs can succeed when rooted in trust, championed by a local leader, and effectively engage the stakeholders who are most impacted by its implementation and integral to its success. The Mountain Plover Nest Conservation Program's ability to transform skepticism into stewardship and align ecological goals with human needs underscores its replicable potential as a model for community-based species conservation on private lands.

CHAPTER 4: BUILDING LEADERSHIP CAPACITY IN EMERGING CONSERVATION PROFESSIONALS

Introduction

Leadership is widely recognized as essential for navigating the complex, interdisciplinary challenges inherent in modern conservation work, and for achieving successful and durable conservation outcomes. It has even been deemed one of "the most important attributes in the toolkit of a conservation biologist" (Dietz et al., 2004, p. 274). Scholars have consistently emphasized that effective conservation leaders must operate in dynamic and uncertain contexts, often requiring interpersonal acumen as much as technical and discipline-specific expertise (Black, 2021; Englefield et al., 2019; Motzer et al., 2021; Slater et al., 2024; Webb et al., 2022). Despite this acknowledged importance, leadership training remains insufficiently prioritized in conservation education and professional development (Black, 2021; Bruyere et al., 2020; Cannon et al., 1996; Manolis et al., 2009; Webb et al., 2022). Conservation professionals frequently face multifaceted ecological and social predicaments with limited formal preparation in leadership competencies such as communication, conflict resolution, and stakeholder engagement (Englefield et al., 2019; Thomas-Walters et al., 2024).

A growing body of literature has attempted to define the leadership competencies most critical to conservation. Syntheses such as the Webb et al. (2022) framework and Black's (2021) empirical model conceptualize conservation leadership across several broad domains and constructs (e.g., stakeholder engagement, vision), that include specific practices (e.g., building a clear vision, sufficiently communicating with stakeholders), reflecting a convergence toward interpersonal and behavioral competencies. Across these and other diverse studies, there is

wide agreement that leadership in conservation relies on trust-building, inclusive visioning, self-awareness, communication and collaboration across differences, and intercultural aptitudes (Black 2021; Bruyere, 2015; Englefield et al., 2019; Straka et al., 2018; Thomas-Walters et al., 2024; Webb et al., 2022). These themes are reinforced by research that highlights the need for leaders who can think systemically, act adaptively, and engage meaningfully with a range of stakeholders and knowledge systems (Bruyere et al., 2020; Jacobson & McDuff, 1998; Langholz & Abeles, 2014; Teel et al., 2022; Thomas-Walters et al., 2024).

In recent years, growing attention has been paid to the design of leadership development in conservation, with increasing recognition of the need for curriculum grounded in real-world leadership practices, other human dimensions skills, and applied learning experiences (Bruyere et al., 2020; Englefield et al., 2019; Loffeld et al., 2022; Sandbrook et al., 2022; Slater et al., 2024; Teel et al., 2022; Thomas-Walters et al., 2024). However, some misalignment exists between the demands of contemporary conservation and the leadership preparation offered through university curriculum and similar capacity-building programs (Motzer et al., 2021; Slater et al., 2024; Teel et al., 2022). Echoing these concerns, Bruyere et al. (2020) identified the need for the conservation sector to build the capacity of “leaders who are self-aware, systems thinkers, adaptive learners, conveners, network builders, collaboration brokers, effective communicators, and innovators” (p. 2).

Despite this emerging consensus on what leadership in conservation entails, several gaps remain. Most notably, with the exception of Sandbrook et al. (2022), few studies have empirically examined how these leadership competencies develop or persist over time, particularly among alumni of formal conservation leadership education programs in higher

education. While the literature identifies what skills are needed, there is limited evidence on how those skills are retained, perceived, and applied in different career stages or professional contexts.

Purpose of Study

This study sought to contribute to the growing body of research on conservation leadership education and address a gap in the literature by examining the competency and long-term relevance of leadership practices among alumni of the Master of Conservation Leadership program at Colorado State University. Drawing on survey data from the program's first 10 cohorts (2012–2022) and analyzing data across years since graduation and job sectors, it explored whether conservation leadership practices are perceived as enduring and applicable in the different stages and contexts of professional conservation work. In doing so, it aimed to offer new insights into the lasting effects of leadership education and inform the future design of programs designed to build leadership capacity for conservation impact.

Research Questions

The research questions guiding this study were: (1) Do self-reported competency and relevance of leadership practices change over time for Master of Conservation Leadership alumni? and (2) Do self-reported competency and relevance of leadership practices differ by job sector for Master of Conservation Leadership alumni?

Objectives

The intent of this study was to assess the capacity building outcomes of the conservation leadership graduate program using the framework developed by Webb et al. (2022). The objectives guiding the analysis were: (1) To examine the relationship between years since

graduation from the program, and differences between job sectors in alumni self-reported competency in leadership practices, and (2) To examine the relationship between years since graduation from the program and differences between job sectors in alumni self-reported relevance of leadership practices to their job.

By studying how leadership outcomes compare among alumni at varying years since completing the program, this study can reveal helpful information about the endurance of outcomes as individuals move through their career; the earliest program alumni have more than 10 years' experience in the conservation workforce. There is little to no research about the endurance and evolution of conservation leadership development throughout a career, and this study is able to provide initial insights on this topic.

In addition, conservation work occurs among several job sectors in society, particularly the nonprofit and public sectors. While the ultimate goals of conservation are often shared across sectors, the contexts of institutions within each can vary greatly. For example, leadership needs within a small locally focused non-profit would likely look different than a large federal land management agency. Therefore, comparisons among job sectors can support the program in its preparation of students for leadership in a variety of sectors. These findings can inform program objectives, ongoing curricular design, highlight potential training gaps, and guide future directions and investment in conservation leadership graduate education and professional development.

Master of Conservation Leadership Program

The Master of Conservation Leadership (also referred to as the Conservation Leadership Through Learning program, or CLTL) resides in the Human Dimensions of Natural Resources

Department in the Warner College of Natural Resources at Colorado State University in Fort Collins, Colorado. The program prepares leaders to address complex conservation issues and is built around principles of experiential learning, interdisciplinary instruction, and project-based application (Colorado State University, 2025, Master of Conservation Leadership, introduction para. 1-2). It is an 18-month graduate program, which includes two semesters of full-time coursework followed by a four-month Capstone Project. The coursework trains students to work in the conservation field by developing skills and knowledge in leadership, collaboration, systems-thinking, innovation, and other skills. The Capstone Project gives students the opportunity to apply skills and knowledge to a real conservation issue by working with a community partner and developing a project deliverable to help the organization further their conservation work (Colorado State University, 2025).

The program has seven core objectives that all students should be able to achieve upon graduating from the program:

1. Analyze conservation issues from multiple disciplines and stakeholder perspectives.
2. Collaborate with diverse stakeholders and individuals.
3. Utilize systems thinking to examine conservation issues.
4. Apply interdisciplinary problem-solving approaches to conservation issues.
5. Apply inquiry tools and methods to address conservation issues.
6. Effectively communicate conservation via varied media, academic outputs, and presentations.
7. Demonstrate leadership skills to work effectively in group environments.

Methods

Data-gathering and Sampling Methods

Each year, the Master in Conservation Leadership program administers an alumni survey with questions ranging from employment demographics (current employment status, position or title, employer name, salary range), cohort group, and job sector (private, public, non-profit and academia/doctoral studies), to Likert scale questions centered on their beliefs about a variety of competency-oriented statements, the relevance of these skills to their job, their ability to perform the competencies associated with the program objectives and lastly the relevance to their jobs. Additionally, several open-ended questions ask about priority skills and content areas related to diversity, equity, inclusion and justice in conservation, the most valuable skills or outcomes gained from participation in the program, one skill or content area they use in their job that was not addressed by the program, and skill or content areas they think should be included to address to future needs of conservation over the next five to ten years.

A request to complete the electronic survey was sent in September 2022, to 174 alumni from the first ten cohorts who completed the master's program between 2012-2022. This represented all alumni with known email addresses by program staff. A reminder email was sent three weeks later.

Instrument

The survey was an existing instrument administered annually by the Master in Conservation Leadership program to its alumni for evaluation purposes. It included 77 items within 17 sections. Three of these sections included the 13 items used for analysis in this study.

These items utilized a 5-point Likert scale (i.e., strongly disagree to strongly agree; not capable at all to very capable; not relevant at all to very relevant) related to assessment of their *competence* in specific leadership skills– and the *relevance* of the skills to their employment. The Webb et al. (2022) *framework* for c*onceptualizing leadership in conservation* leadership domains and behavioral practices was linked to the selected survey questions. For example, the question about the *skills to influence others in a positive way* was linked to the domain of *Individual Champion* and the practice of *inspire others to act*. These linkages were determined collaboratively by two authors of Chapter 2 and the program manager of the Master in Conservation Leadership.

Self-reported Leadership Competencies

The survey asked respondents to rate their level of agreement or disagreement using a 5-point Likert scale, strongly disagree to strongly agree, to assess competency in seven leadership practices. The correlated Webb et al. (2022) framework domains and practices are noted in brackets.

1. The program gave me skills to influence others in a positive way [Domain: Individual Champion; Practice: Inspire Others to Act].
2. CLTL helped me recognize the importance of adaptability in conservation [Domain: Excellence in Internal Attributes; Practice: Adapt to Changing Circumstances].
3. I feel confident in my ability to address conflict [Domain: Stakeholder Engagement; Practice: Conflict Management].
4. I learned how to persevere through challenges during my time in CLTL [Domain: Individual Champion; Practice: Persist through Challenges].

5. In CLTL, I learned how to lead others to achieve a shared goal [Domain: Vision; Practice: Include Others to Build Vision; Domain: Individual Champion; Practice: Inspire Others to Act].
6. I have the skills to effectively interact in cross-cultural situations [Domain: Trust; Practices: Know Local Context and Culture and Exchange Knowledge].
7. I can build and maintain effective partnerships with stakeholders [Domain: Stakeholder Engagement; Practice: Clear Roles for Partners; Domain: Trust; Practice: Build Relationships].

Program Objectives

The Master of Conservation Leadership program includes seven core program objectives that influence how it delivers the program; three of the seven core objectives were used in the analysis. The survey asked respondents to rate how capable they felt to perform each of the objectives using a 5-point Likert scale, not capable at all to very capable, to assess alumni self-reported competency on three out of the seven items. Additionally, the survey asked respondents to rate the relevance of the program's core objectives to their job, using a 5-point Likert scale, not relevant at all to very relevant, to assess alumni self-reported relevance of the same three core objectives. The corelated Webb et al. (2022) framework domains and practices are noted in brackets.

1. Collaborate and communicate with diverse stakeholders and individuals [Domain: Stakeholder Engagement; Practices: Access to Decision Making and Sufficient Communication; Domain: Trust; Practice: Build Relationships].

2. Utilize systems thinking to examine conservation and management issues [Domain: Excellence in Internal Attributes; Practice: See Issues at Different Scales].
3. Demonstrate strong leadership and interpersonal skills to work effectively in group environments [Domain: Excellence in Internal Attributes; Practice: Effective Internal Communication].

Data Analysis Procedures

The survey data was uploaded to and analyzed in Statistical Package for the Social Sciences (SPSS). To meet the study objectives and examine differences and relationships in alumni self-reported leadership competency and relevance across cohort groups, years since graduation, and job sectors, the analysis included the use of linear regressions to look for predictive relationships in the data and one-way ANOVAs for group comparisons (Newing et al., 2011). Given the sample size, the two analysis strategies were conducted to triangulate findings. For example, regression analyses were used with years since graduation as an independent variable; cohort groupings were later used for group comparisons to also investigate potential differences based on when alumni completed the program. Scheffé's method was used in the ANOVA analyses to test for post-hoc comparisons. Additionally, a post hoc power analysis was performed using G*Power in an attempt to evaluate and measure the power of the statistical tests performed in the primary analyses (Kang, 2021).

Results

A total of 92 alumni survey responses were received yielding a 53% response rate. Seventy-five (75) responses were retained for the analysis based on full completion of questions in the survey, for a 43% response rate. The cohort group sample consisted of 20 responses from

Group 1 (cohorts 1-4) or the early alumni, 23 responses from Group 2 (cohorts 5-7) or the mid alumni, and 32 responses from Group 3 (cohorts 8-10) or the recent alumni (see Table 4). Group 1, alumni who graduated seven to ten years ago, and Group 2, alumni who graduated five to seven years ago, were nearly equal in terms of percentage of respondents, at approximately 26% and 31% respectively. Group 3, alumni who graduated one to three years ago, represented a larger percentage of the sample at approximately 43% of respondents.

Table 4

Cohort group numbers, years since graduation, cohort numbers (by semester), alumni status in program, and number of responses by cohort group.

Group Number	**Years Since Graduation**	**Cohort Numbers by Semester**	**Alumni Status in Program**	**n Total = 75**
Group 1	7 – 10 years	1-4; spring 2012 to fall 2016	Early alumni	20
Group 2	4 – 6 years	5-7; fall 2017 to fall 2019	Mid alumni	23
Group 3	1 – 3 years	8-10; fall 2020 to fall 2022	Recent alumni	32

The job sector sample consisted of 17 responses from Public (federal, state, local and municipal government), 39 from Non-Governmental Organization/Non-Profit, 11 from Private, and eight from Academia (see Table 5). Public sector respondents made up nearly 23% of the total sample, Private sector consisted of almost 15%, and Academia was approximately 11%, the lowest number of respondents among the job sectors. The Non-Governmental Organization/Non-Profit sector respondents comprised the largest percentage by far at 52%, over half of the 75 respondents.

Table 5

Job sector type and number of responses by sector.

Job Sector	n
1. Public (federal, state, local & municipal government)	17
2. Non-Governmental Organization & Non-Profit	39
3. Private	11
4. Academia	8
Total	**75**

Leadership Competencies: Linear Regression – Cohort Group (years since graduation)

A series of linear regressions were conducted to test whether years since graduation predicted competency in seven leadership practices. Findings revealed that only one of the seven practices—*recognizing the importance of adaptability in conservation*—showed a statistically significant relationship with years since graduation ($p = 0.02$, $\beta = -0.29$; see Appendix 3: Table 6). The relationship was negative, suggesting that as more time passes, alumni reported less adaptability.

The results for the remaining six leadership practices—*the skills to influence others in a positive way, the confidence in ability to address conflict, learning how to persevere through challenges, learning how to lead others to achieve a shared goal, the skills to effectively interact in cross-cultural situations, and building and maintaining effective partnerships with stakeholders*—showed no statistically significant relationships ($p > 0.05$; see Appendix 3: Table 6).

Leadership Competencies: ANOVA – Cohort Group (years since graduation)

To examine cohort-level differences, a series of one-way ANOVAs was conducted to test whether alumni competency in the leadership practices differed significantly across early, mid and recent alumni groups. Among the seven practices evaluated, only one statistically significant

difference emerged, *recognizing the importance of adaptability in conservation* (F = 5.63, p = 0.01; see Appendix 3: Table 7). This finding is consistent with the regression results, with alumni in Group 1 reporting lower adaptability than those in Groups 2 and 3. (means: Group 1 = 4.3^{a}, Group 2 = 4.8^{b} Group 3, 4.8^{b}; see Appendix 3: Table 7).

The results for the remaining six leadership practices—*the skills to influence others in a positive way* (F = 0.16, p = 0.86), *the confidence in ability to address conflict* (F = 1.76, p = 0.18)*, learning how to persevere through challenges* (F = 1.04, p = 0.36)*, learning how to lead others to achieve a shared goal* (F = 2.26, p = 0.11)*, the skills to effectively interact in cross-cultural situations* (F = 1.30, p = 0.28)*, and building and maintaining effective partnerships with stakeholders* (F = 1.13, p = 0.33)—showed no statistically significant difference across cohort groups (see Appendix 3: Table 7). However, while the difference was not statistically significant, but approaching significance (F = 2.26, p = 0.11), alumni in Group 2 reported higher competency for *leading others to achieve a shared goal* than in Groups 1 and 3 (means: Group 1 = 4.0, Group 2 = 4.6, Group 3 = 4.3; see Appendix 3: Table 7). This may deserve further investigation in future analyses.

Leadership Competencies: ANOVA – Job Sector

For the final analysis of leadership competencies, a series of one-way ANOVAs examined differences in competency in leadership practices by job sectors. Of the seven leadership practices, statistically significant differences were found in two areas*, persevering through challenges, and leading others to achieve a shared goal* (see Appendix 3: Table 8).

The results for *persevering through challenges* showed a p-value slightly above the 0.05 threshold (0.06), and post hoc comparisons revealed significant differences. Alumni in academia

(5.0) reported significantly higher competency in perseverance compared to public sector alumni (4.2). Results and post hoc comparisons for the practice of *leading others to achieve a shared goal* also revealed significant differences across job sectors ($F = 7.14$, $p < 0.01$; see Appendix 3: Table 8). The public sector mean (3.8) was significantly lower than the NGO/non-profit sector (4.6), which was the highest of the job sectors. Although the results for *recognizing the importance of adaptability in conservation* were not statistically significant (Public = 4.5, NGO/Non-profit = 4.9, Private = 4.7, Academia = 4.6), the F (3.14), p-values (0.03) and descriptive statistics indicate one notable contrast—the NGO/non-profit sector alumni reported the highest competency in adaptability (4.9), compared to their public sector counterparts who reported the lowest (4.5). An additional finding not directly captured in Table 8 is that for five of the seven leadership practices, the public sector mean is the lowest among the four job sectors (means ranging from 3.8 to 4.6; see Appendix 3: Table 8).

The remaining four practices—*the skills to influence others in a positive way, the confidence in ability to address conflict, the skills to effectively interact in cross-cultural situations, and building and maintaining effective partnerships with stakeholders*—did not show significant differences across job sectors, with p values > 0.10 (see Appendix 3: Table 8). Competency ratings in these practices were consistently high and similar across all four job sector environments.

Program Objectives: Linear Regression Results – Cohort Group (years since graduation)

A series of linear regressions were conducted to evaluate whether years since graduation predicted competency in leadership practices related to three CLTL core program objectives, (1) *Collaborate and communicate with diverse stakeholders and individuals*, (2)

Utilize systems thinking to examine conservation and management issues, and (3) *Demonstrate strong leadership and interpersonal skills to work effectively in group environments*. Results showed no statistically significant relationship between years since graduation and competency for any of the three practices, with p-values > 0.37 (see Appendix 3: Table 6). Additionally, all adjusted R^2 values were at or below zero (0.00, -0.01, -0.02; see Appendix 3: Table 6) indicating that cohort group explained no meaningful variance in alumni responses regarding competency. These findings suggest a strong level of consistency in how alumni assess their competency in these leadership practices, regardless of how much time has passed since they completed the program.

Program Objectives: ANOVA Results – Cohort Group (years since graduation)

To complement the regression analysis and further examine cohort-level differences, one-way ANOVAs were conducted to test whether alumni competency in the practices related to the three core program objectives varied across the three cohort groups. Aligning with the regression analysis, results revealed no statistically significant differences across cohort groups for any of the leadership practices, *collaborating and communicating with diverse stakeholders and individuals* ($F = 2.03$, $p = 0.14$), *utilizing systems thinking to examine conservation and management issues* ($F = 0.29$, $p = 0.75$), and *demonstrating strong leadership and interpersonal skills to work effectively in group environments* ($F = 1.17$, $p = 0.32$; see Appendix 3: Table 7). Mean scores were relatively high across all groups for each of the three practices, ranging between 4.5 and 5.0 (see Appendix 3: Table 7). These findings suggest that alumni, regardless of how long ago they completed the program, perceive themselves as consistently capable in these core leadership areas.

Program Objectives: ANOVA Results – Job Sector

For the final analysis of competence, one-way ANOVAs were performed to assess differences in alumni competency related to three core program objectives between job sectors. The findings revealed no statistically significant differences across the four sectors for any of the leadership practices associated with the three program objectives of *collaborating and communicating with diverse stakeholders and individuals* ($F = 0.45$, $p = 0.72$), *utilizing systems thinking to examine conservation and management issues* ($F = 0.11$, $p = 0.95$), and *demonstrating strong leadership and interpersonal skills to work effectively in group environments* ($F = 1.49$, $p = 0.23$; see Appendix 3: Table 8). Mean scores across all job sectors for each of the three areas ranged from 4.5 to 5.0 (see Appendix 3: Table 8).

Relevance: Linear Regression Results – Cohort Group (years since graduation)

A series of linear regressions were conducted to examine whether years since graduation predicted relevance of leadership practices related to three program objectives to alumni's current job. Results revealed no statistically significant relationships between years since graduation and the relevance of the three leadership practices (see Appendix 3: Table 6). Given the high p value, findings for *collaborating and communicating with diverse stakeholders* ($p = 0.82$, $\beta = -0.03$) indicate this leadership practice is likely viewed consistently relevant across all cohort groups.

While lacking statistical significance, the results for *utilizing systems thinking to examine conservation and management issues* ($p = 0.10$, $\beta = 0.20$), and *demonstrating strong leadership and interpersonal skills to work effectively in group environments* ($p = 0.14$, $\beta = 0.18$) approached significance (see Appendix 3: Table 6). The moderate positive betas suggest

a possible trend where alumni further removed from the program may perceive *utilizing systems thinking* and *demonstrating strong leadership and interpersonal skills* as slightly more relevant to their professional work. The relatively low adjusted R^2 and p-values indicate the relationship is weak but could warrant future exploration.

Relevance: ANOVA Results – Cohort Group (years since graduation)

To further examine cohort-level differences and augment the regression analysis, one-way ANOVAs were conducted to test differences between cohort groups in relevance to the three core program objectives. Supporting the regression analysis, results revealed no statistically significant differences across cohort groups: *collaborating and communicating with diverse stakeholders and individuals* ($F = 0.73$, $p = 0.49$), *utilizing systems thinking to examine conservation and management issues* ($F = 1.63$, $p = 0.20$), and *demonstrating strong leadership and interpersonal skills to work effectively in group environments* ($F = 2.63$, $p = 0.08$; see Appendix 3: Table 7). Consistent with the regression findings, all cohort groups rated *collaborating and communicating* highly, with minimal variation in the means (Group 1 = 4.7, Group 2 = 4.9, Group 3 = 4.8), indicating it is seen as a universally relevant leadership practice across career stages.

However, results for *utilizing systems thinking* showed a trend in the means (Group 1 = 4.8, Group 2 = 4.3, Group 3 = 4.3; see Appendix 3: Table 7), with early alumni (Group 1, 7-10 years since graduation) rating this practice as more relevant to their job than mid alumni (Group 2, 4-6 years since graduation) and recent alumni (Group 3, 1-3 years since graduation). While not statistically significant, this finding is consistent with the modest positive trend found in the regression results and could suggest that systems thinking becomes more valued with

experience. Results for *demonstrating strong leadership and interpersonal skills* approached significance with a small to moderate effect size (p = 0.08; means: Group 1 = 5.0, Group 2 = 4.9, Group 3 = 4.7; see Appendix 3: Table 7). This may suggest that early alumni (7–10 years since graduation) also perceived *strong leadership and interpersonal skills* as more relevant to their jobs compared to more recent graduates. Considered together, the results for these two leadership areas, while not significant, may warrant further investigation.

Relevance: ANOVA Results – Job Sector

For the final analysis of relevance, one-way ANOVAs were completed to evaluate differences in relevance of leadership practices related to three program objectives to work across job sectors. The findings revealed no statistically significant differences (p > 0.05) level across the four sectors for any of the leadership practices associated with three program objectives of *collaborating and communicating with diverse stakeholders and individuals* (F = 1.18, p = 0.33), *utilizing systems thinking to examine conservation and management issues* (F = 0.94, p = 0.43), and *demonstrating strong leadership and interpersonal skills to work effectively in group environments* (F = 2.13, p = 0.11; see Appendix 3: Table 8).

Though the differences were not meaningful statistically, alumni across all sectors reported high and consistent relevance of *collaborating and communicating* to their jobs (means: Public = 4.9, NGO/Non-Profit = 4.8, Private = 4.9, Academia = 4.6), and public and private sector alumni rated *utilizing systems thinking* as slightly more relevant than the NGO/non-profit and academia alumni (means: Public = 4.7, NGO/Non-Profit = 4.3, Private = 4.7, Academia = 4.1). Findings for *demonstrating strong leadership and interpersonal skills* approached marginal significance with the lowest of the p values (0.11), as alumni in the private

and NGO/non-profit sectors reported somewhat more relevance to their jobs than the public and academia alumni (means: Public = 4.7, NGO = 4.9, Private = 5.0, Academia = 4.6; see Appendix 3: Table 8). The results indicate a consistent perception of the relevance of these leadership practices to their jobs across public, NGO/non-profit, private, and academic sectors.

Power Analysis Results

Across all the analyses described above, power analyses were conducted and led to results consistent with smaller sample sizes. For the regression analyses, nearly one quarter of the analyses resulted in power factors greater than 0.80 (preferred threshold), and the remaining ranged between 0.1 and 0.5. The ANOVA group comparison results were all below the preferred threshold of 0.8, with power factors ranging between 0.08 and 0.5. These results were not surprising given the sample size; the final *n* of 75 poses limits for detecting statistical significance, especially among group comparison analyses. The limits of the sample size are noted later in the limitations section.

Discussion

By assessing the first 10 cohorts of the Master in Conservation Leadership program, this study explored whether competency and relevance of leadership practices changed over time across cohort groups and whether they differed by job sector. Overall, the results provided some evidence that many of the leadership practices emphasized in the program remain consistent as relevant and applicable across both time and professional contexts, while also highlighting certain patterns and sector-specific variations that offer meaningful insight into conservation leadership development.

One of the most notable findings of this study is the overall stability observed in competency for the majority of leadership practices evaluated. Across nine of the ten leadership practices on the survey the analyses revealed consistently high levels of competence that did not vary by cohort group. This consistency suggests that the program instills leadership competencies that endure over time, even as alumni progress through different stages of their professional careers.

These findings align with previous literature that emphasizes the importance of developing durable leadership skills in conservation training and education (Black, 2021; Bruyere et al., 2020; Slater et al., 2024; Thomas-Walters et al., 2024). In particular, the enduring relevance of interpersonal competencies such as collaboration, communication, and stakeholder engagement reflects the significance placed on these dimensions in frameworks like Webb et al. (2022), which identified *trust*, *vision*, and *stakeholder engagement*, as core domains of conservation leadership. The consistency of alumni responses also suggests that these foundational skills remain central to professional success regardless of career stage, supporting the argument that interpersonal leadership capacities are important alongside technical and disciplinary expertise in conservation practice (Englefield et al., 2019; Jacobson & McDuff, 1998; Langholz & Abeles, 2014; Motzer et al., 2021; Slater et al., 2024; Teel et al., 2022; Thomas-Walters et al., 2024).

While stability characterized much of the results, the analyses did reveal several important differences. In particular, competency in *recognizing the importance of adaptability in conservation* declined significantly among the earliest cohort group (7–10 years since graduation). This may suggest that as alumni progress in their careers, perhaps taking on more

demanding senior roles, there is an increased preference for stability, or organizational norms and structure over adaptive practices, or that their senior roles place them in positions in which adaptability is more difficult given the additional responsibilities of senior roles. Alternatively, they may simply perceive their ability to be adaptable as constrained by the complexities of their multifaceted professional and personal lives as mid-career employees; they are the most likely of the three cohort groups to be in positions of balancing work and families, for example. This finding connects to the Webb et al. (2022) domain of *excellence in internal attributes*, which includes adapting to changing circumstances as a critical practice. Additionally, it is consistent with Bruyere's (2015) conclusion that leaders need to be comfortable operating in a context of ambiguity and be adjustable and willing to change course when external forces or organizational priorities shift and underscores the importance of reinforcing and practicing adaptive capacity throughout a conservation career, regardless of title or position. As someone moves through their career, they may find it more difficult to put the adaptability leadership behavior into practice.

Additionally, job sector differences were found in two leadership practices: *persevering through challenges, and leading others to achieve a shared goal*, and a notable contrast in *recognizing the importance of adaptability in conservation.* The job sector analysis revealed that alumni working in the public sector reported lower competency in leading others to achieve a shared goal and in adaptability, compared to their counterparts in the NGO/non-profit sector. Conversely, alumni in academia reported a high level of competence in perseverance compared to public sector alumni. These sectoral differences may reflect the distinct operational environments of conservation work rather than a lack of capacity. For example, public agencies

often operate within rigid regulatory frameworks, bureaucratic processes, and hierarchical structures that may limit leaders' autonomy and capacity for adaptive problem-solving. In contrast, non-profit and academic roles may offer greater flexibility, innovation, and emphasis on independent initiative, creating conditions that foster stronger perceptions of adaptability and perseverance among professionals in these settings.

The sector-specific patterns observed echo prior scholarship identifying the importance of visionary leadership and understanding operational context in conservation (Black, 2021). They reinforce Webb et al.'s (2022) argument that leadership effectiveness is shaped not only by individual competency but also by how well leaders navigate internal organizational cultures, norms, and constraints. These findings suggest that conservation leadership programs may benefit from developing sector-sensitive curricula that address the unique leadership challenges faced in different job environments.

Finally, analyses examining the relationship between cohort groups and job sectors in relevance of the leadership practices to alumni's job responsibilities yielded similarly stable findings as some of the competency results. Alumni across all job sectors and career stages reported consistently high relevance for *collaborating and communicating with diverse stakeholders and individuals*, *utilizing systems thinking to examine conservation and management issues*, and *demonstrating strong leadership and interpersonal skills to work effectively in group environments.* This reinforces the assertion that these competencies serve as foundational pillars for effective conservation leadership, regardless of job function or organizational setting (Bruyere et al., 2020; Englefield et al., 2019; Slater et al., 2024; Thomas-Walters et al., 2024).

While lacking statistical significance, two modest trends emerged that may have practical implications for conservation leadership programs and future research. First, the results suggest that more experienced alumni may increasingly recognize the applicability and value of systems thinking and leadership and interpersonal skills as they advance in their careers. As alumni move into more senior positions, their work may increasingly demand higher-level systems thinking and relational leadership to navigate organizational complexity, stakeholder coordination, and strategic decision-making (Black, 2021; Bruyere et al., 2020; Loffeld et al., 2022; Webb et al., 2022). Second, public and private sector alumni perceived systems thinking as slightly more relevant to their job than their NGO/non-profit and academia counterparts, and alumni in the private and NGO/non-profit sectors viewed the importance of leadership and interpersonal skills as somewhat more pronounced in their work than the public and academia alumni, suggesting that these leadership practices may be emphasized differently depending on organizational context and culture.

In testing for differences in competencies and relevance, logic indicated that consistency across years since graduation or job sectors would not be found. Some differences were anticipated, particularly given the range of professional contexts in which alumni are applying the leadership competencies. Yet, differences were not present in areas where variation was intuitively expected (i.e., increased competence based on more time since graduation). Where differences were found it is hard to understand why, aside from explaining them as a function of the limitations or opportunities in alumni work environments. This leads to the question of whether a self-reported survey instrument is truly measuring competence, or is it instead

measuring alumni perceptions of competence as filtered through the lenses of organizational role, sectoral norms, and/or environmental constraints?

Contributions of Study

This study makes several unique contributions to the research on conservation leadership development. First, while many previous studies have focused on defining the leadership competencies required for conservation (e.g., Bruyere, 2015; Dietz et al., 2004; Englefield et al., 2019; Manolis et al., 2009; Webb et al., 2022), few have empirically assessed how these competencies persist and are applied over time after formal education has been completed. By tracking alumni across a full decade of cohorts, this study provides evidence that the leadership capacities fostered through structured graduate leadership training may have durable impacts on professional self-efficacy and job relevance.

Second, the study contributes to the relatively limited literature exploring how leadership competencies function across diverse professional contexts. Sector-level differences identified in *adaptability*, *perseverance*, and *leading shared goals* highlight how leadership development may need to be tailored to different organizational realities. As conservation work increasingly spans multiple sectors, from government to non-profit to private enterprise, understanding how leadership competencies are perceived and applied in these distinct environments is critical for the design of effective training models (Bruyere et al., 2020; Loffeld et al., 2022; Sandbrook et al., 2022; Slater et al., 2024; Teel et al., 2022; Thomas-Walters et al., 2024). Finally, this study offers empirical support for the leadership framework proposed by Webb et al. (2022), demonstrating that many of the behavioral practices in the leadership

domains identified in that framework are reflected in the enduring competencies and relevance reported by alumni.

Limitations

While the findings of this study offer meaningful insights about the Master in Conservation Leadership program, they are subject to a few limitations. The study relied on self-reported data, which may be impacted by memory decay and recall bias (LePeau, 2015). Additionally, alumni self-perceptions about competence can be influenced by differing confidence levels or self-assessment standards, and opportunities for (or lack of) ongoing professional development. Lastly, although the study covered a full decade of program graduates, and overall self-reported competency scores were relatively high with little variance, the modest sample sizes, especially within job sector, may have limited statistical power to detect more nuanced differences across the thinly spread respondents.

Implications for Leadership Development Practice and Future Research

The results validate the Master of Conservation Leadership program's pedagogical design and delivery, with its focus on experiential learning, interdisciplinary instruction, and project-based application. This is particularly evident in the strong consistency of how it cultivates leadership competencies that have long-standing value and are perceived similarly across generations of alumni. The findings highlight opportunities for the continued design and refinement of conservation leadership education. The durability of core competencies such as *collaboration and communication*, *systems thinking*, and *interpersonal leadership skills*, in addition to the majority of the other leadership practices evaluated, suggests that these should remain central pillars of leadership curricula. The consistent high relevance of these

competencies across time and job sectors further supports their status as foundational to conservation leadership effectiveness.

At the same time, the job sector differences suggest a need for leadership development programs to offer more customized learning experiences that prepare students for the distinct leadership demands of government, NGO/non-profit, private, and academic sectors. For example, public sector leaders may require additional emphasis on navigating bureaucratic processes, adaptive capacity within institutional constraints, and building coalitions across agencies, while non-profit leaders may benefit from training in innovation, resource mobilization, and adaptive management in resource-scarce environments. These findings are congruent with other research (see Bruyere et al., 2020 and Sandbrook et al., 2022) that highlights the value of integrating ongoing leadership development opportunities beyond graduate education, such as continuing education, sector-specific workshops, peer learning networks, and mentoring programs that reinforce and evolve leadership skills throughout a career.

Promising avenues exist for extending this research. First, future studies could adopt mixed methods approaches that combine quantitative assessments with in-depth qualitative interviews to better capture how leadership practices are applied in real-world professional contexts. Second, broadening future assessment criteria to include the role of organizational culture, job position, gender identity, or geographic context could reveal intersectional patterns that years since graduation and job sector are unable to explain. Finally, longitudinal tracking of leadership development across multiple programs and institutions could help determine the

generalizability of these findings and further refine leadership training models suited to diverse conservation contexts.

Conclusion

Building the leadership capacity of the next generation of conservation professionals is an essential priority for advancing conservation science and practice in increasingly complex global contexts (Bruyere et al., 2020; Sandbrook et al., 2022; Slater et al., 2024; Teel et al., 2022; Thomas-Walters et al., 2024). The findings from this study reinforce existing literature and contributes to the body of work on conservation leadership education by providing evidence that the Master of Conservation Leadership program is widely viewed as impactful and relevant and instills leadership competencies that remain stable and applicable regardless of career stage and across job sectors. Importantly, this study confirms the relevance of several leadership domains and practices from the *framework for conceptualizing leadership in conservation* by Webb et al. (2022). The implications of these findings extend beyond the program itself. As conservation work increasingly requires cross-sectoral collaboration, cultural competency, and the ability to navigate complexity and uncertainty, conservation leadership education must remain dynamic and adaptive. Programs should continue to prioritize the leadership practices evaluated in this study while also developing opportunities for ongoing professional development that reinforce and expand leadership capacity throughout conservation careers.

CHAPTER 5: CONCLUSION

Summary of Study

As the urgency of global biodiversity loss, ecosystem degradation, and climate change intensifies, leadership is increasingly recognized as essential to advancing conservation outcomes—yet it remains underexamined in both research and practice. This dissertation helps address that gap through a three-part, mixed-methods inquiry that expands our understanding of conservation leadership by developing a conceptual framework, testing its application in a real-world species recovery program, and evaluating graduate conservation leadership capacity building outcomes.

To achieve these research objectives, Chapter 2 developed a new conceptual framework for conservation leadership, synthesizing findings from a systematic literature review into five leadership domains and fifteen associated practices. Chapter 3 applied and tested this framework through a qualitative case study of the Mountain Plover Nest Conservation Program, highlighting key leadership practices in a collaborative species recovery effort on private lands. Chapter 4 then assessed alumni self-reported competencies in, and relevance of several leadership practices articulated in the framework, evaluating variation across years since graduation and job sectors. Collectively, this research advances our understanding of conservation leadership by providing evidence of how it is conceptualized, applied, practiced, and cultivated in emerging conservation professionals.

Key Findings

The key findings across all three chapters affirmed the value and relevance of the research objectives. From a conceptual perspective (Chapter 2), the framework proposed by Webb et al. (2022) has gained early scholarly traction (cited in several subsequent studies) and contributes to a clarified understanding of conservation leadership as comprising skills to motivate, positively interact with and inspire others toward a shared conservation outcome. It proved applicable in both practical and capacity-building contexts, suggesting it holds value as a tool for both scientists and practitioners. From a practical perspective (Chapter 3), the Mountain Plover Nest Conservation Program case study validated the framework's applicability in achieving successful species conservation outcomes on private lands. The findings illustrate how effective landowner participation was facilitated through context-specific leadership practices that emphasized *trust*, *stakeholder engagement*, and the influence of an *individual champion* operating within a dynamic social-ecological system. From a capacity building perspective (Chapter 4), the alumni survey revealed strong, consistent self-reported competency in, and relevance of, core leadership practices across years since graduation and job sectors. The few differences observed, particularly in *adaptability* among earlier cohorts and those in the public sector, suggest that perceived leadership competency may be shaped more by job context or organizational culture than by individual ability or educational background.

Implications of Study

These three studies offer an integrated understanding of conservation leadership across conceptual, practical, and capacity-building dimensions. The findings confirm that conservation leadership is inherently multidimensional and context-dependent, emerging through behavioral practices situated within the complex social-ecological systems where conservation work occurs.

Conceptually, this research contributes to, strengthens and refines the conservation leadership literature by offering the framework (Chapter 2) developed by Webb et al. (2022). The framework serves as a conceptual bridge across disciplines and scales, helping to unify diverse perspectives on leadership in conservation and providing a coherent structure for further empirical investigation. Practically, testing and validating the framework in a real-world species recovery program (Chapter 3) illustrates the benefits and applicability of case-specific approaches tailored to the socio-cultural and ecological conditions of private lands conservation. The Mountain Plover case study underscores how leadership practices such as building trust and stakeholder relationships, and the role of a respected local champion, can determine successful conservation outcomes. The alumni survey results (Chapter 4) inform conservation education and professional capacity building efforts. They reveal how perceived leadership competency, and relevance may be shaped by job sector norms and organizational environments, emphasizing the importance of equipping conservation leaders with interpersonal, adaptable, and sector-responsive competencies.

Ultimately, this dissertation establishes a clear continuum of evidence—linking conceptual, practical, and capacity-building dimensions of conservation leadership. As today's

conservation challenges escalate in complexity and demand interdisciplinary, cross-sector solutions, the ability to lead effectively is not optional but essential. This research contributes to a growing body of scholarship that firmly positions leadership as central to enabling scientists and practitioners to drive more inclusive, collaborative, and impactful conservation outcomes.

Limitations of Study

Despite these contributions, a few limitations must be acknowledged. First, Chapter 2 is a published manuscript and therefore I opted not to revise it. However, since our systematic review was completed and published, which captured relevant literature through mid-April 2020, more research has been conducted examining various aspects of leadership in conservation and related disciplines. I have incorporated and referenced many of these studies in other chapters of this dissertation. However, not all of them were thoroughly examined in this research, and they certainly contribute to our evolving understanding of leadership in conservation. Examples include articles that addressed:

- a conservation leadership competency framework (Black, 2021)
- graduate sustainability leadership training (Motzer et al., 2021)
- capacity and leadership for wildlife conservation (Abu-Bakarr et al., 2022)
- the role of self-efficacy and peer networks in building capacity for species conservation planning (Bruyere et al., 2022)
- conservation leader development (Loffeld et al., 2022; Rice, 2022)
- leadership, gender and organizational effectiveness in conservation programs (Nery Silva et al., 2022)

- graduate conservation leadership program evaluation (Sandbrook et al., 2022)
- university education needs of wildlife conservation professionals in the United States (Teel et al., 2022)
- gender equity in climate leadership (Wray et al., 2023)
- boundary spanning leadership for stakeholder engagement in collaborative water management (Burbach et al., 2023)
- conservation leadership in the Global South (Ocampo-Ariza et al., 2023)
- communication, trust and leadership in co-managing biodiversity (Koch et al., 2023)
- skills and methods used to teach conservation in higher education across the United Kingdom and Australia (Slater et al., 2024)
- and training needs for the next generation of conservation social science professionals (Thomas-Walters et al., 2024).

Second, while the retrospective case study of the Mountain Plover Nest Conservation Program did validate three out of five domains in the conceptual framework, its small sample size reflecting a single conservation program limits generalizability to similar contexts. Finally, alumni survey data relied on self-reported measures, which may be subject to bias such as overestimation of ability or perceptions of competency and relevance impacted by organizational, job sector or other environmental effects, and/or social desirability in survey responses.

Recommendations for Future Research

In his book *Leadership*, James MacGregor Burns (1978) posited that "leadership is one of the most observed and least understood phenomena on earth" (p. 2). Nearly 50 years later, it can be argued that this is till the case to some extent. Because leadership behaviors take place in a socially constructed and interpersonal context, the study of the topic should continue to evolve and reflect the current and future conditions of societies, organizations, governments, and communities.

Though undoubtedly modest in number to date, and difficult to accurately determine, our review article (Webb et al., 2022; Chapter 2) has been cited in several new works (i.e., Oryx counts 8, ResearchGate lists 12 [with a Research Interest Score of 10.6 and 220 reads], and Google Scholar counts 24). Some of the citations are found in the more recent articles I noted in the previous *Limitations* section and have been referenced in my dissertation research (e.g., see Black 2021; Nery Silva et al., 2022). Along with the breadth of more recent literature, this indicates the ongoing relevance, scholarly interest and need for better understanding and further conceptualizing leadership in conservation science and practice, and for educating and training future generations of conservation leaders.

Additional important areas of investigation have been noted by other authors and would benefit from further examination. These include the need for a diversity of conservation leadership perspectives and frameworks from other parts of the world and other cultural paradigms, such as the Global South (Ocampo-Ariza et al., 2023). I would also advocate for the inclusion of leadership perspectives from the Global East, where societies and cultures tend to be considered more collectivistic rather than individualistic like in much of the Global West

(Lomas et al., 2023). The role of gender differences is also a much-needed area of increased understanding and investigation (Jones & Solomon, 2019; Jones et al., 2020; Nery Silva et al., 2022). Finally, as the need for including the voices of and integrating the practices and knowledge of Indigenous communities is increasingly acknowledged, Indigenous-led conservation must continue to be at the forefront of practice and scholarly efforts to achieve global biodiversity goals (Goolmeer et al., 2022).

Specific to the results of this dissertation, future research could apply the conservation leadership framework across a wider range of conservation initiatives outside of species recovery on private lands (i.e., public lands management, sustainable outdoor recreation, marine protected areas), including those that were not successful. Related to emerging professional capacity-building, conducting longitudinal studies of alumni across multiple programs and institutions—rather than relying on a single program point-in-time survey—could provide a more dynamic understanding of leadership development. Tracking the progression of leadership competencies over time within individual cohort groups would offer deeper insights into when and how different capacities emerge and prove most relevant across careers and job sectors. Lastly, future alumni assessment criteria could examine perceived and actual leadership competency through the lenses of organizational role, sectoral norms, and environmental constraints (both professional and personal).

Personal Reflection

I never intended to spend a decade of my life completing my PhD. In fact, despite having a unique professional life that kept me in the mountains for half the year while raising a family when I started, I entered the program with 9 pre-admission credits and was set up for some

level of timeliness to completion. Significant life events, a global pandemic coupled with a major wildfire and two new professional positions later, and here I am. Nor did I think I would finish with experience in not only conducting a systematic review, but having the manuscript published. Thanks to the encouragement of my advisor, I settled on a mixed-method approach rather than an exclusively qualitative approach as originally intended. I cannot claim to be an expert in either qualitative or quantitative research, but I am glad I had the chance to wrestle with both methodologies during my research process.

I have always been a pragmatist at heart, especially when it comes to my intellectual endeavors. This approach to inquiry resonates with my nature, and advocates for a critical evaluation of theories and concepts in terms of their relevance to practical application. For my master's research I wanted to understand the theory behind wilderness-based (or adventure-based) orientation for first-year college students, and its effectiveness for fostering and facilitating academic and social integration of new students. As importantly, I wanted to test it in the field, so rather than simply produce a research paper on the subject (which of course I did), I also developed and implemented a new adventure-based orientation program for first-year students in partnership with the Colorado State University Outdoor Program and Mountain Campus (that is still running today in a modified format).

So, it follows suit that when it came time to map out my PhD research, I stayed true to my nature and chose a structure that would allow me to critically examine leadership in conservation with an eye toward applied approaches for practice. I set out to systematically examine and understand what it means to be an effective leader in conservation contexts, and how competence is embodied through individual behaviors and practices—that process

produced the published manuscript and *framework for conceptualizing leadership in conservation*. I then tested the framework in a successful conservation program and came away with concrete insights about the utility of the framework and a better understanding of community-based conservation involving landowners and private lands. For the final piece of research, I was able to check the applicability and relevance of the framework through the lived experiences of alumni working in various conservation-related careers—knowledge that will aid me in my own leadership teaching. Combined, this research approach and the outcomes from my dissertation more than met my expectations for an applied PhD learning experience. I believe I have made a meaningful contribution to our knowledge and understanding of leadership in conservation.

Additionally, throughout the process I gained more classroom teaching experience and increased my competencies in facilitating the teaching and learning process for students. This was accomplished by multiple opportunities to co-teach with my advisor and other colleagues, serve as a guest lecturer and assist in the development of an online graduate certificate program and its curriculum and coursework.

Taking 10 years to complete my PhD has included some unanticipated twists and turns, and unexpected advantages. It was not an explicit goal when I began my doctoral studies, but by happy circumstance, that I find myself in the enviable position of having opportunities to apply the framework developed through our systematic review in my work as a leadership practitioner. For the final three years of my journey, I've been employed as a leadership educator, tasked with examining and implementing best practices for experiential student

leader competency development. As such, despite reaching the summit of my PhD process, my applied journey continues.

In the past year, I developed a program using the framework to help students understand and learn what it means to be a conservation leader in the context of river stewardship and management while on a multi-day river expedition, presented the framework at an Indigenous-led conservation conference, and collaborated with a colleague to incorporate the framework with other frameworks to bolster sustainability leadership offerings in an environmental studies graduate program. Lastly, I helped create and propose an undergraduate sustainability leadership certificate and am developing a new undergraduate course on sustainability leadership for the outdoor recreation industry. The next frontier of my professional pursuits has begun, as I seek to integrate frameworks from conservation and sustainability leadership to educate and train the next generation of emerging conservation professionals.

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APPENDICES

Appendix 1: Chapter 2 Supplementary Table 1

Supplementary Table 1. List of leadership domains and practices referenced in each article.

Authors	Year	Leadership Domains and Practices																			
		Stakeholder Engagement	Stakeholder Access	Communication	Conflict Management	Partners with Clear Roles	**Trust**	Knows Culture	Built Relationships	Exchange Knowledge	**Vision**	Clear Vision	Included Others in Vision	**Individual Champion**	Persisted Through Challenges	Unwavering Passion	Inspired Others	**Internal Excellence**	Internal Communication	See Issue at Different Scales	Adaptable
Agyare et al	2015	1			1		1	1		1				1	1						
Ardoin et al	2015	1		1	1		1				1	1	1					1	1		
Bartlett	2018	1	1	1		1	1	1	1									1			1
Black	2015										1	1	1								
Black & Groombridge	2010	1	1	1		1								1	1		1	1		1	1
Black, Groombridge & Jones	2011	1	1	1	1	1	1	1	1		1	1	1					1	1	1	1
Blicharska & Ronnback	2018						1			1				1		1		1			1
Blickley et al	2013	1		1	1		1	1										1	1		
Bodin & Crona	2008	1			1		1	1	1	1				1				1	1		
Bruyere	2015	1			1	1					1	1	1					1	1	1	1
Butler et al	2015	1			1		1		1	1	1	1	1	1				1	1	1	1
Case et al	2015	1			1		1				1			1	1	1		1	1	1	1
Christiansen & Belton	2017	1	1		1		1	1	1	1								1		1	
Clark et al	2017	1		1		1	1		1									1		1	
Crees et al	2016	1	1	1	1	1															
Crona et al	2017	1		1			1	1	1		1	1						1	1		
Davenport & Hassan	2019	1		1	1	1	1	1	1		1		1	1			1	1	1		1
Deitz et al	2004	1		1	1		1	1	1		1	1						1		1	
Diedrich et al	2017	1	1				1														
Dyer et al	2014	1	1	1	1	1	1			1	1	1	1	1							
Englefield et al	2019						1		1		1	1		1		1	1	1	1		
Evans et al	2015	1			1		1				1	1	1					1		1	1
Foster et al	2011	1	1				1	1													
Game et al	2014	1	1								1	1						1			1
Giakoumi et al	2018	1																			
Gruber	2010	1	1	1	1		1		1		1	1	1								
Guiterrez et al	2011	1		1	1		1							1	1	1					
Head et al	2016	1					1							1				1			1
Keward et al	2011																	1			1
Langholz & Abeles	2014	1		1	1		1				1	1									
Leahy et al	2008	1					1	1	1												

Leisher et al	2011										1			1	1						
Liu et al	2008	1	1	1			1			1											
Lockwood et al	2012	1	1		1		1		1	1	1	1	1					1			1
Mannetti et al	2015						1			1				1	1		1				
Manolis et al	2009	1		1	1		1		1		1	1	1					1			1
Martin et al	2012										1	1		1	1	1	1				
Mattson et al	2011										1	1		1	1		1				
McGreavy et al	2016	1	1	1	1	1					1	1	1	1	1		1				
McKiernan	2018						1	1	1	1				1		1	1				
Micheli & Niccolini	2013	1			1		1		1		1	1	1								
Mountjoy et al	2014	1		1			1				1	1		1			1	1			1
Pero & Smith	2008	1	1	1	1	1	1	1	1		1	1	1	1		1	1				
Scheele et al	2018	1	1	1			1		1		1	1		1		1					
Sjolander et al	2015	1		1			1	1	1	1	1										
Smith et al	2007	1	1	1		1	1	1	1		1	1	1	1							
Stern & Predmore	2012	1	1	1	1	1					1	1	1	1	1			1	1		
Stohr et al	2014	1		1	1	1	1		1		1	1	1	1	1						
Straka et al	2018	1		1		1					1	1	1	1	1		1				
Sudtongkong & Webb	2008	1	1	1	1	1	1	1													
Sullivan & Syvertsen	2019													1			1				
Sutton	2015	1			1	1	1	1	1		1	1	1	1	1		1	1			1
Sutton & Rudd	2016	1	1	1			1	1	1	1								1	1		
Sutton & Rudd	2015	1			1		1	1	1					1							
Sutton & Rudd	2014	1		1	1		1	1	1	1	1	1		1							
Trialfhianty & Suadi	2017						1	1	1	1											
Wallace	2003	1		1		1												1			1
Walters	2007													1	1	1	1				
Zulu	2008	1	1		1		1							1	1	1		1			1
TOTALS	**59**	**47**	**20**	**29**	**29**	**17**	**43**	**21**	**26**	**14**	**32**	**28**	**19**	**30**	**15**	**10**	**14**	**28**	**12**	**9**	**18**

Appendix 2: Chapter 3 Interview Protocol

Dear Participant,

My name is Seth Webb, and I am a graduate student from Colorado State University in the Human Dimensions of Natural Resources department. We are conducting a study to examine the Mountain Plover Nest Conservation in Cultivated Fields Project by the Bird Conservancy of the Rockies (formerly Rocky Mountain Bird Observatory). The goal of this study is to identify the strategies used in the project to garner support for the conservation of the Mountain Plover among the various stakeholders which ultimately led to successful participation by landowners. I am conducting this work under the supervision of my advisor, *Dr. Brett Bruyere in* Human Dimensions of Natural Resources.

We would like you to participate in an in-person confidential and voluntary interview that will consist of questions related to your participation in the project. The location and date will be determined by your availability and preference. We estimate the interview to take up to one hour. At any point in the process, you can decide to end your participation.

Confidentiality and privacy will be maintained throughout the study process, and we don't foresee any risks to your involvement. Only myself and my advisor will have access to any notes or transcripts. Results will be maintained without using any personally identifiable information, though anonymous quotes may be included in our written summary. We intend to share the results with other researchers and conservation practitioners in the form of a published academic journal article and would be happy to provide you with a copy as well. While there are no direct benefits to you, we hope to gain more knowledge on leadership strategies that support species recovery programs.

If you would like to participate or have any questions, please contact Seth Webb at seth.webb@colostate.edu or 970-491-4729 or Dr. Brett Bruyere at brett.bruyere@colostate.edu or 970-491-1360, and indicate your willingness to participate and your consent to being audio-recorded in the interview. If you have any questions about your rights as a volunteer in this research, contact the CSU IRB at: RICRO_IRB@mail.colostate.edu; 970-491-1553.

Sincerely,

Dr. Brett Bruyere	Seth Webb
Associate Professor	Ph.D. Student

Conservation Leadership Strategies that Support Species Recovery

Semi-Structured Interview Protocol

Before we begin, I'd like to read you a few statements.

PURPOSE: You are being asked to participate in a study examining the Mountain Plover Nest Conservation in Cultivated Fields Project. The goal of this study is to identify the leadership strategies used in the project to garner support for the conservation of the Mountain Plover among the various stakeholders, and which ultimately led to its successful recovery.

PROCEDURES: During this confidential audio-recorded interview, you will be asked to answer questions related to your participation in the project. The questions address elements of the partnership context between Bird Conservancy of the Rockies and community participants, project vision, stakeholder engagement, trust, individual leaders, and organizational processes that took place within the project. The interview consists of a number of questions, will leave room for open dialogue, and will take approximately 60 plus minutes to complete.

RISKS: I anticipate no risk from participating in this confidential interview.

BENEFITS: No benefit can be promised to you from your participation in this interview.

ALTERNATIVES AND RIGHT TO WITHDRAW: Your participation is voluntary; you have the right to withdraw or to skip any questions at any time. You have the alternative not to participate in this study. You may also choose to redact your consent to participate in this study at any time. Your desire not to participate in this study or your request to withdraw will have no adverse effects on you or your relationship with myself or Colorado State University.

COSTS: There are no costs to participating in this study.

PAYMENT: There is no payment for participating in this study.

CONFIDENTIALITY: This interview is confidential. Upon completion of the interview, your results will be submitted to a secure account held by the Principal Investigator and Co-Principal Investigator. Results will be aggregated and collectively analyzed without using any personally identifiable information, though anonymous quotes may be included.

OTHER PERTINENT INFORMATION: I am happy to answer any questions you may have about the study. If you have any questions after we finish, please feel free to call or email me at any time. If you have any questions concerning your rights as a research participant, please contact the CSU IRB at: RICRO_IRB@mail.colostate.edu; 970-491-1553.

Conservation Leadership Strategies that Support Species Recovery

Semi-Structured Interview Protocol

Interviewer Name: _____

Date: _____

Interview Number: _____

Interviewee Number: _____

1. What is your role in the project?
    a. How long have you been in that role?
    b. How did you get involved? How would you describe your involvement?
2. How are partnerships created and utilized?
    a. What have been the benefits of the partnerships, if any?
    b. What have been the challenges of the partnerships, if any? How are they overcome?
3. Is there a clear idea of what the project hopes to accomplish? Please explain.
4. Discuss any opportunities you had to be involved in providing input or in the decision-making process.
5. Describe and evaluate the communication among the project participants.
6. How is conflict (if any) resolved when disagreements arise?
7. What have been the greatest challenges to achieving the project objective(s)?
8. What have been the greatest successes in achieving the project objective(s)?
9. If someone had to duplicate this project elsewhere, what would you advise they do to be successful?
10. Is there anything else you'd like to add? What have I not asked you that I should have?

Appendix 3: Chapter 4 Tables – Linear Regression and ANOVA Results

Table 6

Linear regression results: Effects of years since graduation on alumni self-reported competency in and relevance of leadership practices.

Dependent Variable	Standardized β	SE	t	Sig.	Adjusted R^2
Influence others in a positive way	-0.09	0.59	33.01	0.47	-0.01
Adaptability in conservation	-0.29	0.46	44.84	0.02	0.07
Address conflict	0.09	0.74	22.87	0.47	-0.01
Persevere through challenges	-0.15	0.64	29.7	0.25	0.01
Lead others to achieve a shared goal	0.00	0.66	27.38	0.99	-0.02
Cross-cultural interaction	-0.02	0.70	26.91	0.87	-0.02
Stakeholder partnerships	0.21	0.57	33.08	0.10	0.03
Collaborate and communicate	0.11	0.34	68.51	0.37	-0.00
Systems thinking	0.06	0.63	35.17	0.62	-0.01
Leadership/interpersonal skills	-0.00	0.48	48.89	0.99	-0.02
Relevance: Collaborate and communicate	-0.03	0.41	57.03	0.82	-0.02
Relevance: Systems thinking	0.20	0.93	21.94	0.10	0.03
Relevance: Leadership/interpersonal skills	0.18	0.44	52.24	0.14	0.02

Table 7

ANOVA results: Comparisons of alumni self-reported competency in and relevance of leadership practices and cohort group (years since graduation).[1, 2]

Dependent Variable	Overall Mean	Group 1 (7-10 years)	Group 2 (4-6 years)	Group 3 (1-3 years)	sd	F	Sig.	Eta²
Influence others in a positive way	4.6	4.5	4.6	4.6	0.59	0.16	0.86	0.01
Adaptability in conservation	4.7	4.3[a]	4.8[b]	4.8[b]	0.48	5.63	0.01	0.16
Address conflict	4.2	4.0	4.4	4.1	0.74	1.76	0.18	0.06
Persevere through challenges	4.4	4.3	4.3	4.5	0.64	1.04	0.36	0.03
Lead others to achieve a shared goal	4.3	4.0	4.6	4.3	0.66	2.26	0.11	0.07
Cross-cultural interaction	4.5	4.3	4.7	4.5	0.70	1.30	0.28	0.04
Stakeholder partnerships	4.8	4.8	4.9	4.6	0.58	1.13	0.33	0.04
Collaborate and communicate	4.9	4.8	5.0	4.8	0.37	2.03	0.14	0.06
Systems thinking	4.6	4.6	4.5	4.6	0.73	0.29	0.75	0.01
Leadership/interpersonal skills	4.7	4.8	4.6	4.8	0.54	1.17	0.32	0.04

Dependent Variable	Overall Mean	Group 1 (7-10 years)	Group 2 (4-6 years)	Group 3 (1-3 years)	sd	F	Sig.	Eta²
Relevance: Collaborate and communicate	4.8	4.7	4.9	4.8	0.53	0.73	0.49	0.02
Relevance: Systems thinking	4.5	4.8	4.3	4.3	1.09	1.63	0.20	0.05
Relevance: Leadership/interpersonal skills	4.9	5.0	4.9	4.7	0.54	2.63	0.08	0.08

1: different superscripts note statistically significant ($p < 0.05$) group differences.
2: absence of superscripts indicate lack of statistically significant ($p > 0.05$) group differences.

Table 8

ANOVA results: Comparisons of alumni self-reported competency in and relevance of leadership practices and job sector.[1, 2]

Dependent Variable	Overall Mean	Public	NGO/Non-Profit	Private	Academia	sd	F	Sig.	Eta²
Influence others in a positive way	4.5	4.5	4.7	4.6	4.3	0.58	1.28	0.29	0.06
Adaptability in conservation	4.7	4.5	4.9	4.7	4.6	0.45	3.14	0.03	0.14
Address conflict	4.1	4.3	4.3	4.0	3.7	0.73	1.44	0.24	0.07
Persevere through challenges	4.5	4.2[a]	4.4[ab]	4.4[ab]	5.0[b]	0.61	2.64	0.06	0.12
Lead others to achieve a shared goal	4.3	3.8[a]	4.6[b]	4.2[ab]	4.4[ab]	0.57	7.14	<0.01	0.27
Cross-cultural interaction	4.6	4.1	4.6	4.7	4.9	0.68	2.22	0.10	0.10
Stakeholder partnerships	4.7	4.6	4.8	4.6	4.9	0.58	0.95	0.42	0.05
Collaborate and communicate	4.9	4.9	4.8	4.9	4.9	0.35	0.45	0.72	0.02
Systems thinking	4.6	4.5	4.6	4.7	4.6	0.64	0.11	0.95	0.05
Leadership/interpersonal skills	4.9	4.8	4.7	4.9	5.0	0.47	1.49	0.23	0.07

Dependent Variable	Overall Mean	Public	NGO/Non-Profit	Private	Academia	sd	F	Sig.	Eta²
Relevance: Collaborate and communicate	4.8	4.9	4.8	4.9	4.6	0.35	1.18	0.33	0.05
Relevance: Systems thinking	4.5	4.7	4.3	4.7	4.1	0.64	0.94	0.43	0.04
Relevance: Leadership/interpersonal skills	4.8	4.7	4.9	5.0	4.6	0.47	2.13	0.11	0.09

1: different superscripts note statistically significant ($p < 0.05$) group differences.
2: absence of superscripts indicate lack of statistically significant ($p > 0.05$) group differences.