

Exploring Environmental Stewardship in the Niagara Region of Canada: How Do Elements of
Environmental Stewardship Relate to Success?

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Abstract

Environmental stewardship is imperative as it provides a means for individuals and society to reconnect with the biosphere as well as work to protect and conserve the environment for future generations. While the concept of stewardship is not new, the scholarship addressing it is still developing. In particular, there is limited research that addresses what makes stewardship successful. This thesis addresses calls in the literature for empirical investigations into local-scale environmental stewardship. Specifically, it contributes to a better understanding of elements of stewardship and what makes stewardship initiatives successful. Two studies were conducted in the Niagara Region of Canada. The first study investigated the social-ecological context of the area and examined the elements of environmental stewardship initiatives by empirically testing a framework for environmental stewardship. The second study examined factors allowing for stewardship success, from the perspective of the organizations conducting the work. In concert, the findings reveal: a nuanced relationship between context and stewardship elements; factors making for stewardship success; and an expanded conceptual framework which more fulsomely describes local environmental stewardship. Finally, recommendations for future work in this realm of empirical environmental stewardship investigations are put forth.

Key words: environmental stewardship, social-ecological system, context, local, success

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Chapter One: Introduction

1.1 Research Context

Since the onset of the industrial revolution, there has been an increasing disconnect between society and the natural environment (Folke et al., 2011; Pyle, 2003). This disconnect is due largely to eurocentric cultural norms and is found to be a main factor in our current ecological crises (Zylstra et al., 2014). Additionally, direct human impacts are causing ever-increasing environmental degradation, having stemmed largely from the disconnect between society and environment (Folke et al., 2011; Zylstra et al., 2014). Now, more than ever, it is imperative that we reconnect humans to the natural environment and work to protect and maintain the integrity of our local and global ecosystems.

The extent of human influences on the environment is recognized with the designation of the Anthropocene: a new geological epoch which recognizes that humans have the greatest impact on the environment, more than any other natural phenomena at any other point in the Earth's history (Lewis & Maslin, 2015; Steffen et al., 2007; Zalasiewicz et al., 2011). Most notable among the myriad of environmental impacts are human-caused climate change (Hughes et al., 2003; IPCC, 2013; Vitousek et al., 1997); loss or reduction in ecosystem services (Costanza et al., 2014; Worm et al., 2006); species and biodiversity loss (Dirzo et al., 2014; Worm et al., 2006); and habitat fragmentation or reduction in quality habitat (Fahrig, 2003; Fischer & Lindenmayer, 2007; Forman & Alexander, 1998). The importance of reconnecting to nature and working to protect our local to global ecosystems is highlighted in the recent declaration by the United Nations (UN) of the 2021-2030 Decade on Environmental Restoration, highlighting the global need for restoration of our degraded ecosystems in the face of global environmental change. Less recently, the Sustainable Development Goals (SDGs) were established in 2015, and address this need specifically through Goal 13 (Climate Action), Goal 14 (Life Below Water), and Goal 15 (Life on Land). However, the importance of environmental stewardship is echoed throughout all 17 SDGs.

Engaging in stewardship of the environment is mutually beneficial for the health of the environment and society: it enhances and maintains the integrity of the natural environment while simultaneously providing a means for individuals to reconnect with nature and the biosphere. Benefits to people may include reconnecting to nature; formation of greenspaces; and social satisfaction from volunteering or helping the community (Dresner et al., 2015; Ives et al., 2017; Kittinger et al., 2016; Zylstra et al., 2014). At a time in our collective history where we are experiencing dual crises of ecological degradation and a profound societal disconnect from the natural environment, environmental stewardship is becoming increasingly important. International goals such as the UN Declaration of the Decade on Environmental Restoration and the SDGs highlight this.

Environmental stewardship is urgently needed. As a society, we need to work to protect and restore our natural environment to reconnect to nature and mitigate the impacts of climate

change and environmental degradation. To do so, we will need an in-depth understanding of environmental stewardship and how to conduct stewardship work effectively.

1.2 Environmental Stewardship

The concept of environmental stewardship is not new. Aldo Leopold published the *Land Ethic* in 1949, where he introduced his ideas of stewardship as the duty of humans to treat the land in a responsible and ethical manner. Since then, environmental stewardship has evolved as a concept that involves multiple scales, methods, and applications. Despite its early start and general colloquial acceptance, environmental stewardship scholarship continues to evolve.

Environmental stewardship is sparsely defined, largely depending on the context in which it is used (e.g. Bennett et al., 2018; Chapin, Kofinas, & Folke, 2009; Mathevet et al., 2018; Steffen et al., 2011; Worrell & Appleby, 2000). However, environmental stewardship is generally defined as the responsible use, management, and protection of the land in such a way that considers society's needs both now and in the future (Worrell & Appleby, 2000). The main idea behind environmental stewardship is that it involves fully integrating the social and ecological systems in a way that shapes stewardship outcomes to ensure positive impacts on both humans and the environment (Bennett et al., 2018; Chapin et al., 2015; Folke et al., 2011; Steffen et al., 2011).

There are three key elements of environmental stewardship, as described by Chapin et al., (2015): (1) the integration of social and ecological processes and systems; (2) the dual goals of both ecosystem resilience and human or societal wellbeing; and (3) an emphasis on shaping the future rather than restoring the past. These elements are present at all scales of stewardship.

Environmental stewardship can occur at different spatial scales, from local to regional to global, all of which are interconnected and linked. The largest scale of environmental stewardship occurs at the global scale. We have recently entered the Anthropocene, where climate change and other human impacts will have unknown global consequences, transcending both political and geographical divides (Chapin et al., 2015; Steffen et al., 2011). The nature of this problem requires global participation and action; this is the basis of global scale stewardship. Global environmental stewardship involves participation from individuals at all scales and methods of engagement to solve global environmental problems.

The next scale of stewardship occurs at the regional scale. This can be thought of as a bridging between the local and global scales of environmental stewardship. Examples of regional stewardship initiatives may be focused on improving sustainable waste management to reduce impacts on downstream water quality, or the establishment of a park or protected area (Peachey, 2008; Walton et al., 2014). This scale of environmental stewardship requires regional involvement and may have direct effects on communities. An example of regional bridging of stewardship work is in Arctic stewardship. The Arctic is most affected by global climate change, and these impacts extend to a global scale. Therefore, the nature of the Arctic environmental problems requires a regional to global perspective on environmental stewardship to address these problems (Chapin et al., 2015).

Local-scale environmental stewardship is where any changes or decisions made at this level have direct effects on the communities involved. It is at the local scale where stewardship initiatives are most quickly developed and implemented (Chapin et al., 2015). Examples of local-scale initiatives may be a stream restoration or a tree planting event. These initiatives involve direct community involvement and have direct effects on the community (Bennett et al., 2018). Local-scale environmental stewardship can have links to community or individual development of sense of place as well, which may further feed back into involvement in environmental stewardship work at all scales (Bennett et al., 2018; Bramston et al., 2011; Chapin et al., 2015; Ryan et al., 2001). The focus of this thesis research is on the local scale of environmental stewardship.

1.2.1 **Conceptualizations of Local Environmental Stewardship**

The conceptual framework of local stewardship put forth by Bennett et al., (2018) describes local-scale environmental stewardship as the actions taken by various actors who have a range of motivations and capacities, with the end goal of attaining positive ecological and social outcomes; all of which are influenced by the social-ecological context in which they are situated. The key elements of environmental stewardship, as identified by Chapin et al., (2015) and the conceptual framework of local stewardship put forth by Bennett et al., (2018) are combined into the conceptualization of local environmental stewardship referred to in this study (Figure 1-1).

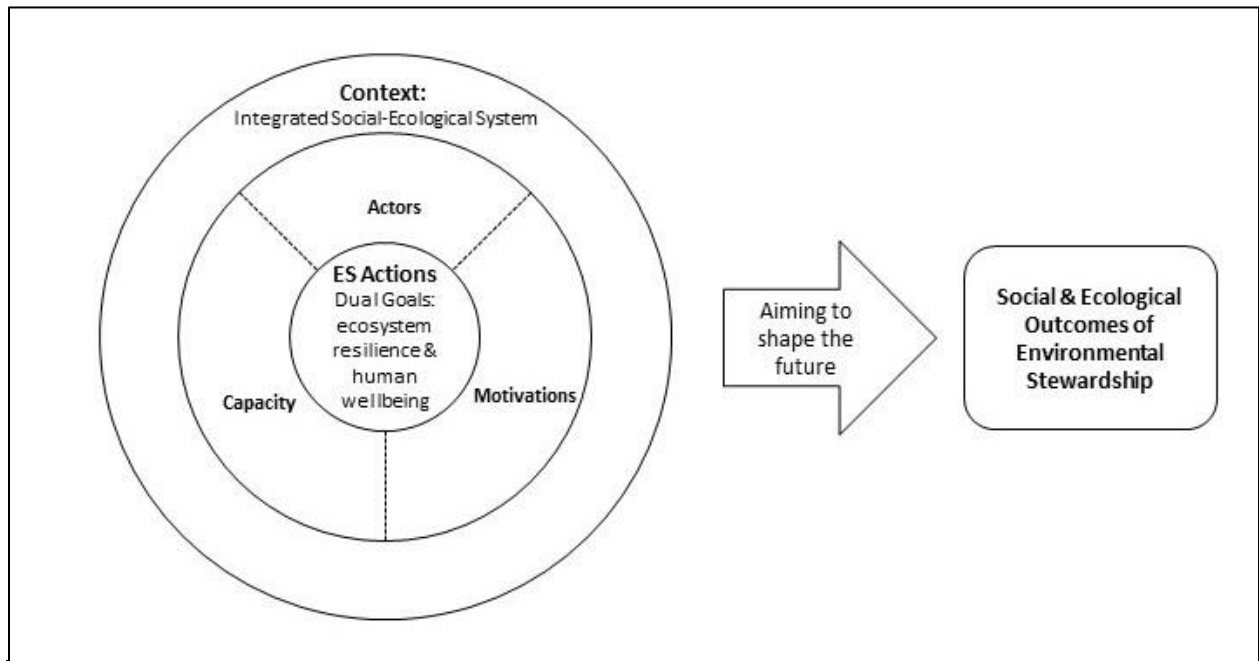


Figure 1-1 *Conceptualization of environmental stewardship adapted from Bennett et al., (2018) and Chapin et al., (2015). Bolded text indicates the conceptualization of Bennett et al., (2018), and un-bolded indicates Chapin et al., (2015).*

The first key element of environmental stewardship involves the integration of social and ecological processes at multiple scales (Chapin et al., 2015). Humans are intimately connected

with ecosystems, and we rely on the proper functioning of the environment for our survival (Folke et al., 2011). Therefore, it is imperative that the social and ecological systems are completely integrated and considered as one interconnected whole (Kates et al., 2001). The social-ecological system provides the context in which environmental stewardship takes place at all scales (Bennett et al., 2018).

Because society is reliant on a healthy ecological system, it is not wise nor practical to consider society's goals as separate from those of the natural environment; an important basis for stewardship work. The second key element of environmental stewardship identified by Chapin et al., (2015) is that it has dual goals of maintaining and enhancing both ecosystem resilience and human wellbeing. To do so, environmental stewardship involves linking multiple disciplines, knowledges, and practices to successfully broaden and link the goals of the social and ecological sciences (Driscoll et al., 2012; Rozzi et al., 2015). For example, in key societal processes such as waste management, resource and energy use, and water recycling, responsible environmental stewardship involves mirroring the environment or nature in key areas (Folke et al., 2011; Peachey, 2008; Steffen et al., 2011).

The final key element of environmental stewardship is the focus on attaining successful positive social and ecological outcomes that focus on shaping the future of the social-ecological system rather than mending the past (Bennett et al., 2018; Chapin et al., 2015). The future of the social-ecological system must be shaped by science and take account of ethical land values, ecology of the system, stakeholder opinions, and decision-making processes (Cirillo, 2014; Driscoll et al., 2012). This idea of environmental stewardship as shaping the future of a social-ecological system involves a shift from previous resource management that focuses on reactive management, to a governance-based, forward-looking resource management system that considers the whole complex system in a fully transdisciplinary way (Chapin, Carpenter, et al., 2009; Cirillo, 2014; Rozzi et al., 2015). Environmental stewardship provides an avenue for stewardship initiatives and environmental management plans that are focused on directing future changes to benefit both humans and the environment.

While conceptualizations of local environmental stewardship are being put forth in the literature (Bennett et al., 2018; Chapin et al., 2015; Mathevet et al., 2018), the evidence and scholarly discussion on the success of environmental stewardship efforts and on how elements of stewardship interact is largely underdeveloped. To improve stewardship efforts on the ground, it is imperative that we develop a better understanding of environmental stewardship and success. Existing research tends to focus on methods of measuring success, commonly using ecological outcomes as the indicator for success, rather than encompassing social and ecological elements of success (Conrad & Daoust, 2008; Gutiérrez et al., 2011; Roman et al., 2015; Ruiz-Jaen & Aide, 2005). Furthermore, much of the stewardship research to date has focused on specific instances or types of environmental stewardship (Waylen et al., 2010), whereas research that takes a broad perspective encompassing many types and cases of stewardship is less common. Additionally, the unit of analysis is commonly at the initiative or project level (e.g. Conrad &

Daoust, 2008a; Gutiérrez et al., 2011; Roman et al., 2015) and there is a need for a better understanding of local-scale stewardship from a broader perspective. There is a need for research that addresses these gaps in the literature through undertaking an empirical investigation of local environmental stewardship that broadly focuses on both elements of stewardship and success.

1.3 Study Aim

The overall aim of this thesis research is to advance understanding of local-scale environmental stewardship through an in-depth exploration of environmental stewardship work in an empirical context. The thesis research will address this aim through undertaking two distinct studies. The first study (Chapter Two) explores the social-ecological context as well as initiative-specific elements of local environmental stewardship. The second study (Chapter Three) scales up the focus from the initiative-level (Study One) to the organizational level to examine environmental stewardship success from the perspectives of stewardship organizations undertaking the work.

1.3.1 Study One: Exploring the Context and Elements of Environmental Stewardship

The purpose of this study is to develop an in-depth understanding of environmental stewardship at a local scale. The empirical study design was informed by the literature on social-ecological context as well as conceptual elements of environmental stewardship. The study seeks to address the following two research questions:

Research question one: How does the social-ecological context shape environmental stewardship work in an empirical context?

The social-ecological context in which environmental stewardship occurs is arguably one of the most salient aspects to consider. Context impacts all other aspects of environmental stewardship, for example: the efficacy of the initiatives; what is socially acceptable in a given contextual space; what actors are involved and their motivations to do the work (Bennett et al., 2018; Edwards & Steins, 1999; Honadle, 1999; Swainson & de Loe, 2011). However, there is a tendency in social science research to focus on broader cases and generalizations (Honadle, 1999). There is therefore a significant need to undertake an investigation of how the social-ecological context impacts environmental stewardship work in a local setting. This understanding of the local context forms the basis of this study and the broader thesis research.

To address this research question, a qualitative approach was utilized in which semi-structured interviews were conducted. The interviews were informed by literature on social-ecological context, participants were asked to discuss various contextual factors, and transcripts were qualitatively coded. The results will address how environmental stewardship is impacted by the social-ecological context within an empirical setting.

Research question two: How do elements of environmental stewardship interact at the level of individual initiatives at a local scale?

Conceptualizations of local environmental stewardship are relatively recent (Bennett et al., 2018; Chapin et al., 2015). As such, there have been few empirical studies undertaken to investigate

the conceptual aspects of environmental stewardship interacting within local initiatives. The literature indicates the following elements to be important in environmental stewardship work: the social-ecological context, the actors involved, their motivations to engage in the work, the capacity to undertake the initiative, the actions taken, and finally the social and ecological outcomes of the stewardship initiative (Bennett et al., 2018). There is a need to empirically test this conceptualization on-the-ground to: gain an understanding of how these elements interact, and to contribute to and enhance the scholarly literature on the elements of environmental stewardship.

To address this research question, a quantitative online questionnaire was utilized. Participants were asked to provide information on all elements of stewardship for each of their initiatives, and results were quantitatively analysed. The results of this questionnaire will provide insights into how stewardship elements interact within local environmental stewardship initiatives.

1.3.2 Study Two: Assessing Factors of Environmental Stewardship Success

The purpose of the second study is to gain an understanding of the factors that lead to environmental stewardship success, from the perspective of the organizations undertaking the work. This study will scale up the focus from the individual stewardship initiatives, to the organizational perspective of success more broadly. There are three study objectives that will be investigated to address this purpose:

Objective one: to discover what factors contribute to successful environmental stewardship initiatives.

Investigations of successful environmental stewardship have typically focused on specific investigations. For example, research has focused on particular methods of measuring success or specific examples of environmental stewardship work (Ruiz-Jaen & Aide, 2005; Waylen, et al., 2010), or on particular types of stewardship initiatives such as urban tree-planting or restoration initiatives (Roman et al., 2015; Ruiz-Jaen & Aide, 2005; Zhao et al., 2016). Additionally, the unit of analysis of existing research on environmental stewardship and success tends to be on the initiative (Conrad & Daoust, 2008a; Gutiérrez, et al., 2011; Roman et al., 2015), or the organizational structure (Close et al., 2016; Connolly et al., 2013; Johnson et al., 2019). There has yet to be a holistic study that aims to understand what factors contribute to success across environmental stewardship initiatives broadly.

Objective two: to discern how representatives from staff and volunteer-based organizations perceive those factors.

The organizations engaged in environmental stewardship work typically have a mandate of serving the greater good (Bach-Mortensen & Montgomery, 2018; Salamon & Sokolowski, 2016). The broad missions and goals of third sector, or charitable non-profit organizations therefore makes it difficult to measure their success, unlike for-profit organizations that may have clearer definitions or markers of success (Bach-Mortensen & Montgomery, 2018; Helmig et al., 2014; Sawhill & Williamson, 2001). Additionally, existing research regarding stewardship organizations

investigates the structure of local community or environmental groups (Andrews & Edwards, 2005), networks between groups or actors working on stewardship efforts (Romolini et al., 2016; Svendsen & Campbell, 2008), and relationships between environmental groups and effectiveness on the ground (Close et al., 2016; Locke et al., 2014). There has yet to be an investigation of how different types of environmental stewardship organizations perceive factors important for successful stewardship efforts.

Objective three: to understand, from an organizational perspective, why those factors are important for stewardship success.

This final objective investigates the success factors identified in objective one in more detail to understand why organizations perceive those factors to be important. It develops an in-depth understanding of how organizations perceive their success and the success of environmental stewardship more broadly, taking the study an additional step further to provide supplementary insights into stewardship success.

To address these objectives, an initial questionnaire was conducted to gather baseline information on stewardship success, followed up with semi-structured interviews to gather insights from the participants on what they believed made for their success. The results were qualitatively coded and further analysed to address each of the three objectives.

1.4 Study Limitations and Delimitations

Research limitations are defined as factors that may affect the study but are out of the researcher's control (Mauch & Park, 2003). The focus of this exploratory research is on environmental stewardship at a broad scale; both in looking at the initiatives (Study One) and the success factors (Study Two). Due to the scope of the master's thesis, breadth comes at the expense of depth, limiting the in-depth investigation of specific aspects of stewardship elements or success factors. However, there is much published research that achieves this depth (Andrews & Edwards, 2005; Johnson et al., 2019; Kollmuss & Agyeman, 2002; Locke et al., 2014; Romolini et al., 2016; Svendsen & Campbell, 2008). Rather, the focus here is on an in-depth investigation of environmental stewardship, not on specific elements or aspects of such. As discussed previously, this was a deliberate design to address current gaps in the literature. Another limitation involves the use of organizational perceptions as a measure of outcomes and success. Perceived success may not be as accurate as physical measures of environmental condition, and is contested in the literature (Bennett, 2016; Cook et al., 2010; Petursdottir et al., 2013; Wood & Lavery, 2000). However, physical measurements are outside the scope of this research, so perceptions are used as a proxy. A final limitation of the study is the method employed to collect questionnaire responses. Participants were asked to complete the questionnaire multiple times for each initiative of interest, and the same participants were requested to participate in both phases of data collection; however, it is outside the researcher's control whether participants followed these instructions. Every effort was made to mitigate the impacts of these limitations on the study.

Research delimitations are similar to limitations but are under the researcher's control and imposed purposefully on the study (Mauch & Park, 2003). The delimitations of this research are related to the criteria used to identify the units of analysis, the stewardship initiatives and organizations invited to participate. The Niagara Region was chosen as the empirical case because it is local, and it provides adequate and logical boundaries for the case study. Private landowner initiatives were excluded from this study to maintain consistency across initiatives implemented by public organizations. Finally, the initiatives must have been implemented within the years 2012-2017. This five-year period was chosen after consultation with a partner at a stewardship organization because the initiatives should be relatively recent and most would have been completed or nearing completion in 2018, the time of data collection.

An important point to address here is the lack of Indigenous voices in this research. The criteria and method used to identify stewardship organizations to be invited to participate did not identify any local Indigenous groups in the Niagara Region. As well, while the methods employed in this research are well established and were rigorously employed, the focus on stewardship organizations is a noteworthy limitation as it resulted in a lack of diverse perspectives. Suggestions to address this concern and create a more inclusive methodology in future work are included in the discussion chapter (Chapter Four).

1.5 Organization of Thesis

This introductory chapter situates the current research within the context of human impact on the environment, the need to reconnect with the biosphere, and ultimately, the key role environmental stewardship plays in addressing both of these broader issues. This chapter also situates the current research within the published literature on environmental stewardship, highlighting the literature gaps that will be addressed. The chapter details the overall aim of the thesis - to advance understanding of environmental stewardship through an in-depth exploration of local stewardship work within the Niagara Region of Canada. Detail is provided on the specific objectives/research questions that are addressed through two distinct studies. Acknowledgment of limitations and delimitations are described. Chapters Two and Three will present each of the two unique studies (to be submitted as independent journal articles).

Chapter Two details Study One which aimed to develop an in-depth understanding of local-scale environmental stewardship within an empirical context. The two study questions were as follows: (1) how does the social-ecological context shape local environmental stewardship?; and (2) how do elements of environmental stewardship interact at the level of stewardship initiatives?. To answer these research questions, a mixed-methods case study approach was employed where the Niagara Region was identified as the case study. The data collection and analyses were divided into two phases. Phase one utilized a quantitative online questionnaire to gather information on stewardship elements for each initiative of interest. Phase two utilized semi-structured interviews to gather more in-depth information from study participants. Results are presented and discussed within this chapter.

Chapter Three includes Study Two, which investigated local-scale environmental stewardship success from the perspectives of the organizations undertaking the work. The objectives of this study are as follows: (1) discover what factors contribute to successful stewardship initiatives; (2) discern how representatives from staff- and volunteer-based organizations perceive those factors; and (3) understand, from an organizational perspective, why those factors are important for stewardship success. This study also employed a two-phase mixed-methods study design. Phase one utilized a questionnaire to gather initial information on initiative success. Semi-structured interviews were then conducted to gather detailed information on stewardship success; the results of these interviews form the bulk of the contribution provided by Study Two. Findings are presented and discussed within this chapter.

The final chapter opens with a synthesis of the findings from Study One and Study Two. Key findings and the overall contributions of the research to the literature on environmental stewardship are discussed. Final conclusions and suggested recommendations end the thesis.

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Chapter Two: Study One: Exploring the Context and Elements of Environmental Stewardship

2.1 Introduction

Environmental stewardship is a powerful idea about the human-environment relationship which has both endured and evolved. Aldo Leopold's (1949) articulation of a land ethic popularized the concept and set out ethical obligations of humans to nature. Use of the term stewardship was observed in 2000 to have increased considerably, defined specifically in relation to the responsible use, management, and protection of the land in such a way that takes account of society's needs both now and in the future (Worrell & Appleby, 2000). The need for stewardship continues to grow in both importance and urgency in response to a host of pressing contemporary challenges. These include, for example: the increasing disconnect between society and the natural environment (Folke et al., 2011; Pyle, 2003); direct human impacts such as human-caused climate changes (Hughes et al., 2003; IPCC, 2013; Vitousek et al., 1997); loss or reduction in ecosystem services (Costanza et al., 2014; Worm et al., 2006); species and biodiversity loss (Dirzo et al., 2014; Worm et al., 2006); and habitat fragmentation or reduction in quality habitat (Fahrig, 2003; Fischer & Lindenmayer, 2007; Forman & Alexander, 1998), all of which are resulting in further environmental degradation.

Despite increasing use and the growing importance of environmental stewardship, definitions of the term vary in the literature and are largely dependent on the context in which it is used (e.g. Bennett et al., 2018; Chapin, Kofinas, & Folke, 2009; Mathevet et al., 2018; Steffen et al., 2011; Worrell & Appleby, 2000). In synthesizing the main themes from existing definitions we can glean that stewardship entails the responsible use of the ecological system (Bennett et al., 2018; Steffen et al., 2011; Worrell & Appleby, 2000) with an emphasis on human wellbeing and meeting society's needs both now and in the future (Chapin et al., 2011, 2015; Peachey, 2008; Worrell & Appleby, 2000). Stewardship is, or should be, based on science (Peachey, 2008; Steffen et al., 2011), and linkages between social and ecological systems as well as the mutual benefits of stewardship to humans and the environment have come to the fore. Stewardship involves integrating social and ecological systems and shaping trajectories in beneficial ways for people and the planet (Bennett et al., 2018; Chapin et al., 2011, 2015; Mathevet et al., 2018), with social-ecological resilience as an important focus (Chapin, Folke, & Kofinas, 2009; Mathevet et al., 2018).

One of the most influential factors in environmental stewardship efforts is the context in which it occurs. For researchers and practitioners alike to be successful in studying and undertaking environmental stewardship, an understanding of the context is imperative for two important reasons; the first being that social and ecological changes occurring in both the local and broader system will inevitably affect the stewardship work being done; the second reason being that the social context will impact what stewardship efforts are acceptable or appropriate in a given context (Bennett et al., 2018; Edwards & Steins, 1999; Swainson & de Loe, 2011).

In response, the aim of this study is to develop an in-depth understanding of local-scale environmental stewardship in an empirical context. The study questions are as follows: (1) how does the social-ecological context shape environmental stewardship work in an empirical context?; and (2) how do elements of environmental stewardship interact at the level of individual initiatives at a local scale? These questions are investigated through a mixed-methods case study that utilizes both an online questionnaire and semi-structured interviews.

2.2 Study Literature Framing

Stewardship has become the subject of a rapidly expanding and multi-dimensional body of scholarship. Published research varies from practical studies on how to improve environmental stewardship work on the ground, or on specific elements of environmental stewardship (e.g. Bramston et al., 2011; Fisher et al., 2012; Roman et al., 2015; Ryan et al., 2001), to broader and more conceptual studies on environmental stewardship (e.g. Chapin, Carpenter, et al., 2009; Mathevet et al., 2018; Steffen et al., 2011; Chapin et al., 2011; Taylor, 2017). Studies also vary from local to global contexts and areas of focus (Bennett et al., 2018; Donald, 1997; Raymond et al., 2016; Steffen et al., 2011).

2.2.1 The Social-Ecological Context of Environmental Stewardship

Context influences environmental stewardship in multiple ways, and research from a social-ecological-systems perspective reveals important contextual factors (Bennett et al., 2018; Honadle, 1999; Johnson et al., 2019). These include: the political/institutional; social/cultural; economic; and environmental/biophysical factors. These factors are interrelated and operate in concert to form the contextual space in which stewardship occurs. They come together, in various configurations, to influence environmental stewardship efforts.

Environmental stewardship occurs at different scales, from local to regional to global, all of which are interconnected and linked, and each will come with its own set of contextual factors. It is at the local scale where stewardship initiatives are most quickly developed and implemented (Chapin et al., 2015). Examples of local-scale initiatives could be a stream restoration or a tree planting event. These initiatives involve direct community involvement and have direct effects on the community (Bennett et al., 2018). Local-scale environmental stewardship can have links to community or individual development of sense of place as well, which may further feed back into individuals' involvement in environmental stewardship at all scales, as well as fostering positive environmental values and behaviours (Bennett et al., 2018; Bramston et al., 2011; Chapin et al., 2015; Ryan et al., 2001). It is therefore important to focus in-depth research at the local scale of environmental stewardship.

The context in which the social-ecological system is embedded, and where stewardship initiatives take place, affects all other aspects of environmental stewardship through the determination of the most relevant and effective actions to be taken (Bennett et al., 2018). However, one cannot consider the social-ecological context without also considering spatial characteristics. As Tobler's first law of geography states: "everything is related to everything else, but near things are more related than distant things" (Tobler, 1970, p. 236). The location(s) in which environmental

stewardship occurs is an important aspect to consider; the context is largely dictated by this. However, studies have only recently begun to investigate the spatial aspects of environmental stewardship, and much of this work focuses at an organizational level of analysis (Jasny, et al., 2019; Locke et al., 2014; Svendsen et al., 2016). Studying stewardship spatially at the organizational level provides a way of identifying gaps in stewardship efforts or capacity on the ground and investigating collaborative relationships between groups. For example, a study published in 2019 found that there were differences in collaborative networks in two U.S. cities, but that in one city, collaboration was linked to geographic proximity (Jasny et al., 2019). Research that investigates the context and spatial arrangement of individual environmental stewardship initiatives is both relatively recent and rare.

2.2.2 Frameworks of Local Environmental Stewardship

The environmental stewardship literature has also been fairly limited in the development of in-depth conceptual or analytical frameworks for studying stewardship. Notable exceptions include: Chapin et al.'s, (2015) study of arctic environmental stewardship, where the three scales are discussed in detail; and, Bennett et al.'s, (2018) framework for local environmental stewardship, where elements of environmental stewardship are put forth. The framework put forth by Bennett et al., (2018) describes local-scale environmental stewardship as the actions taken by various actors who have a range of motivations and capacities with the end goal of attaining positive social and ecological outcomes; all of which are influenced by the social-ecological context in which they are situated. The main themes of environmental stewardship echo throughout this analytical framework: the integration of the social-ecological system; dual goals of ecosystem and societal wellbeing; and positively shaping the future of the social-ecological system (Chapin et al., 2015).

The actors (stewards) who are engaging in environmental stewardship actions are directly affected and determined by the context, and are also likely those who most strongly feel the direct effects of the stewardship efforts (Bennett et al., 2018; Chapin et al., 2015). Stewards may consist of individuals managing private land, voluntary groups of citizens such as naturalists groups, more formalized non-profit organizations that may or may not have paid staff, Indigenous groups and councils, or governmental entities from municipal to federal scales (Bennett et al., 2018; Ens et al., 2016; Fisher et al., 2012; Merenlender et al., 2016; Reo et al., 2017; Svendsen & Campbell, 2008).

The actors undertaking environmental stewardship work have different motivations for engaging that can be either intrinsic, extrinsic, or both (Bennett et al., 2018). Intrinsic motivations are those that are internal and associated with an individual's morals or ethics, while extrinsic motivations are outside forces motivating an individual to act, such as rewards or incentives (Bennett et al., 2018). Research has found that many stewards who engage in this work are motivated intrinsically, with social interactions, personal learning, and caring for the environment being important motivators (Asah & Blahna, 2013; Bramston et al., 2011). Fostering individuals'

motivations to engage in this type of work has also been linked to successful work being sustained over longer terms (Cetas & Yasué, 2016).

The capacity for successful environmental stewardship hinges on the ability of the system and actors to meet the desired goals. Capacity is dependent on a range of factors including, for example: financial capacity, human capacity, policies put in place that may either support or hinder the work, time commitments involved, social and cultural systems, and broader political systems (Bennett et al., 2018; Chapin, Carpenter, et al., 2009; Mathevet et al., 2018). Bennett et al.'s 2018 framework for local environmental stewardship puts forth six categories of capital important for environmental stewardship efforts: social, cultural, financial, physical, human, and institutional capital. Often a limiting factor in the establishment of new stewardship organizations is the amount of dedicated resources (Svendsen & Campbell, 2008); groups often can get started with limited capacity, but to grow and take on more initiatives, capacity is imperative.

The actions taken to implement environmental stewardship initiatives include the approaches, plans, and behaviours taken by the actors, and can occur at all scales of stewardship (Bennett et al., 2018). The stewardship actions are the physical manifestation of the stewardship work, whether that be a tree-planting initiative, or the establishment of a protected area or conservation easement. Actions may be categorized as restoration, preservation, or sustainable use of the natural environment (Bennett et al., 2018). They may also vary in their complexity from focusing on specific species to habitat or ecosystem-level targets (Bennett et al., 2018).

The outcomes are the specific end goals or results of the stewardship work, focusing on both the social and ecological aspects stemming from the initiative. These outcomes can be either beneficial or not and may or may not be intended. Social and ecological outcomes are used to adapt the actions taken to achieve stewardship goals in an iterative and adaptive process that attains the final goal in a particular setting (Armitage et al., 2009; Bennett et al., 2018; Chapin, Kofinas, & Folke, 2009). Examples of ecological outcomes put forth by Bennett et al., 2018 include: species abundance, habitat quality, area coverage, ecosystem productivity, and sustainability. And social outcomes may include: wealth/poverty, improving livelihoods, employment, well being, and food security (Bennett et al., 2018).

This study is framed by bringing together these salient strands of scholarship on environmental stewardship. It is important to develop an in-depth understanding of how environmental stewardship may be affected by the social-ecological context in which it is situated (Honadle, 1999; Wolf et al., 2013). There is also a need to empirically investigate conceptualizations of local stewardship (Bennett et al., 2018) and how elements of environmental stewardship interact in different settings.

2.3 Study Design and Methods

A case study research design was selected for this research. Case studies involve the in-depth study of a pre-determined unit(s) of analysis, and may be exploratory, explanatory, or descriptive

(Baxter & Jack, 2008; Scholz & Tietje, 2002; Yin, 2009). In contrast to other methods that may focus on a wider range of research questions, case studies generally aim to answer either ‘how’ or ‘why’ (Yin, 2009), and thus are well aligned with the questions guiding this inquiry.

2.3.1 Case Study Design and Participant Selection

Figure 2-1 illustrates the single embedded case study design taken in this research. Yin (2009) suggests pre-developed theory as an appropriate starting point; as such, we employ the study framing set out in the previous section, as there is generally a paucity of environmental stewardship theory to guide the case study development.

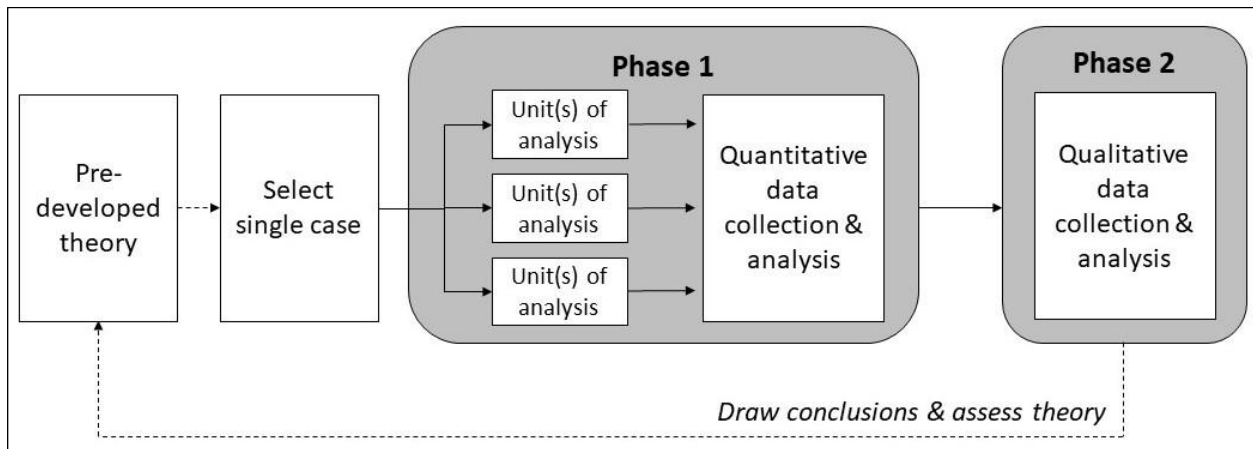


Figure 2-1 Outline of the case study method/research design being undertaken here, with a delineation of the two research phases. Adapted from Yin, (2009).

A case consists of a bounded entity or an individual unit of analysis (Yin, 2009). The Niagara Region of Canada was selected as the case study for this research because it is a spatially discrete unit, and the Region is undergoing both developmental and political changes while also being an ecologically important region in southern Ontario. The Niagara Region consists of 12 municipalities and the regional borders are well defined; the Region is undergoing significant changes, both politically and socio-economically; the Region is relatively independent with a diverse economy supported by agriculture (e.g. fruit farms, wineries), tourism (e.g. Niagara Falls, Niagara-on-the-lake), and two post-secondary institutions; it is located between two Great Lakes and contains some of the last remaining Carolinian forest in Canada; finally, there are many active stewardship and conservation groups in the Region. The Niagara Region is located in southern Ontario (Canada), and borders the United States with the Niagara River marking the international border (Figure 2-2).

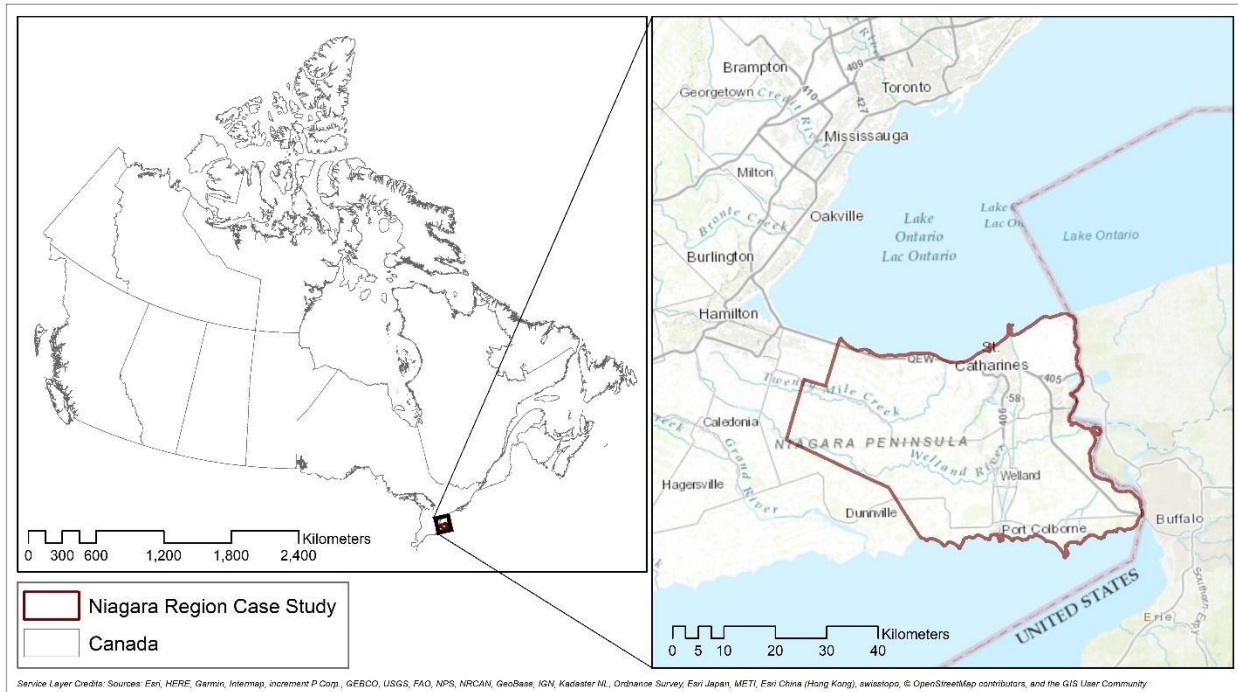


Figure 2-2 Map showing the location and context of the Niagara Region case study area.

Within the Niagara Region case, the individual units of analysis are environmental stewardship initiatives. Initiatives were chosen because they are the physical manifestation of the organizations’ stewardship work and are relatable units of analysis. For the purposes of inclusion in the study, participants were given the following definition:

“A **stewardship initiative** is defined as any **physical actions, events, or activities** that are taken at a site with the intention of ‘stewarding’ the land or environment by an actor(s) (your organization). Examples of stewardship initiatives include: restoration of a site, a tree-planting event, protection of habitat, etc. I am specifically interested in the stewardship initiatives of your organization that were implemented and completed within the Niagara Region between the years of 2012-2017.”

The study focused on both the case (the Niagara Region of Canada), and the units of analysis (the environmental stewardship initiatives). Research question one aims to understand how the case influences the units of analysis, while research question two focuses in-depth on the units of analysis (Section 2.1).

Stewardship initiatives within the Niagara Region were determined through a two-step process. First, an online search was conducted to identify all environmental stewardship entities (non-governmental organizations, businesses, government agencies, etc.) operating within the Niagara Region (hereafter referred to as “organizations” or “groups”). A comprehensive list of search terms was used to identify the organizations; the list included multiple search terms related to environmental stewardship (e.g. “stewardship”, “conservation”, etc.) paired with the

names of all municipalities and the study region. A full list of search terms is included in Appendix 2-A. The website of each organization was then scrutinized to ensure: an organizational focus on stewardship (broadly defined to encompass the sustainable use, management, or protection of land or water); the public nature of the entity (i.e. not a private landowner); and, the presence of stewardship initiatives for the years 2012 to 2017.

Organizations that met these criteria, or were identified by others, were contacted by email to participate in the study. If a contact person was known at the organization, they were sent the initial email. If not, the email was sent to the organization's general email address. Organization contacts were sent both a letter of invitation to participate and a brief research summary. Snowball sampling was used to ensure that all possible organizations of relevance were contacted (Biernacki & Waldorf, 1981; Bryman et al., 2012) and continued until saturation, when no new organizations were identified by informants (Bryman et al., 2012). Research ethics was sought and gained prior to the contact (REB file #17-406). Participants were asked to fill out an informed consent form prior to both research phases (Appendix 2-B).

A total of 35 organizations were contacted, with 17 participating in both research phases, and one participating only in phase one. The organizations that participated include: Association for Canadian Educational Resources, Ducks Unlimited Canada, Friends of Walkers Creek, Fort Erie Conservation Club, Friends of Malcolmson Eco-Park, Friends of One Mile Creek, Land Care Niagara, Links for Greener Learning, Nature Conservancy of Canada, Niagara Bruce Trail Club, Niagara Falls Nature Club, Niagara Parks Commission, Niagara Peninsula Conservation Authority, Niagara Restoration Council, Ontario Ministry of Natural Resources and Forestry, Peninsula Field Naturalists Club, Port Colborne and District Conservation Club, and Trout Unlimited Canada. For the purposes of this study, the participants represented their respective organizations; as such, "participants" and "organizations" will be referred to interchangeably.

2.3.2 Methods

A mixed methods approach was employed to data collection and analysis. This approach recognizes using a combination of methods available and appropriate to the aim of the research (Creswell, 2014; Greene et al., 1989). Data was first collected through a questionnaire, then follow-up semi-structured interviews were conducted with key informants from the organization ("participants"). Key informants are individuals who are knowledgeable about the organization and able to represent it. The same participant was requested to participate in both study phases, but it was outside of researcher control whether organizations chose to participate in that manner.

2.3.2.1 Phase One: Online Questionnaire

Data was first collected through a questionnaire (see Appendix 2-C). The questionnaire was distributed to representatives from each organization using Qualtrics online. The key informant was asked to complete a questionnaire for each initiative. The questionnaire was designed to gather information on elements of environmental stewardship (actors, motivations, capacity, actions, and outcomes) for each of the organizations' initiatives. The questions were structured

by stewardship element, and the options associated with each were written to operationalize the framework for local environmental stewardship (Bennett et al., 2018). The questions were mainly Likert-scale, allowing for participants to select a range for each option (Bryman et al., 2012).

There was a total of 89 initiatives included in the study. Information gained from the questionnaire was analysed in two ways. First, to understand the spatial arrangement of initiatives, geospatial information for each initiative was collected from a Google Map API code embedded within the questionnaire and mapped using ArcGIS 10.7.1. For initiatives that had multiple locations given, they were mapped individually. The density of initiatives per municipality in the Niagara Region was then determined and mapped using ArcGIS.

Second, to understand how elements of environmental stewardship manifest in initiatives across the Niagara Region, the elements were quantitatively summarized. For initiatives that had multiple locations entered, they were considered as a single initiative for this portion. Some questions were open-ended, allowing for participants to provide additional pertinent information and ensure nothing was missed. For these, participants' answers were grouped into common statements and included in the results section. Results were calculated and presented for each stewardship element as the percentage of total initiatives, calculated using Microsoft Excel.

2.3.2.2 Phase Two: Semi-Structured Interviews

Semi-structured interviews were used as a second means of data collection because they provide some degree of structure while still allowing for flexibility in interviewer responses and follow-up questions (Bryman et al., 2012; Longhurst, 2010). The interviews were conducted with the key informant from each organization and sought to elucidate context of environmental stewardship in the Niagara Region. The set question for the interview, as well as a diagram summarizing the contextual factors set out in the study framing section (see Appendix 2-D) were given to the participants in advance as background information and to help with interview preparation. The semi-structured interview format allowed for further discussion of context, with prompts about each of the four factors evoked when appropriate and/or necessary. Each interview was recorded and lasted approximately 15 minutes.

The audio recording from each interview was transcribed using NVivo Transcription online software. Transcripts were then sent to participants to conduct a member check for two reasons; first to ensure accuracy of their statements, and second to seek any additional thoughts. If participants did not respond to the member check, their transcript was assumed to be accurate. Additionally, interviews were assigned a random letter identifier to present the results; this was done to give voice to participants' quotes while maintaining their anonymity. Finally, in presenting participant quotes in the study results, quotes were edited to improve clarity by removing repeated phrases or crutch words used in conversation.

The transcribed interviews were qualitatively coded using NVivo 12 software. The coding method involved a combination of first cycle structural coding followed by multiple iterations of second cycle pattern coding (Saldaña, 2013). Structural coding is typically employed when there is a specific question of the data, and involves collecting similarly coded segments together (Saldaña, 2013). Pattern coding is a secondary method used to pull information together into broader themes (Saldaña, 2013).

Qualitative coding occurred in the following three steps. Each step was completed for all transcripts at once, rather than fully coding a single interview at a time, to ensure consistency.

Step one: The first pass used structural coding to categorize any text that discussed the context of environmental stewardship in the Niagara Region. Codes were given short names that described the essence of what was being described, using the participants' words when possible. A second pass was then taken using the exact same method to ensure that all relevant text was captured.

Step two: The resulting codes from step one were then grouped into common themes. Any codes that discussed similar topics were grouped into a single theme in this step and given a concise and accurate name. Multiple iterations of this grouping method were conducted until the resulting themes were sufficiently different.

Step three: In the final step, pattern coding was employed to group the themes from step two into the four contextual factors discussed in the study framing and included in the interview question (Appendix 2-D); economic, environmental, political, and social-cultural contextual factors. For themes that fell into multiple contextual factors, they were grouped into all that were relevant.

The themes were then calculated and displayed as the percentage of participants who discussed each. These themes are presented in their contextual factor groupings in the results section below. It should be noted that the percentage frequencies do not reflect the number of times that participants may have discussed a particular point.

2.4 Results

The study results are presented in accordance with the two guiding research questions: (1) the context and spatial arrangement of environmental stewardship in the Niagara Region; and, (2) the elements of environmental stewardship found to be present and interacting within each initiative.

2.4.1 The Context and Spatial Arrangement of Environmental Stewardship in Niagara

The contextual factors' theme frequencies are displayed in Figure 2-3 below. These frequencies reflect the percentage of participants that discussed each of the themes. From the interview data, the themes emerging were categorized into the four contextual factors; economic, environmental, political, and social/cultural context. Themes that commonly occurred within

multiple factors included: “development pressure”; “economics overpowering conservation”; and “nature viewed as roadblocks to development”.

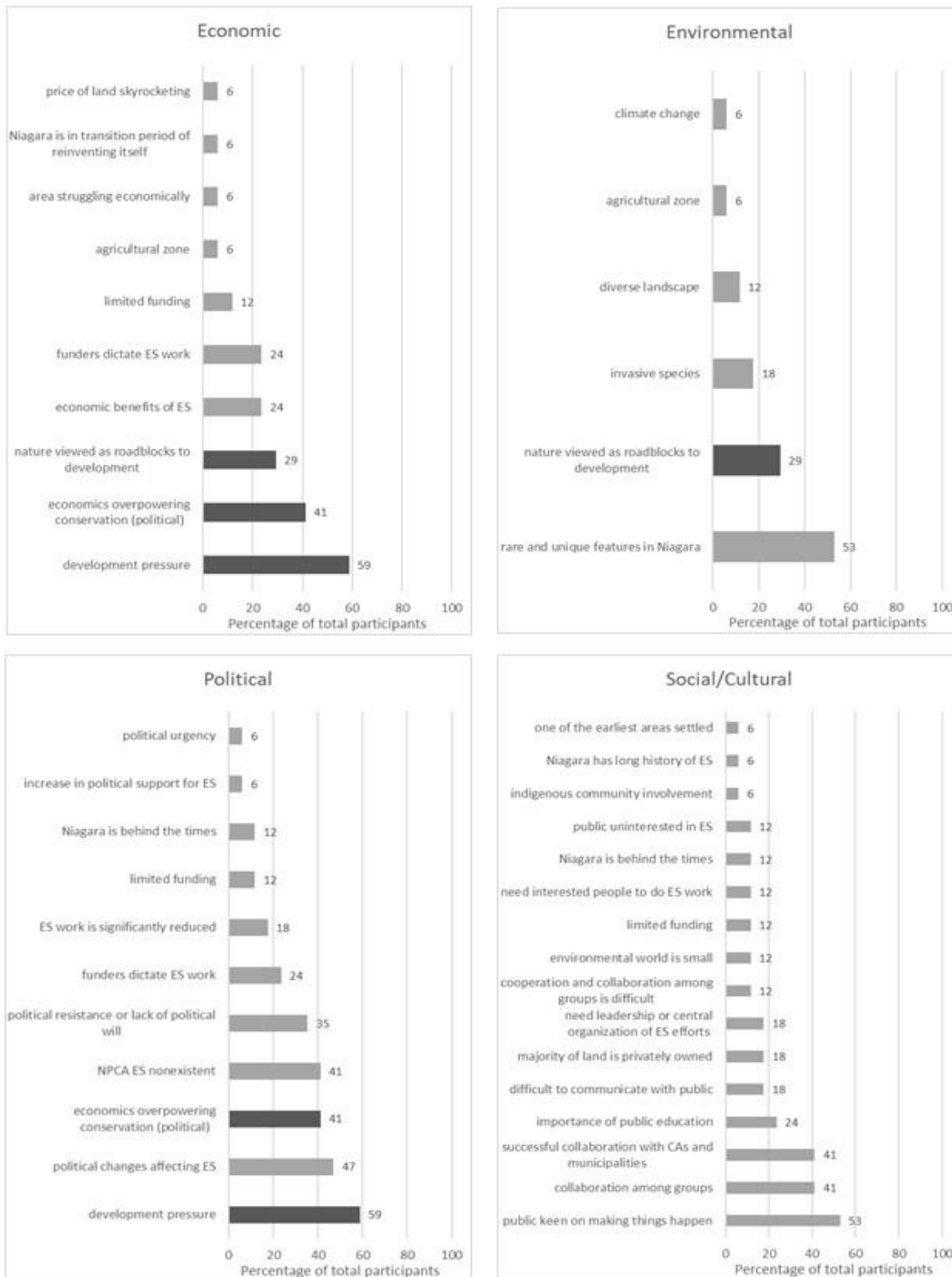


Figure 2-3 The context of environmental stewardship (ES) in the Niagara Region. Qualitative themes identified from semi-structured interview data are grouped by contextual factor. Darker shading indicates themes that occur within multiple factors.

For the economic contextual factor, the themes with the highest frequencies were related to the conflict between environmental stewardship and economics or development, often because of political influence. Quotations from participants which illustrate this theme:

"You've got to kind of... if you want to save anything, you've got to fight with them [the politicians] to get it, you've got to show them the issues because they don't really think that much on the environment end of it. They just think the dollar signs, and "let's build these houses and let's destroy this and build this and build that, and this... ". (participant E)

"And then I think politically that Niagara is not in good condition either. Just because I think there's a lot of economics that are overpowering conservation values. [...] Case in point, I mean there's a big story about they're wanting to build some kind of resort or something in Niagara Falls, right over a potentially significant wetland." (participant D)

Two of the three most common themes in the political contextual factor also overlap in the economic contextual factor. The political context in Niagara was revealed to be closely linked to the economic context. The impacts of political changes on environmental stewardship efforts in the Region was also important. The following excerpt from the transcript of participant K summarizes this:

Participant K: "So that, yeah, I guess that the answer to that question is there's some [stewardship work], but it could be better, by 60 percent... in my expert opinion."

Researcher: "So mostly due to politics?"

Participant K: "Politics related to the conflict between conservation and development. And I mean that's not a new conflict. It's been around for a long time."

Additionally, participant F articulated the impact of politics quite simply: "Yeah, unfortunately I think political influence have really stymied a lot of the stewardship efforts in Niagara".

For the environmental contextual factor, the uniqueness of the Niagara Region, in terms of flora, fauna, and physical features was often discussed by participants. Additionally, the idea of the natural features conflicting with development were often discussed. Illustrative quotations of this theme from participants include:

"So, yeah I think as a whole, like the Niagara Region itself, it's so rich in different ecosystems. It's one of the only areas where you can have the Carolinian species in Canada." (participant L)

"And there's so many rare species that are here. You can read about different species that are here that aren't anywhere else. And the more I read about it in books and through the Internet, the more I find out about this and how lucky we are to have these types of things here that are endangered, threatened, and very rare. Growing here right in our backyard." (participant H)

"There are areas of Niagara where it's just, you know, they're seen as barriers to economic prosperity because they can't be developed." (participant K)

Finally, for the social/cultural contextual factor, participants most often discussed the importance of collaboration among stewardship groups. This theme is illustrated in a quotation by participant H, who stated: "I think that's very important [the connection with other organizations]. I don't think that either just one of those organizations can do it. It takes a village". Public in Niagara being keen to participate also emerged as main theme. This theme is aptly illustrated by quotations such as:

"The environmental world, it seems big at first and then you kind of start spending time in it, and you realize you see lots of the same faces all over the place." (participant A)

"I think it's unique because we have so many caring people." (participant H)

These results indicate the importance of context in understanding local-scale environmental stewardship work. If the study was replicated in another context, these results would undoubtedly differ.

The spatial arrangement of initiatives on the landscape is another important piece of local context. The map showing the spatial arrangement of environmental stewardship initiatives in the Niagara Region is included in Figure 2-4. The initiatives are displayed along with the density of initiatives by municipality. A density calculation was chosen to identify where initiatives are clustered within the Region, and municipalities were chosen as a logical division on the landscape. The initiatives appear to cluster closer to the Niagara River and within more populated municipalities. Unfortunately, due to the nature of the dataset, further analyses or division by stewardship element types was not possible.

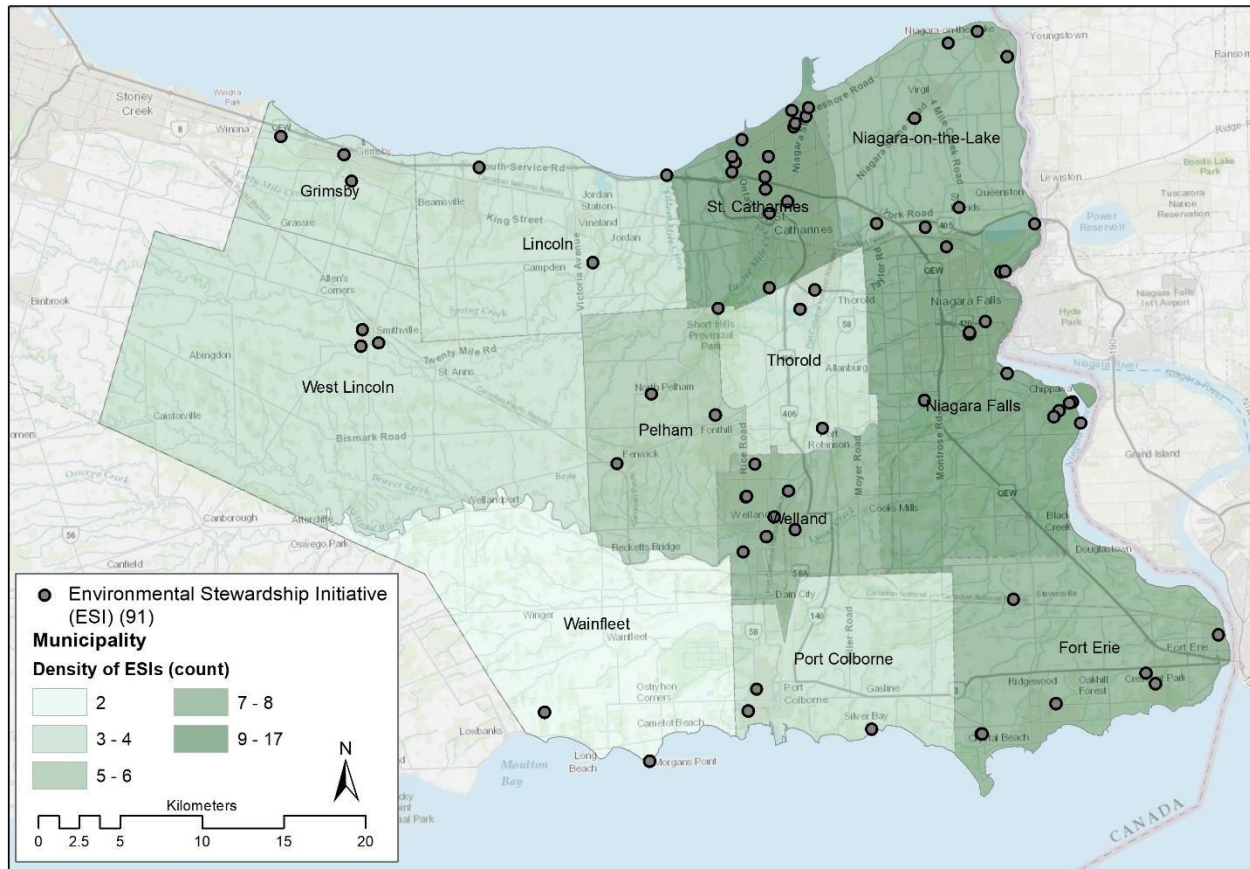


Figure 2-4 Environmental stewardship initiatives in the Niagara Region with initiative density by municipality.

2.4.2 The Configuration of Environmental Stewardship Elements

The configuration of stewardship elements for each of the initiatives is included in Figure 2-5. The actors element chart shows the extent of each of the different actor types in each initiative. Most often involved were individuals (63% of initiatives had individuals ‘extremely involved’) and organizations (53% of initiatives had organizations ‘extremely involved’). The motivations element shows that most initiatives (76%) were spurred to occur because of both intrinsic and extrinsic motivations. The capacity element shows the degree of importance of each of the capacity types to successful initiatives. Most important were social capacity (58% had social capacity as ‘extremely important’ to their success), human capacity (48% had human capacity as ‘extremely important’ to their success), and financial capacity (37% had financial capacity as ‘extremely important’ to their success). The actions element showed that most initiatives were restoration-focused (65%). An additional purpose type of “education” was added by participants using the open-ended text box option. The complexity of actions was fairly evenly spread among the “multiple species” (30%), “individual habitat” (25%), and “entire ecosystem” (33%) options. Few were identified as focusing on an individual species (7%). Finally, the ecological outcomes showed habitat quality (70%), species abundance (64%), and area coverage (62%) to be the most reported, with additional other ecological outcomes of monitoring and water quality being added by participants. Most common social outcomes were wellbeing (78%) and education (30%), with

education, community involvement, preparing for extreme weather, and informing decision-making being added to the list of social outcomes.

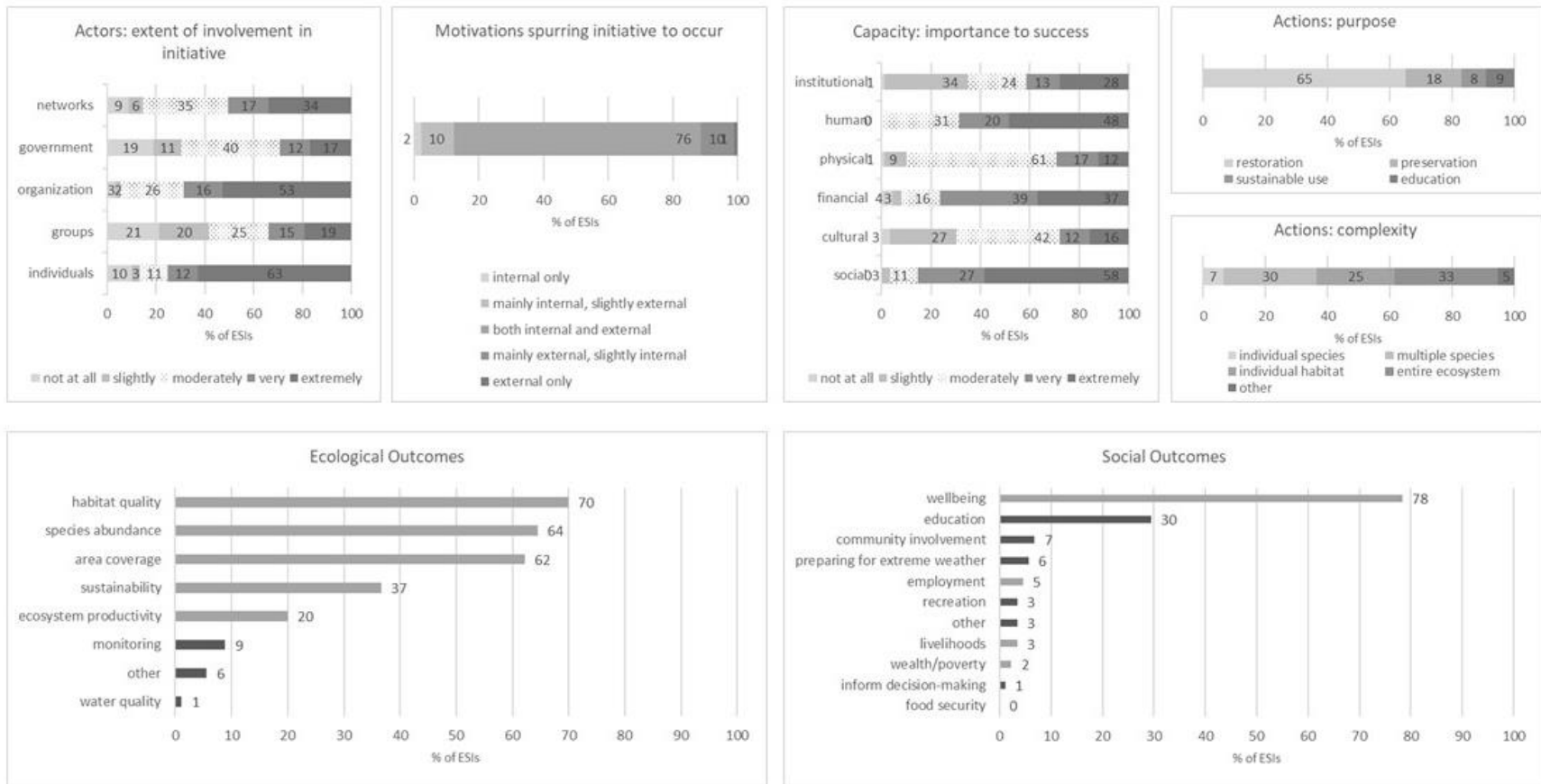


Figure 2-5 Aspects of environmental stewardship elements (actors, motivations, capacity, actions, and outcomes) summarized by percentage of stewardship initiatives reported by participants. Darker colouring indicates social and ecological outcomes added by participants.

2.5 Discussion

This research brings together different aspects of environmental stewardship; the contextual factors and conceptual elements. It specifically positions the results from investigating the two research questions in relation to antecedent scholarship as well as discusses the implication of future work.

2.5.1 How Does the Social-Ecological Context Shape Environmental Stewardship?

To gain an in-depth understanding of environmental stewardship, it is necessary to consider the social-ecological context in which it occurs. However, there is a tendency for research to develop and focus on broad conceptual frameworks without addressing context (Honadle, 1999). As such, this research is novel in that it focuses on a specific social-ecological context (the Niagara Region of Canada) as an empirical testing ground.

The social-ecological context in which environmental stewardship takes place has important implications on all other aspects of stewardship. In the current study, two main themes commonly reoccurred regarding the social-ecological context in the Niagara Region: (1) the significance of collaboration; and (2) the conflict between nature and environmental stewardship with development and politics. These are reflected in the themes most commonly discussed by participants, such as: “collaboration among groups”, “public keen on making things happen”, “development pressure”, and “political changes affecting environmental stewardship”.

The importance of collaboration in environmental stewardship is well established (Bodin et al., 2014; Gutiérrez et al., 2011; Jasny et al., 2019; Plummer & Hashimoto, 2011; Wyborn & Bixler, 2013). Cockburn et al., (2018) stated that collaboration is necessary for environmental stewardship on a multifunctional landscape (Cockburn et al., 2018). However, the results of this study reveal an interesting paradox: collaboration was found to be one of the most important factors of the social/cultural context in Niagara, but was not strongly rated among the elements of stewardship at the initiative-scale. Wyborn and Bixler, (2013) studied stewardship groups working at different spatial scales and found that the nature of the collaboration and dialogue change with the spatial scale (Wyborn & Bixler, 2013). Perhaps this paradox is occurring because the initiative-scale at which the elements were surveyed is too fine to pick up the importance of collaboration, but the prominence increased when participants were asked to think more broadly on the regional scale. Scale may be a mediating variable for the importance of collaboration when considering environmental stewardship.

Common throughout all contextual factors is the ongoing conflict between the natural world with economic development as well as politics. First, economics and development are very much tied to politics in the Niagara Region; during the interviews, participants often conflated the two, speaking of economics and politics as being one in the same. The conflict between environment and economics/politics came up often, with the natural environment often being negatively impacted by one or both of these factors. The ongoing conflict between nature and development

is a core tenet of sustainability science; the essence of which is in integrating the social and ecological systems in such a way that this conflict is mitigated (Fischer et al., 2015; Kates et al., 2001). Land-use conflicts exist at all scales, especially in areas outside of cities that are experiencing growth or urban sprawl, referred to as the urban-rural fringe (Jensen et al., 2019); as is the case in the Niagara Region. To reduce these conflicts, local citizens must be consulted on major projects and developments, with their connection to place being considered as a legitimate concern (Wester-Herber, 2004). Land use conflicts between nature and development are inevitable, and these conflicts and related activities will have an important impact on environmental stewardship work being conducted in these contexts; for example, in a natural area that is under pressure for development, environmental stewardship may take the form of activism or lobbying, especially in instances where the public was not adequately consulted on such changes (Carmin & Balsler, 2002; Tindall & Robinson, 2017). In the Niagara Region, study participants and local citizens were particularly concerned about this conflict and development pressure on natural spaces, often citing political influence as a major factor.

Another important aspect of environmental stewardship in the Niagara Region concerns political changes. When this research was conducted, the local Conservation Authority had undergone significant changes both in elected board members and staffing, as well as reductions in their stewardship programming, a new provincial government had just been elected, and municipal councils had also been re-elected. The research participants spoke at length about the impacts of these changes on stewardship in the Region, often citing the vacuum that had been created when the Conservation Authority reduced their restoration mandate. Research has found political support to be important for successful stewardship work to be undertaken, driven by both policy frameworks and red tape (Johnson et al., 2019; Sheppard et al., 2017; Swainson & de Loe, 2011), as was also discussed by participants.

Figure 2-5 shows that the density of initiatives is higher in those municipalities that are close to the Niagara River; this may be explained by population, environmental factors, sampling technique employed in this study, use or popularity, or myriad other variables. Previous research bringing together geospatial aspects with investigation of stewardship organizations has found that organizational aspects tend to be more influenced by other organizations operating in the same space, and the work that they are doing (Jasny et al., 2019; Johnson et al., 2019). The larger number of stewardship initiatives occurring in those municipalities may be partially explained by this phenomenon, although requires further investigation.

Although the spatial aspect is the basis of the social-ecological context, stewardship literature has only recently begun to tie these together to map stewardship initiatives, groups, and communities in relation to environmental features and other factors (e.g. Johnson et al., 2019; Romolini et al., 2016; Svendsen et al., 2016). Much of which has stemmed from the STEW-MAP project (Svendsen et al., 2016), which focuses at the organizational scale; mapping organizations' spatial 'turf', rather than individual initiatives themselves. Mapping at the initiative level seems to gain more information, as organizations' stewardship turfs can be delineated using this

method, while also collecting location information for specific initiatives. Future work should combine the methods used in this study with those of the STEW-MAP project to delve into relationships between stewardship efforts, initiative success, and measures of environmental quality, using methods similar to Baird et al., (2016).

2.5.2 How Do Elements of Environmental Stewardship Interact at the Level of Individual Initiatives?

The elements of environmental stewardship include the actors involved, their motivations, the capacity of groups to undertake the work, the actions taken, and the resulting social and ecological outcomes (Bennett et al., 2018). The most important actors for successful stewardship initiatives in this study were revealed to be individuals and organizations. It is interesting that the networks were not rated as being highly involved, considering the emphasis on collaboration that emerged from the interview portion of the study, as well as the substantive body of scholarship regarding the importance of networks in stewardship efforts (e.g. Baird et al., 2016; Connolly et al., 2014; Svendsen & Campbell, 2008). As discussed above, this effect may be related to scale.

An important consideration is the degree of complexity when organizations collaborate; factors such as organizational size and scope, competition between organizations, and equity in collaboration efforts all play an important role. The interviews shed light on a common issue with collaboration; being that larger organizations can overshadow smaller organizations, making collaboration difficult or undesirable if the organizations involved are not seen as equals. There was also a concern among groups regarding competition that can occur when groups are struggling to find funding and/or volunteers. These organizations are often working toward the same end goal, but the competition among them can run counter to positive or successful collaboration (Haski-Leventhal & Meijs, 2011; Svendsen & Campbell, 2008). An example of community-level organization that may remedy this would be the establishment of clear “bridge organizations” as groups that coordinate work among others and act in a leadership role (Connolly et al., 2013). The need for strong overall leadership or coordination of groups in the Region was a common sentiment among participants in the study.

Bennett et al., (2018) stated that the two most important factors affecting the capability of stewards to undertake their initiatives are the local community assets and the broader governance structures. The community assets that were found to be most important in the implementation of initiatives in this study were the social capital (i.e., the relationships/networks that help facilitate or support stewardship), and the human capital (i.e., the knowledge/skills/experiences of the people involved in this initiative); both of which are linked to the importance of collaboration that emerged in the social/cultural contextual factor discussed previously. These results are aligned with others in the stewardship literature. For example, a 2008 study of urban stewardship groups in the United States studied organizational resources available to these groups, and how their capacity was affected. The groups were asked what the main barriers were to successful achievement of their missions, and half (49%) indicated a lack of funds as the main barrier, followed by a lack of staff (23%) (Svendsen & Campbell, 2008). Other

barriers that existed were bureaucratic barriers, lack of cooperation, and lack of political power (Svendsen & Campbell, 2008). Another study by Mathijs, (2003) investigated the importance of social capital in farmers' willingness to adopt environmental stewardship practices on their land; it was found that farmers with more social capital (more connections) were more likely to be open to the idea of adopting these practices, and that they were often influenced by personal, structural, and financial factors (Mathijs, 2003).

The broader governance structure in the Region was also found to have an important impact in Niagara: often political support or political will were cited by participants as running counter to environmental stewardship objectives. Additionally, many participants made comments regarding permitting processes and 'red tape' involved in gaining approvals to do their work. These sentiments were certainly impacted by the political context in the Region, as discussed previously.

Stewards' motivations to engage in this type of work are as diverse as the people involved, often varying from intrinsic to extrinsically motivated. The results from this study indicated that most initiatives were spurred by both intrinsic and extrinsic motivations. Studies in the environmental stewardship literature generally indicate that initiatives that are intrinsically motivated have a higher chance of success, citing motivations such as fostering a sense of belonging, personal learning, community connections and development (Asah & Blahna, 2013; Bramston et al., 2011; Cetas & Yasué, 2016). The questionnaire asked participants to indicate what types of motivations spurred the initiative to occur, on a range from intrinsic to extrinsic (Appendix 2-C, Question 21). Therefore, information was not collected on what specifically motivated the stewardship initiative to occur, making it difficult to discuss motivation types in great detail here.

The actions taken hinge on three central components: the actors, motivations, and capacity (Bennett et al., 2018). For the purposes of this research, the stewardship elements were not split by action type, because most resulting initiatives were focused on restoration. An additional action type that was added by participants was that of education. Much of the literature on connectedness to nature and environmental values links back to environmental education as a core aspect of stewarding an ethic of care (Dresner et al., 2015; Ernst et al., 2011; Otto & Pensini, 2017; Stern et al., 2008; Zylstra et al., 2014). As such, it is proposed here that environmental education be considered a type of environmental stewardship action. Another type of environmental action that was not encompassed in the framework nor the survey results is political advocacy, although it had been alluded to by participants in conversation or interviews, hence its inclusion here. This may be explained by the local scale at which the study was focused. Perhaps organizations working at a larger scale, such as regional or national, may have more of an advocacy focus than the organizations involved in this research (Wyborn & Bixler, 2013).

Local-scale environmental stewardship actions can be further broken down into different levels of complexity, which vary from individual species to entire ecosystems. The results of this study indicated fairly even spread across different levels of complexity. However, future research in

other contexts may lend itself to separating stewardship elements by level of complexity, possibly revealing important patterns. These results were not conducive to this type of analysis.

The final stewardship element is the resulting social and ecological outcomes. The outcomes of an initiative can be either social, ecological, or both; with either positive or negative impacts on the surrounding areas and people involved (Bennett et al., 2018). Ecological outcomes of stewardship are those outcomes that either directly or indirectly affect the natural environment or ecological system (Bennett et al., 2018; Sheppard et al., 2017). Social outcomes of stewardship include those that affect people in both direct and indirect manners (Bennett et al., 2018; Kaplan-Hallam & Bennett, 2017). The results of this study indicated a larger emphasis on ecological outcomes, with the majority of ecological outcomes focusing on habitat quality, species abundance, and area coverage. Additional ecological outcomes that were added by participants were monitoring and water quality. On the other hand, there was less consistency in social outcomes in this study. The large majority of social outcomes focused on individuals' wellbeing. Additional social outcomes that were identified included education, community development, and preparing for extreme weather. The larger emphasis on ecological outcomes is likely due to the nature of environmental stewardship work that focuses on the natural environment. However, the larger amount of new social outcomes identified by participants may point to a need to further investigate the social side of environmental stewardship work.

According to Bennett et al., (2018), outcomes feed back into the framework and should inform decisions and changes to stewardship actions to achieve the desired goals of the initiative. Other research in this realm discusses the importance of monitoring and adaptive capacity to improve stewardship work and success (Roman et al., 2015; Sheppard et al., 2017). While these assertions are theoretically sound and much emphasized in approaches to environmental management under conditions of complexity and uncertainty (e.g. Armitage et al., 2009; Chapin, Carpenter, et al., 2009; Folke et al., 2016), the results of this study indicated less than half of the initiatives monitor outcomes. Additionally, monitoring and adjustment may only occur if organizations have the capacity to do so and this was not found to be present. Albeit inappropriate to generalize from the disconnect found in this study, other studies have found a disconnect between monitoring outcomes in environmental stewardship and suggest monitoring and funding improvements to adjust stewardship for success (Driscoll et al., 2012; Sheppard et al., 2017).

2.6 Conclusions

This research brought together two salient threads in contemporary scholarship (contextual factors and elements of stewardship) to examine environmental stewardship in the Niagara Region of Canada. The results from the embedded case study reinforce the important influence of local context on environmental stewardship and build upon it (e.g. de Loe & Swainson, 2011; Edwards & Steins, 1999; Honadle, 1999). Specifically, the findings deepen understanding of how the social-ecological context shapes environmental stewardship, and the ways elements of environmental stewardship interact within organizations' stewardship initiatives.

The absence of Indigenous Peoples and perspectives in this research is noteworthy. Indigenous Peoples have a long history of stewardship in the case study area. In terms of factors of the social-ecological context, this includes the incorporation of Traditional Ecological Knowledge as a component of the history and character of the ecological system, as well as the social/cultural context, political, and likely economic contextual factors. While the methods employed in this research are well established and were rigorously employed, the focus on stewardship organizations is a noteworthy limitation. The collaboration literature often fails to recognise Indigenous Peoples as self-governed entities; Indigenous governments and councils are often included in decision-making processes as another stakeholder group, rather than on a government-to-government basis (Reo et al., 2017). The absence of Indigenous Peoples and perspectives in this research is further evidence of this. Future work in this realm must expand on the methods used here to explicitly identify and include Indigenous groups in the area. Additionally, future work in developing conceptual frameworks for environmental stewardship should explicitly identify Traditional Ecological Knowledge as a contextual factor, and Indigenous groups in the elements of environmental stewardship.

The empirical orientation of the study was chosen because at the time of study, the framework for local environmental stewardship was a recent conceptualization and gaining experience with it in a variety of applied settings was an identified need (Bennett et al., 2018). Several salient observations emerge upon critical reflections from utilizing the framework as an anchoring conceptual structure in this research. There are several aspects for potential elaboration of the framework. First is the element of social-ecological context. This research highlights the value of carefully considering the spatial aspects of local environmental stewardship, a noteworthy addition to the framework. Second, increasing the breadth of reasons individuals are motivated to engage in stewardship to include specific examples such as connection to nature or community building (Asah & Blahna, 2013; Ryan et al., 2001). Third, expanding the range of stewardship actions to include education initiatives and political advocacy. Finally, explicitly acknowledging Indigenous Peoples as an actor as well as Indigenous perspectives in the context portion of the framework. Traditional Ecological Knowledge, and local knowledge of the landscape need to be considered in frameworks of environmental stewardship as well as future stewardship research (Berkes et al., 2000; Bussey et al., 2016; Turner et al., 2000).

With the above aspects of elaboration in mind, the novel integration of contextual factors and elements of environmental stewardship in this work provides a departure point for avenues of future research. Investigating different locations and settings will advance understanding of local environmental stewardship and further enrich the framework proposed by Bennett et al., (2018). As the number of investigations grows, gaining insights across case studies will be possible. As has been argued for allied constructs (Plummer et al., 2017), using a shared conceptualization and systematic approach opens exciting opportunities for advanced analysis of interactions among factors and elements of environmental stewardship and the local context. Ultimately, the more we understand about what influences environmental stewardship, the better our collective capacity to encourage it, and respond to pressing contemporary challenges.

2.7 References

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Chapter Three: Study Two: Assessing Factors of Environmental Stewardship Success: Organizational Perceptions from the Niagara Region of Canada

3.1 Introduction

The extent and rate of environmental degradation occurring as a result of human impacts is alarming. Contemporarily, this includes: anthropogenic climate change (Hughes et al., 2003; IPCC, 2013; Vitousek et al., 1997); loss or reduction in ecosystem services (Costanza et al., 2014; Worm et al., 2006); species and biodiversity loss (Dirzo et al., 2014; Worm et al., 2006); habitat fragmentation or reduction in quality habitat (Fahrig, 2003; Fischer & Lindenmayer, 2007; Forman & Alexander, 1998); and ever-increasing human impacts on the environment as we enter the Anthropocene (Aronson et al., 2020; Rockström et al., 2009; Steffen et al., 2011; Zalasiewicz et al., 2011). It is anticipated that these challenges will grow and intensify with the impacts from climate change and that new threats will emerge (Hughes et al., 2003; IPCC, 2013; Vitousek et al., 1997; Zalasiewicz et al., 2011).

Alarm about present and future environmental degradation has rekindled enthusiasm about environmental stewardship. Environmental stewardship provides a means to ensure that local environments are protected and managed in such a way that the health of the environment is not put at risk; it can be defined generally as the responsible use, management, and protection of the land in such a way that takes account of society's needs both now and in the future (Worrell & Appleby, 2000). Stewardship actions may include such efforts as a local tree planting event, stream restoration, establishment of a park or protected area, or broader political advocacy to achieve environmental stewardship goals (Bennett et al., 2018; Roman et al., 2015; Ruiz-Jaen & Aide, 2005). While the concept of environmental stewardship is not novel and generally has colloquial acceptance, the literature regarding stewardship is still developing. Environmental stewardship definitions vary within the literature, largely dictated by the context in which it is used (Bennett et al., 2018; Chapin, Kofinas, & Folke, 2009; Mathevet et al., 2018; Steffen et al., 2011; Worrell & Appleby, 2000). Additionally, conceptual and analytical frameworks describing aspects of stewardship were largely absent in the literature prior to 2018 (Bennett et al., 2018).

Engaging in environmental stewardship is important for the health of the environment as well as for society. Environmental stewardship enhances and maintains the integrity of the natural environment through, for example, habitat restoration, largescale environmental protection, or contamination cleanup and management (Bennett et al., 2018; Chapin et al., 2015; Tallis et al., 2008). Stewardship simultaneously provides a means for individuals to reconnect with nature and the biosphere (Folke et al., 2011; Plummer et al., 2020). Benefits to people from engaging in environmental stewardship work may include: developing a sense of community, social satisfaction, pro-environmental behaviours, and/or developing healthier lifestyles (Dresner et al., 2015; Ives et al., 2017; Kittinger et al., 2016; Zylstra et al., 2014).

Conceptual or analytical frameworks for local environmental stewardship are a relatively recent advent (Bennett et al., 2018; Chapin et al., 2015). Most recently, Bennett and colleagues (2018) developed a descriptive framework to convey the elements of local environmental stewardship

to include: the social-ecological context, actors involved, motivations, capacity, actions taken, and the resulting social and ecological outcomes. The context in which the social-ecological system is embedded, and where environmental stewardship efforts take place, affects all other aspects through the determination of the most relevant and effective actions to be taken (Bennett et al., 2018). The actors who are engaging in stewardship are directly affected and determined by the context, and are also those who most strongly feel the direct effects of the stewardship efforts (Bennett et al., 2018; Chapin et al., 2015). These actors have different motivations for engaging in this work that may be either intrinsic, extrinsic, or both (Bennett et al., 2018). The capacity for successful environmental stewardship hinges first on the broader social-ecological system; the institutions, local cultures, politics, and support; and second on the ability of actors to achieve the desired goals of environmental stewardship (Bennett et al., 2018; Chapin, Carpenter, et al., 2009; Mathevet et al., 2018). The actions are the approaches, plans, and behaviours taken by the actors, and can occur at all scales (Bennett et al., 2018). The outcomes of environmental stewardship may refer to the end result of the initiative, including both social and ecological. These outcomes can be intended and beneficial, or may have unintended negative effects, and are used to adapt the actions taken to achieve successful stewardship efforts in an iterative and adaptive process to attain the final goals of the stewardship work (Armitage et al., 2009; Bennett et al., 2018; Chapin, Kofinas, & Folke, 2009).

Environmental stewardship can occur at different interconnected spatial scales, ranging from local to regional to global. Steffen et al., (2011) described global environmental stewardship: "We are the first generation with the knowledge of how our activities influence the Earth system, and thus the first generation with the power and the responsibility to change our relationship with the planet" (Steffen et al., 2011, p. 749). Global environmental stewardship involves working to address planetary challenges such as climate change, and requires participation from actors at all scales and methods of engagement to solve global environmental problems. Regional scale environmental stewardship can be thought of as a bridge between the local and global scales. An example of regional bridging of stewardship efforts is in Arctic stewardship. The Arctic is most affected by global climate change, and these local impacts extend to a global scale. Therefore, the nature of the Arctic environmental problems requires a regional perspective on stewardship (Chapin et al., 2015). Finally, it is the local scale where stewardship initiatives are most quickly developed and implemented (Chapin et al., 2015), most directly affecting communities. Local-scale stewardship connects with individual and community sense of place, which forms a feedback loop for stewardship at all scales (Bennett et al., 2018; Bramston et al., 2011; Chapin et al., 2015; Ryan et al., 2001).

There are different types of actors (stewards), and they may differ based on the scale at which the initiatives are implemented. Stewards may be individuals with a range of personal motivations to engage in stewardship work. For small-scale environmental stewardship initiatives on private land, such as improving soil quality or runoff on a farm, individual stewards are likely to be the only ones involved (Raymond et al., 2016). Stewards may also be organizations implementing and organizing larger-scale initiatives, often on public land. Some types of

organizations that may engage in environmental stewardship are non-governmental organizations (NGOs), all levels of government, and community groups (Bennett et al., 2018; Svendsen & Campbell, 2008). Many organizations who engage in environmental stewardship work fall into what is commonly referred to as the “third sector”; voluntary, non-profit, or other community-based organizations with what are typically social goals aimed at serving the community (Salamon & Sokolowski, 2016; Svendsen & Campbell, 2008; Wolf et al., 2013). This sector largely consists of volunteers and some paid staff. Stewards who work through such organizations are motivated by passion, and these entities typically have a mission of serving the greater good, whether that be socially or environmentally (Bach-Mortensen & Montgomery, 2018; Salamon & Sokolowski, 2016).

Although environmental stewardship encompasses many different types of actions, and can occur at a variety of scales, there is a lack of clarity on what contributes to stewardship success. There is a need to improve understanding of what combinations of factors lead to successful stewardship efforts (Bennett et al., 2018; Chapin et al., 2011; Close et al., 2016; Mathevet et al., 2018; Merenlender et al., 2016). Most research to date has measured stewardship success through ecological outcomes (e.g. Martin et al., 2005; Pander & Geist, 2013). Previous research regarding what contributes to success of environmental stewardship has focused on specific instances, for example the impact of context on success (Waylen et al., 2010), on particular methods of measuring success (Ruiz-Jaen & Aide, 2005), or on specific types of stewardship initiatives such as urban tree-planting or restoration initiatives (Roman et al., 2015; Ruiz-Jaen & Aide, 2005; Zhao et al., 2016). Additionally, the unit of analysis of existing research on environmental stewardship and success tends to be on the initiative (e.g. Conrad & Daoust, 2008; Gutiérrez et al., 2011; Roman et al., 2015), or the organizational structure (e.g. Close et al., 2016; Connolly et al., 2013; Johnson et al., 2019). Baynes and colleagues (2015) identified factors critical to the success of community-based forestry initiatives in developing countries (Baynes et al., 2015). However, the focus is limited to a single initiative type. There has yet to be a holistic study accounting for multiple types of initiatives in relation to success and factors contributing to organizations’ successful environmental stewardship efforts. There is a dearth of research that explores stewardship at the organizational level and research has not investigated environmental stewardship success broadly, to develop an understanding of what factors make for successful stewardship initiatives.

Yet, measuring success at the organizational level is further complicated by the typical nature of environmental stewardship organizations. As described above, the organizations engaged in this work typically have a mandate of serving the greater good (Bach-Mortensen & Montgomery, 2018; Salamon & Sokolowski, 2016); the broad missions and goals of third sector organizations makes it difficult to measure their success, unlike for-profit organizations that may have clearer definitions or markers of success (Bach-Mortensen & Montgomery, 2018; Helmig et al., 2014; Sawhill & Williamson, 2001). As such, it is also difficult to define success across a broad spectrum of environmental stewardship organizations. Research regarding stewardship organizations investigates the structure of local community or environmental groups (Andrews & Edwards,

2005), networks between groups or actors working on stewardship efforts (Romolini et al., 2016; Svendsen & Campbell, 2008), and relationships between environmental groups and effectiveness on the ground (Close et al., 2016; Locke et al., 2014). There has yet to be an investigation of how different types of environmental stewardship organizations perceive factors important for successful stewardship efforts.

In response, this study examines environmental stewardship success at a local scale. Specifically, we aim to: (1) discover what factors contribute to successful stewardship initiatives; (2) discern how representatives from staff- and volunteer-based organizations perceive those factors; and (3) understand, from an organizational perspective, why those factors are important for stewardship success.

3.2 Methods

A two-phase mixed methods design was employed to undertake the research in the Niagara Region of Canada, where environmental stewardship organizations were identified as the units of focus.

3.2.1 Study Site and Participants

As the study focuses on local environmental stewardship, it was important to bound it geographically. The Niagara Region was chosen to form the geographic boundaries of the study for the following reasons: it is a spatially discrete unit, the Niagara Region consists of 12 municipalities and the borders are known; the Region is undergoing significant changes, both politically, and socio-economically; the Region is relatively independent with a diverse economy supported by agriculture (e.g. fruit farms, wineries), tourism (e.g. Niagara Falls, Niagara-on-the-lake), and two post-secondary institutions; and, there are many active stewardship and conservation groups in the Region. The Niagara Region is located in southern Ontario (Canada), and borders the United States with the Niagara River marking the international border (Figure 3-1).

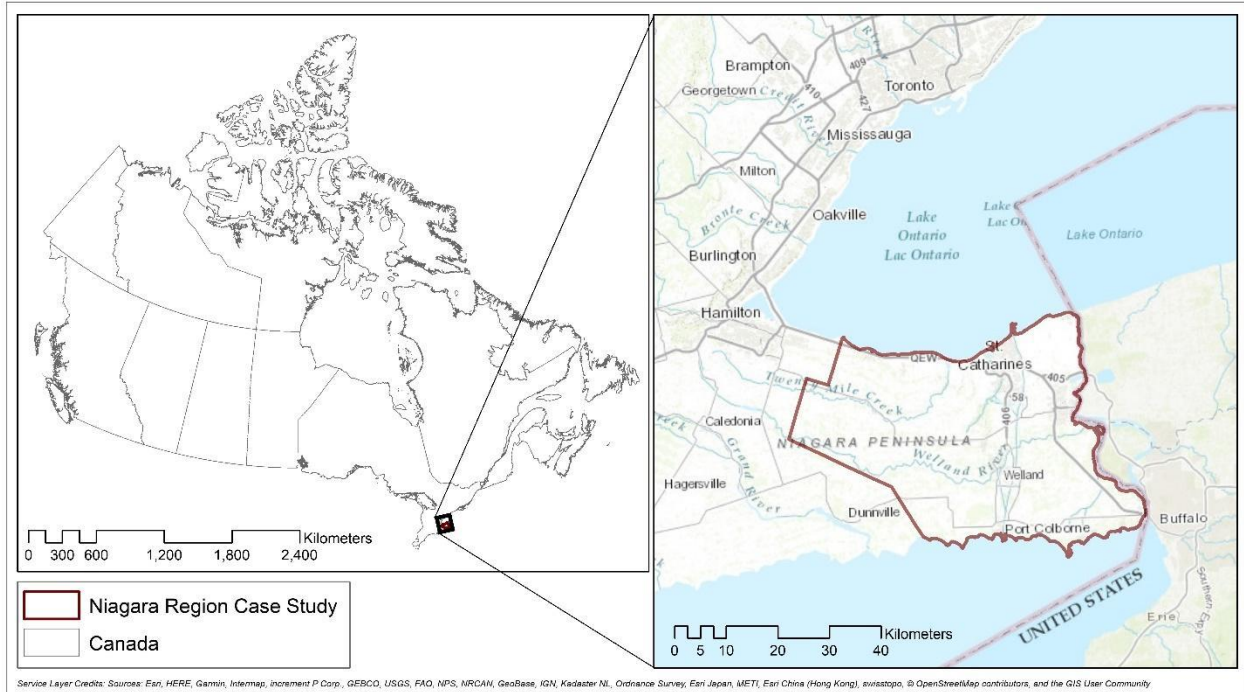


Figure 3-1 The Niagara Region of Canada; the geographic boundaries of this study.

An online search was conducted to identify all environmental stewardship entities (non-governmental organizations, businesses, government agencies, etc.) operating within the Niagara Region (hereafter referred to as “organizations” or “groups”). A comprehensive list of search terms was used to identify the organizations; the list included multiple search terms related to environmental stewardship (e.g. “stewardship”, “conservation”, etc.) paired with the names of all municipalities and the study region. A full list of search terms is included in Appendix 3-A. The website of each organization was then scrutinized to ensure: an organizational focus on stewardship (broadly defined to encompass the responsible use, management, and protection of the environment (Worrell & Appleby, 2000)); the public nature of the entity (i.e. not a private landowner); and, the presence of stewardship initiatives for the years 2012 to 2017. Organizations meeting all three criteria were invited via e-mail to participate in the study. Second, snowball sampling was used to ensure that all possible organizations of relevance were contacted (Biernacki & Waldorf, 1981; Bryman et al., 2012) and continued until saturation, when no new organizations were identified by informants (Bryman et al., 2012). Organizations were contacted by email to request participation in the study; they were sent a letter of invitation and a research summary; both approved by the research ethics board (REB file #17-406). Participants were also asked to sign an informed consent form prior to participation (Appendix 3-B).

A total of 35 organizations were contacted, with the 17 participating in both research phases. The organizations that participated include: Association for Canadian Educational Resources, Ducks Unlimited Canada, Friends of Walkers Creek, Fort Erie Conservation Club, Friends of Malcolmson Eco-Park, Friends of One Mile Creek, Land Care Niagara, Links for Greener Learning,

Nature Conservancy of Canada, Niagara Bruce Trail Club, Niagara Falls Nature Club, Niagara Parks Commission, Niagara Peninsula Conservation Authority, Niagara Restoration Council, Ontario Ministry of Natural Resources and Forestry, Peninsula Field Naturalists Club, Port Colborne and District Conservation Club, and Trout Unlimited Canada. For the purposes of this study, the participants represented their respective organizations; as such, “participants” and “organizations” will be referred to interchangeably here.

3.2.2 Phase One: Questionnaire

The first phase of the study involved an online questionnaire that was distributed to participants. The purpose of the questionnaire was twofold: first, to gain an initial understanding of the stewardship work undertaken by the organizations; and second, to gather a summary of how participants viewed both success of their initiatives, and the relative importance of four elements of stewardship identified in the literature (i.e., actors, motivations, capacity, and actions) (Bennett et al., 2018). These elements were chosen to guide this phase of the study, as this was the most recent and detailed work describing elements of stewardship at the time of data collection. This research did not use a prescriptive definition of success, as success may differ based on the range, diversity, and types of organizations involved in the study (Helmig et al., 2013; Sawhill & Williamson, 2001). Because the aim was to understand how organizations perceive factors making for success, rather than success itself, participants used their own interpretation of success for their unique situation and area of focus. The questionnaire is included in Appendix 3-C; it was developed and shared with participants using Qualtrics online.

Participants were first asked a series of questions to gather information on the organization and the types of stewardship work they conduct. These questions were adapted from the United States Department of Agriculture Forest Service’s *Stewardship Mapping and Assessment Project* (Svendsen et al., 2016). The results are presented as percentages of the total number of organizations to summarize the stewardship work being conducted in the Region.

Participants were asked to rate the success of each of their stewardship initiatives on a five-point Likert scale from extremely successful to not at all successful. The organizational success was then determined by calculating the average success of all of the organization’s initiatives. If an organization only reported a single initiative, this success level was used as their organizational success.

Participants were also asked to rate and then rank the four elements of environmental stewardship (actors, motivations, capacity, and actions) based on how important they perceived them to be to the success of each initiative. Both rating and ranking were used to gain insight as to how important participants believed each element to be on their own (rating), as well as their relative importance to the other elements (ranking). The final rating and ranking of elements by organization was determined by calculating the average of all initiatives. To determine the overall rating and ranking of elements in the Region, an average of all organizations was calculated.

3.2.3 Phase Two: Semi-Structured Interviews

Drawing from, and to provide insight into the findings from the questionnaire in phase one, semi-structured interviews were conducted in phase two to gain a deeper understanding of stewardship success. This interview type was chosen as it involves pre-written questions with a degree of flexibility allowed to further discuss the topics brought up by participants (Bryman et al., 2012; Longhurst, 2010). The same participants that answered the survey were requested to participate in the interview; however, this was not possible in some instances due to logistics or organizational capacity and is recognized as a limitation.

The purpose of the interview was to discuss the four elements of environmental stewardship and their importance to success and then to explore other factors identified by participants. The questions asked in the interview are included in Appendix 3-D. The interviews were transcribed using NVivo Transcription software. Once interviews were transcribed, they were sent to the participants to conduct a member check; both to ensure accuracy of their statements and to ask for any additional thoughts. Additionally, participants were each assigned a random letter identifier. This was done to give voice to participants' quotes while maintaining their anonymity.

3.2.3.1 Interview Transcript Analysis

The transcribed interviews were qualitatively coded using NVivo 12 software. Coding entailed an iterative process that employed different coding methods. It started with In Vivo Coding, in which the participants' exact words were used to form the names of the codes. In Vivo coding is used to ensure that the research honours the participants' voice, so was chosen for the first cycle coding so that the participants' views were maintained (Clifford et al., 2010; Saldaña, 2013). Pattern coding, often used where large amounts of information need to be pulled together into single units of analysis (Saldaña, 2013), occurred next. Codes from the first cycle were brought together in common themes, specifically the factors important for successful stewardship (objective one).

Analysis of the resulting factors then occurred in two ways. First, the factors were considered according to organization type; staff-based or volunteer-based (objective two). The distinction between staff- and volunteer-based was made based on the presence or absence of paid staff within the organization. The authors acknowledge that many staff-based organizations also rely on volunteers, and that the degree of professionalization exists on a scale for these groups, as is common in the non-profit sector (Andrews & Edwards, 2005; Fisher et al., 2012; Salamon & Sokolowski, 2016). Second, structural coding, which is typically employed to probe a specific topic of inquiry to analyse the transcript (Saldaña, 2013), was used to identify text regarding why a particular factor was important for stewardship success.

3.3 Findings

This section opens with a portrait of environmental stewardship in the Niagara Region. Results from the study are then presented and discussed by study objective.

3.3.1 A Description of Local Environmental Stewardship

The study sought to identify and include all active stewardship organizations in the Region. A total of 35 organizations were identified and contacted, with 17 agreeing to participate in the full study. Of the organizations that participated in the questionnaire portion, there were nine staff-based and eight volunteer-based organizations. Most participants reported that their organizations engaged in one or more types of stewardship activities: most organizations educate the public about the local environment (95%); conserve/preserve the local environment (90%); restore or transform local habitat (80%); take care of a place in the local environment (80%); monitor the quality of the local environment (75%); and advocate for the local environment (60%). Most organizations focused their stewardship efforts in forest/woodlands (85%), watersheds (65%), and wetlands (60%), with 45% or less focusing on the other habitat types. Finally, almost half (45%) of the organizations spend the majority (80-100%) of their time on environmental stewardship work, while 25% of the organizations spent less than 19% of their time on environmental stewardship work. The 17 organizations reported 89 stewardship initiatives, which address restoration (65%), preservation (18%), sustainable use (8%), and education (9%).

3.3.2 Objective One: Factors Important for Successful Stewardship

The questionnaire results regarding stewardship initiative success indicated that 11% of organizations perceived their initiatives to be extremely successful, 72% were very successful, and 17% were moderately successful. No organizations reported initiatives to be slightly or not at all successful.

Participants were asked to both rate and rank the four elements based on their relative importance to stewardship success. The average rating of importance for each of the four stewardship elements were extremely important to very important. On the five-point Likert scale used, one represented extremely important for success and two represented very important. The actors element was rated the highest overall (mean = 1.44), followed by motivations (mean = 1.82), actions (mean = 1.93), and capacity (mean = 1.94). On average, participants ranked these elements consistently, with actors as being most important and capacity as being least. The average ranking is as follows: actors (mean = 1.73), motivations (mean = 2.46), actions (mean = 2.87), and capacity (mean = 2.94). These results confirm that all four of the elements of environmental stewardship put forth by Bennett and colleagues, (2018) are important for stewardship success (i.e. actors, motivations, capacity, and actions).

The interview analyses revealed 10 factors that organizations believed to be important for successful stewardship. The factors are displayed in Figure 3-2 and the percent of participants asserting the importance of each is given. Black bars indicate the four stewardship elements from the literature that were included in the survey and used as an entry point to the interview.



Figure 3-2 Factors important for environmental stewardship success, as identified by organization representatives. Darker shading indicates four elements from the framework for local environmental stewardship that were explicitly asked about in the interviews (Bennett et al., 2018).

The top three factors discussed most by participants were the actors, or people involved in the initiative, the capacity to undertake the work, and the motivations to engage in environmental stewardship. These three factors again reinforce their emphasis by Bennett et al., (2018). Interestingly, the fourth factor identified in interview question one, the actions undertaken, was only discussed by 35% of organizations involved in this study. Participants discussed the actions as coming after all other aspects of stewardship are already in place (Section 3.3.4); a likely explanation for this result.

3.3.3 Objective Two: Organization Types and Perceptions of Factors Important for Success

The organizations that participated in the study were categorized as being staff-based (nine) and volunteer-based (eight). The factors for success revealed from the interview transcript analysis and their corresponding themes are presented in Table 3-1 by organization type. The results are presented as percentages of organizations, with the checkerboard colouring indicating the high (red) and low (blue) values for each.

Table 3-1 Factors and themes important for environmental stewardship success, delineated by type of organization (staff- and volunteer-based) that discussed each.

Factor important for success	Factor themes	Percent of Organizations (red = high, blue = low)	
		Staff	Volunteer
Actors	actors are important	22	25
	actors are the least important	11	13
	actors are the most important. you need them first	44	88
	age of group (many volunteers are aging)	0	38
	being thankful for volunteers	11	25
	need motivated and passionate people	33	50
	collaboration	78	50
	people as capacity	22	0
	skills of the people involved	11	38
the passionate few to get it started	11	13	
Capacity	ability to do the work	11	13
	capacity becomes important once established	11	13
	central coordinator	11	13
	financial capacity	89	63
	<i>competition for funding</i>	22	0
	<i>dedicated fund development (grant writing) position</i>	11	13
	<i>funder priorities</i>	11	0
	<i>funding is important</i>	78	38
	<i>initiatives are not very expensive</i>	0	25
	<i>need for longer term funding</i>	44	0
	<i>stewardship is expensive</i>	33	13
	<i>when funding is cut it affects stewardship</i>	22	0
	<i>you can get started without funding (comes last)</i>	33	0
Motivation	actors are motivated by virtue of doing this work	33	50
	getting started will build motivation	11	25
	intrinsic motivation	0	25
	it doesn't matter why people do it, only that they do	22	0
	motivations will vary	22	0
	need motivation first	11	25
	organization mandate or funder priorities	22	0
	organization vision or mandate	11	0
positive outlook	0	13	
Communication and Support	communication and media	11	50
	community support	44	25
	education	44	50
Longer Timeframes	clear priorities	22	0
	long term plans	22	13
	monitoring and evaluation (longer term)	56	0
Politics	political will	44	25
	nonpartisan watch dog	0	13
	red tape can hinder stewardship progress	11	13
Actions	actions come first because it is important to get started	22	25
	actions come last after everything else is in place	0	13
	actions make the initiative	22	0
Volunteer Driven	volunteer-driven (challenges)	11	13
Routine	having that routine is what made the club really successful	0	13
Organization Reputation	organization reputation	11	0

In terms of the actors factor, volunteer-based organizations placed more emphasis on the people involved, along with their motivations and passion to do the work. Conversely, staff-based organizations exclusively discussed the people, or actors involved, as enhancing capacity. The

capacity-building that comes with increased collaboration among stewardship groups is unsurprising given that research on collaboration in environmental stewardship provides support for this assertion (Connolly et al., 2013; Svendsen & Campbell, 2008; Wyborn & Bixler, 2013).

Financial capacity emerged as a theme for both types of organizations, but in distinct ways. Whereas volunteer-based organizations did not think of stewardship as being costly, staff-based groups discussed expenses associated with doing stewardship work. This may be due in large part to the different types of initiatives both groups focus on (Carmin, 1999). For example, staff-based organizations may take on larger, more time-consuming and costly initiatives, such as engaging in working to change policy agendas, whereas volunteer groups may have a lower ability and/or capacity to undertake such initiatives.

Volunteer-based organizations generally place a greater emphasis on the importance of motivations in conducting successful stewardship work. Staff-based organizations understand the importance of motivations as well, but generally not to the same extent. Additionally, 22% of the staff-based organizations believed the motivations did not matter, rather just that the work got done. The importance placed on motivations by the volunteer-based organizations is logical, as many volunteers do this work of their own volition and much of the literature on motivations to engage in this work focuses on volunteers (Asah & Blahna, 2013; Bramston et al., 2011). Many staff-based organizations rely on volunteers to help with capacity, or to physically do the work. As such, staff-based groups may benefit from focusing more effort on fostering motivations to engage volunteers in stewardship work within their communities.

Both types of organizations discussed the importance of communication and education in successful stewardship work, with no noteworthy differences between the two. Volunteer-based groups did discuss communication and media more than staff-based. This likely is due to the fact that volunteer groups often struggle with capacity (time and skills) to use social media platforms, whereas staff-based organizations may have hired staff dedicated to public communication, as was discussed in the interviews.

Staff-based organizations placed a greater emphasis on longer timelines, strategic planning, monitoring, and evaluation. It is unclear whether this is related to job security long-term, their scope of work, or the nature of volunteer-based organizations' long-term sustainability making it difficult to plan long-term.

Both organization types discussed the significance of politics in conducting stewardship work. Staff-based organizations were generally more concerned about political will. Volunteer-based groups tended to discuss politics as it relates to navigating the system. For example, some discussed the need for a non-partisan watch dog to track government and political changes, as well as the challenges faced with various forms of red tape involved in planning and implementing stewardship work. This may be a function of capacity; volunteer-based groups may not have the time nor technical capacity to monitor changes at various political levels that staff-based or advocacy-focused groups do.

Staff-based organizations tend to be more action-oriented, whereas volunteer-based organizations view actions as coming after everything else is in place. This may be a function of organizational mandates, goals, or pressure systems in place for staff-based organizations. Both groups experienced challenges with volunteer retention, attracting new members, and volunteer management. Volunteer-based groups exclusively spoke of routines as being important to ensure stewardship success. Finally, staff-based groups exclusively discussed organization reputation as being important.

The results from this research illuminate the multi-faceted and complex nature of environmental stewardship organizations. Previous studies (e.g. Andrews & Edwards, 2005; Fisher et al., 2012) have discussed the complications that may arise when dichotomizing groups; that this may obscure our understanding of these groups or simplify the results. As such, broad generalizations regarding group types and success factors should not be made based on these results. Rather, this provides a departure point and foundation on which to build to incorporate the degree of professionalization or broader connections into future analyses.

3.3.4 Objective Three: Why Factors are Important for Stewardship Success

The final objective was to understand why organizations perceived factors to be important for stewardship success. The factors and the accompanying rationale by the participants, as revealed by the analysis, are presented.

Many participants discussed the importance of actors for successful stewardship. Reasons articulated for why actors are important for successful stewardship related to capacity gained with additional actors or volunteers, in particular from collaboration. Most of the participants discussed actors as being fundamental, because without them the work would not go ahead. Participant I summarizes this sentiment: “The actors are the people that make it hum. And the chemistry that we have in that group is really good. But the actors are the ones that bring it all to the table”. Partnerships and collaborative networks have been found to be important for successful environmental stewardship efforts in other contexts, and at multiple scales (Connolly et al., 2013; Gutiérrez et al., 2011; Roman et al., 2015). A study by Bodin et al., (2014) found that when stewardship actors collaborated by sharing resources, and were socially linked, conservation (or stewardship) at the scale of the entire social-ecological system was positively affected (Bodin et al., 2014), providing further evidence of the role of collaboration among actors in making for successful stewardship initiatives.

Capacity was discussed directly as being important both in terms of financial capacity (i.e. requiring funds to continue with the work) and the physical ability to complete the initiative. Financial capital is important to success because funding is difficult to secure, and additional finances are required for stewardship groups to grow and expand their capital (Svendsen & Campbell, 2008). One of the participants illustrates the importance of financial capital as follows: “I feel like in environmental and conservation fields, often one of the limiting factors is whether or not you've got enough funding to do the activity” (participant J). The second main type of capital discussed by participants was that of physical capacity, which often includes human

capital. Many participants discussed this in relation to human power, volunteers, and the skills required, for example: “If you work on removing a barrier in a stream, for example, you need to have people who have the skills and abilities and equipment to do that. So that's capacity as well. So I guess I'm saying capacity is the actual ability to do the required tasks” (participant J). Physical capacity is important in terms of the physical ability and help available to undertake and complete the stewardship work (Roman et al., 2015; Svendsen & Campbell, 2008).

It is possible that organizations involved in stewardship may differ in their perceptions of capacity as well as the various types of capital important for success. For example, Mountjoy et al., (2013) found that organizations with differing success levels within a natural resource management context perceived capacity differently. The results from that study suggest that the perceptions of what makes for successful initiatives may be influenced by the level of success or the size of the organization (Mountjoy et al., 2013). The other capital assets listed by Bennett and colleagues (2018) (i.e. social capital, cultural capital, human capital, or institutional capital) were not specifically identified by participants in this research as reasons important to success. However, the previous discussion of the importance of actors, partners, and collaboration points to the importance of human and social capital, although not specifically identified. This may be a function of the physical context within which these organizations operate, the organizational culture and/or characteristics, or simply a matter of the length of interview time and breadth of ideas discussed; the interview questions asked were fairly broad so as not to be prescriptive and to allow participants to discuss topics they felt were important (Appendix 3-D).

Motivation was revealed as important for stewardship success because the actors involved want to make positive environmental changes. Motivation was additionally identified as important to keep groups going through difficult times. Some participants also discussed that if the people involved in stewardship are not motivated to do the work, nothing else matters. One participant stated the importance of motivations to success quite simply: “if you don't have the motivation it doesn't matter” (participant H). Participants did not delineate intrinsic or extrinsic motivations in their discussions. However, the literature points to the importance of intrinsic motivation in meeting stewardship and conservation goals (Asah & Blahna, 2013; Bramston et al., 2011; Cetas & Yasué, 2016).

The communication and support factor was discussed as being important to success in terms of community acceptance and motivation to continue with the work, as well as getting community members and new people involved in stewardship through education and outreach efforts. One participant illustrated the need for community support: “Good stewardship projects do need to be accepted by the community, especially in a dense environment like in Niagara. There's a lot of people there. So if people don't respect the project and they don't support the project, then you're not going to have good long term success because you may get sabotage from your neighbors, deliberately or not” (participant J). Building community support for stewardship work goes a long way in the project success, as well as volunteer growth and retention (Waylen et al., 2010). A key part of building that support is adequately and clearly communicating both the

importance of the project, and of environmental stewardship broadly, to the general public (Kittinger et al., 2016; Van Riper et al., 2016; Waylen et al., 2010).

Longer term planning and monitoring was discussed as being important to the efficiency of stewardship work, as well as having a contingency plan to ensure funding and organization priorities align with stewardship goals long-term. Additionally, some stewardship work requires longer timeframes to ensure establishment and success, so long-term planning and monitoring is a critical aspect for success of those types of initiatives. Longer term planning and monitoring relates to other factors. For example, the relationship between long-term planning and the actors involved: “the actors change, so if you've got a plan in place, at least it doesn't matter who those actors are” (participant F). Another example is the financial capacity or funding for the project: “a lot of times the way that funding kind of works is you get one year worth of funding and then you walk away from the project, and you don't actually ever get to go back. You don't have the support or time to go back. But to make sure that the project that you actually completed was worthwhile and that if there's something that went wrong that you can learn from it is a big thing” (participant P). Long-term monitoring is important to ensure project success, to understand the impact of environmental stewardship work, to inform future policies or research, and to prove success for future funding (Driscoll et al., 2012; Roman et al., 2015; Sheppard et al., 2017).

Two participants illustrate the rationale articulated for the importance of the politics and public policy factor for successful stewardship: “There is a higher up entity, essentially, dictating what's important to the government right now.” (participant P); “So without the actual regulations or policies in place to do these things, it makes it really hard to actually do.” (participant F). Politics are important for, and will impact, stewardship success because they dictate government priorities and action taken for stewardship, in relation to both financial and physical support, as well as regulations and policies directly impacting the organizations and their ability to do the work (Sheppard et al., 2017; Tallis et al., 2008).

The participants discussed the importance of actions to stewardship success, as they are the physical manifestation of all the pieces involved in planning stewardship initiatives. Many participants discussed actions as being the final step after all other aspects of environmental stewardship have been put in to place: “As important as our actions are, I mean that's the end result, is after all the motivation and the people and all that. We're all aiming toward doing it, but the actions have been very hard to come by” (participant C). Additionally, the actions taken also act as a catalyst, or motivator, to both get ahead and to prove themselves as an organization to the stewardship community. Participant G discusses this: “But until you do something, you almost haven't proven yourself to the community that you can get anything done”. Organization reputation was highlighted as being particularly important in relation to private land stewardship, as many of the landowners come from generations before them with long memories. The participant who discussed this also stressed that it only takes a single bad memory to ruin an organization's reputation over the long-term. At the time of publication, the authors are unaware

of additional research investigating organizational reputation in relation to stewardship success. Additionally, as private land stewardship did not play a large role in this study, this factor was not commonly discussed here. However, this may indicate an important effect to be investigated in future research.

3.4 Conclusions

Stewardship is garnering attention as a concerted response to growing concerns about environmental decline and degradation. Success of environmental stewardship is urgently needed to ensure that this work is done well and to mitigate ever-increasing human impacts. In this study we examined environmental stewardship in the Niagara Region of Canada to discover what factors contribute to successful initiatives, discern organizational differences, and understand the reasons why these factors are important.

Actors, capacity, motivations, and public communication and support were revealed as being important factors for stewardship success. Volunteer- and staff-based organizations appear to differ most in their perceptions of the motivations and capacity factors. Participants gave details on why factors were important for success, often citing the physical ability to conduct the work (i.e., actors and capacity), and the importance of being motivated to follow the initiatives through to completion.

These findings have important implications for enhancing success in practice. First, the importance that volunteers place on motivations to engage in stewardship may provide an incentive for staff-based organizations to concentrate on fostering motivations for their members or community members to engage in their stewardship efforts (Cetas & Yasué, 2016). This reinforces the value of public communication and support for stewardship, as highlighted elsewhere (Mountjoy et al., 2013; Waylen et al., 2010). Second, support for conducting monitoring and evaluation as well as extending temporal periods would enhance stewardship success. This finding reinforces assertions made by others (e.g. Sheppard et al., 2017; Svendsen & Campbell, 2008) regarding the need for funders to both extend grant timelines and to display a willingness to fund evaluation efforts, in addition to the common support for boots-on-the-ground work (Sheppard et al., 2017; Svendsen & Campbell, 2008). Prominence was also placed on long-term and strategic planning, mainly discussed by staff-based organizations, likely a result of the types of initiatives these groups tend to take on, with staff-based organizations generally pursuing larger and more costly initiatives (Carmin & Balsler, 2002). Finally, collaboration was highlighted as necessary for environmental stewardship success, aligning with previous research in this realm (Bodin et al., 2014; Gutiérrez et al., 2011). Collaboration between and among environmental stewardship organizations, especially within a geographically defined boundary, may promote information sharing, learning, and ultimately goal achievement.

As the study is an initial response to calls in the literature for research investigating elements of environmental stewardship in relation to success (Bennett et al., 2018), it provides a platform upon which subsequent research can build. Empirical evidence across multiple cases and contexts will enhance the breadth and depth of understanding stewardship success. A rich

opportunity exists to examine the relationship(s) between organizations and their perceptions of what makes for stewardship success, as well as organizational perceptions of success itself. Future work may expand on this to include an in-depth assessment of success that uses physical measures as well as organizational perceptions to validate success rates and factors. The results of this initial investigation can act as an anchoring point for future work in this realm.

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Chapter Four: Synthesis and Conclusions

Ongoing environmental degradation in the era of the Anthropocene has created a situation where society is in dire need of environmental protection, restoration, and management for future generations. Environmental stewardship is a response to these contemporary challenges. However, there is a need to improve environmental stewardship efforts on the ground by developing an in-depth understanding of the social-ecological context, interaction among elements of stewardship, and what contributes to successful stewardship initiatives (Chapter One). Scholarly research in this realm is recently emerging with the advent of conceptual frameworks for local environmental stewardship work that have not been empirically tested (e.g. Bennett et al., 2018). This thesis research is situated within this framing and addresses salient practical and scholarly needs to improve environmental stewardship understanding and work. This final chapter brings the two studies together. It opens with a synthesis of the overall contributions of the research, highlights the main conclusions from the thesis, and sets forth recommendations for practice and future research.

4.1 Synthesis

There were a number of themes that were repeated throughout both studies. Some common themes include the impact and importance of political will to support environmental stewardship, having motivated individuals involved in the work, and the importance of both financial and human capacity. Two of the most salient themes emerging were: i) the importance of collaboration; and ii) the importance of, and problems associated with, monitoring and evaluation efforts.

First, the importance of collaboration to stewardship work and its success was a common theme throughout the thesis research. This is unsurprising given the common focus of collaboration in the literature (Bodin et al., 2014; Cockburn et al., 2018; Gutiérrez et al., 2011; Wyborn & Bixler, 2013). The effect of scale on collaboration is an important area of research that deserves more attention. Research has begun to tease out the effects of scale on collaboration, uncovering tensions between spatial scales of collaborative conservation efforts and differences between local, regional, and global scales of collaboration (Wyborn & Bixler, 2013). An interesting finding regarding collaboration and scale emerged from this research: while collaboration was identified as an important contextual factor across the Region, networks were not identified as being as highly important at the scale of the initiatives themselves (Study One). Still, collaboration was identified as being an important factor for success at the organizational level (Study Two). This further points to discrepancies in scale. Additionally, the findings from this research illustrate a context in which tensions exist among collaborating organizations. Specifically, concerns arose regarding inter-organizational competition and the risk of being overshadowed by larger organizations. As this thesis research indicates, further investigation into collaboration at different scales within local environmental stewardship is required.

Second, monitoring and evaluation was an important theme emerging from both studies. Organizations identified monitoring and evaluation as an important success factor (Study Two),

however very few initiatives had monitoring identified as an initiative outcome (Study One). A common problem identified by participants in the interviews was the lack of funding, or lack of interest from funders for monitoring of initiatives. Often, funding is provided to conduct the initial work but not to return to it for monitoring or evaluation. This is an important finding that does not seem to be adequately captured in the literature. There is a wealth of published research indicating the importance of monitoring and adaptive capacity to improve work and make for success (Bennett et al., 2018; Conrad & Daoust, 2008; Roman et al., 2015; Sheppard et al., 2017). However, while important, there seems to be a disconnect between these theoretical assumptions and the work that is carried out on the ground. This finding requires additional investigation, pointing to the need for empirical investigations such as this to test these conceptual frameworks, and to consider the social-ecological context.

4.1.1 Elaborating on a Conceptual Framework

Study One and Study Two converge to elaborate upon previous scholarship and present a more fulsome conceptual framework for local-scale environmental stewardship efforts (Figure 4-1). Study One built on the published frameworks discussed in Chapter One (Bennett et al., 2018; Chapin et al., 2015), expanding it to include the contextual factors identified in the literature (Bennett et al., 2018; Honadle, 1999). Study Two then evaluated this framework in terms of stewardship success, adding multiple success factors to the conceptual framework. Finally, an important contribution to the framework is in how success feeds back to influence the adaptation and adjustment of the elements of environmental stewardship.

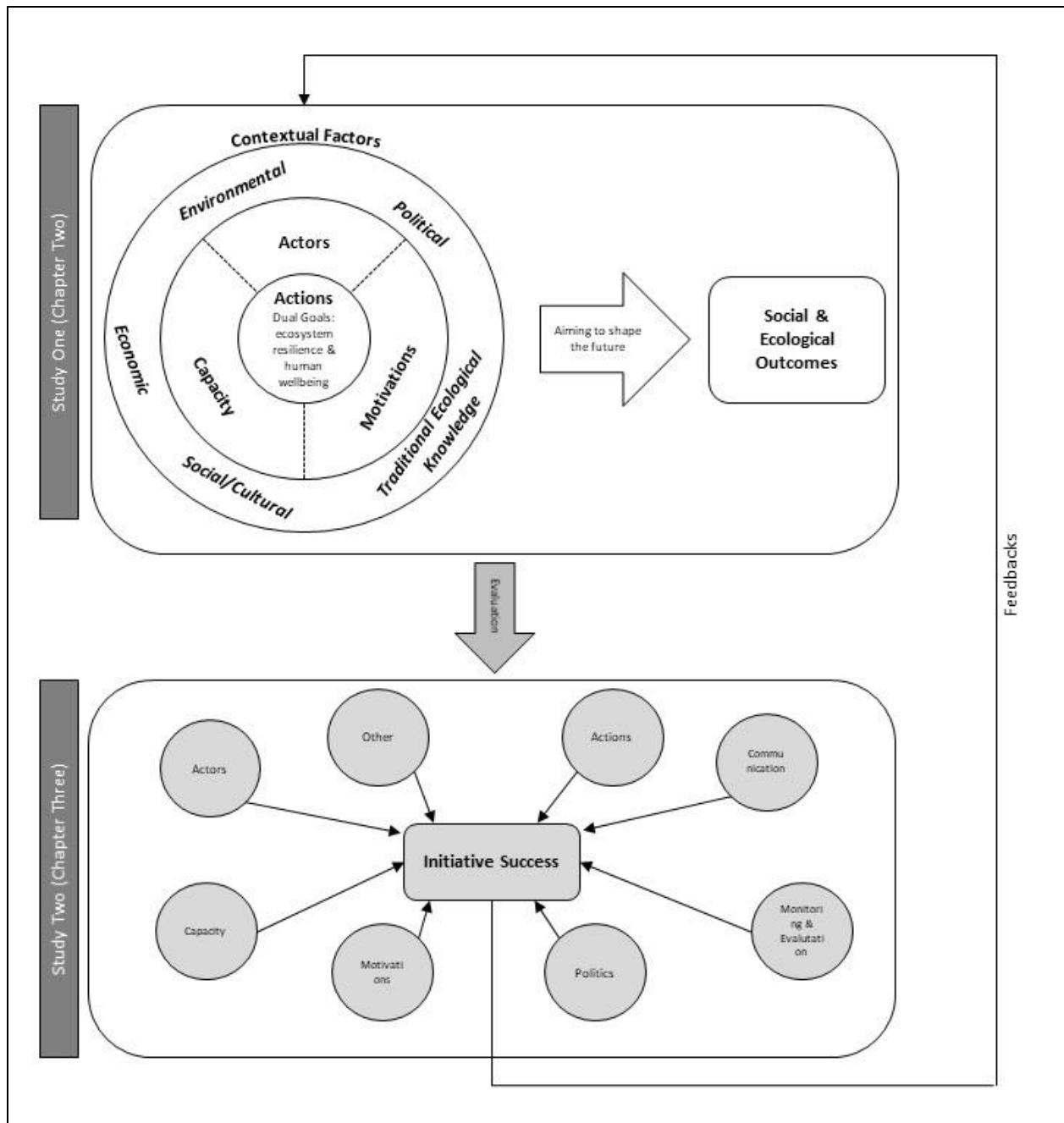


Figure 4-1 Expanded conceptual framework describing local environmental stewardship efforts, based on published work and the results of this thesis research.

A number of contextual factors have been added to the framework above (Figure 4-1): the environmental, economic, political, and social-cultural contextual factors were identified in the literature and focused on in Study One (Bennett et al., 2018; Honadle, 1999), and the significance of Traditional Ecological Knowledge has been underscored below and added to ensure future work undertakes a holistic assessment of the social-ecological context (Berkes, 1993). This research underscores the need to include an account of the local social-ecological context in future work investigating environmental stewardship efforts. While there is a tendency for social

science research to attempt to generalize across wide spatial scales and varied situations for the purposes of developing theoretical assumptions (Honadle, 1999), this research argues that the first step in doing so should be to conduct empirical studies within local contexts (e.g. Johnson et al., 2019). For example, within the Niagara Region two important contextual pieces that were uncovered were the ongoing land-use conflicts in the area, and the recent significant political changes. Land-use conflicts are common, and exist at all spatial scales; however, the degree and type of conflict, as well as how individuals perceive that conflict or pressure, will have important impacts on aspects of environmental stewardship (Carmin & Balsler, 2002; Tindall & Robinson, 2017; Wester-Herber, 2004). Second, the research supports the importance of political will/support for environmental stewardship efforts (Johnson et al., 2019; Sheppard et al., 2017; Swainson & de Loe, 2011). These contextual pieces are significant, as they will affect the stewardship work occurring on the landscape. For example, they may affect individuals' motivations to do the work, or the type of stewardship that manifests. In areas experiencing high development pressure, for example, environmental stewardship may take the form of activism or lobbying for change, especially if citizens were not adequately consulted (Carmin & Balsler, 2002; Tindall & Robinson, 2017).

An important missing piece in the two studies is the perspective of Indigenous groups in the area. Indigenous Peoples are the original stewards of the land and have been since time immemorial. The lack of Indigenous perspectives in these studies is important and highlights a major issue. This gap in perspectives and knowledge occurred despite rigorous methods employed to identify the stewardship organizations. As such, this framework has been expanded to explicitly identify Indigenous Peoples as an actor, as well as to include Traditional Ecological Knowledge as an additional contextual factor (Figure 4-1). Traditional Ecological Knowledge describes the experience and knowledge gained over millennia of humans interacting with their environment passed down through generations (Berkes, 1993). There are multiple ways of knowing the ecosystem and therefore perceiving the context (Bussey et al., 2016; Gagnon & Glynn, 2009; Kimmerer, 2002), however as it stands, the framework for local environmental stewardship does not explicitly address multiple ways of knowing. Incorporating Traditional Ecological Knowledge directly into the framework as a contextual factor will allow future research to use multiple knowledge sources to gain a more holistic and detailed description of the context of environmental stewardship in a local space. The recently published guide by the Kitasoo/Xai'xais Stewardship Authority in British Columbia provides researchers and Nations with key questions to ask prior to undertaking future research projects to ensure that the research is equitable and beneficial for both parties (Kitasoo/Xai'xais Stewardship Authority, 2021). Future work in this realm of environmental stewardship should consult this guide and others to ensure that Traditional Ecological Knowledge and ways of knowing are meaningfully included.

This research set out to empirically test and refine the local environmental stewardship conceptual framework put forth by Bennett et al., (2018). Findings support the assertions made in the conceptual frameworks in that these elements of stewardship identified by the framework (i.e. actors, motivations, capacity, and actions) were found to be important for local-scale

stewardship in this empirical context (Bennett et al., 2018). Study Two then evaluated this framework in terms of stewardship success. Additional success factors emerged from Study Two and have therefore been added to expand the framework (Figure 4-1). For example, success factors such as communication and support, longer timeframes (strategic planning and monitoring), and political support have been added. While some of these success factors are discussed at length in the literature (Driscoll et al., 2012; Roman et al., 2015; Sheppard et al., 2017; Tallis et al., 2008; Waylen et al., 2010), an empirical study had yet to be undertaken to uncover these in relation to each other and stewardship success.

Finally, the importance of stewardship success being used to feed back and adjust elements of environmental stewardship is included in the framework (Figure 4-1). This feedback assumes that there is capacity and funds available for groups to implement monitoring and evaluation, along with adaptation, as part of their stewardship plans; however, the results of this research suggest that may not be the reality on the ground, as tensions were uncovered regarding the ability to fund monitoring and evaluation work, an essential pillar in adapting and improving stewardship elements. While the scholarly literature discusses the importance of adaptive management in creating for success (Armitage et al., 2009; Driscoll et al., 2012), this deserves additional attention.

4.2 Conclusions

Two studies were undertaken in this research to better understand local environmental stewardship. Study One aimed to investigate the social-ecological context in which stewardship takes place, as well as to explore environmental stewardship elements at the scale of stewardship initiatives (Chapter Two). The second study aimed to understand what factors contribute to successful environmental stewardship work at the organizational level (Chapter Three).

The purpose of Study One was to develop an in-depth understanding of environmental stewardship at a local scale. It operationalized and empirically tested key themes emerging from literature on both the social-ecological context as well as the conceptual elements of environmental stewardship (Bennett et al., 2018; Chapin et al., 2015; Johnson et al., 2019; Waylen et al., 2010). Four contextual factors were investigated in Study One: the economic, environmental, political, and social/cultural context of environmental stewardship (Bennett et al., 2018; Honadle, 1999). Important contextual factors in the Niagara Region were found to be: the negative impact of economics and politics on nature and environmental stewardship work; the rare and unique ecological features in the Region; political changes in the area; and the collaboration among stewardship groups. The elements of stewardship that were investigated included the actors involved, the motivations to engage in stewardship, the capacity to undertake the work, the actions taken, and the social and ecological outcomes (Bennett et al., 2018). It was found that individuals and organizations were important actors on the landscape, that social, human, and financial capacity were significant, and that many of the actions were restoration focused. Findings highlight the important role that social-ecological context plays, both in terms of the elements interacting on the landscape, as well as the type of work being conducted in the

area. For example, in the case of the Niagara Region, it was found that the social/cultural context was important for the human and social capacity elements in terms of collaboration among groups, as well as public support for stewardship. This study provides a novel integration of contextual factors and elements of environmental stewardship.

The purpose of Study Two was to understand what factors make for successful environmental stewardship work at the organizational level (i.e. across several initiatives rather than a single initiative) (Chapter Three). Findings revealed ten factors contributing toward success, addressing the need for literature to improve understanding of what combinations of factors lead to successful stewardship efforts (Bennett et al., 2018; Chapin et al., 2011; Close et al., 2016; Mathevet et al., 2018; Merenlender et al., 2016). The most commonly discussed factors in this study were the actors involved, the capacity to do the work, having motivated individuals involved, and the importance of public communication and support. Additionally, the success factors were analyzed and compared between staff-based and volunteer-based organizations to determine whether organizations perceive success differently (Andrews & Edwards, 2005; Svendsen & Campbell, 2008). Volunteer-based organizations tended to place more emphasis on the people involved, along with their motivations and passion to participate in environmental stewardship. Staff-based organizations placed more emphasis on the importance of funding, often discussed in relation to the cost of doing stewardship work. Finally, the study explored why certain factors were identified as being important, and uncovered additional details describing the factors.

In bringing the two studies together and returning to the overarching aim of this thesis, to advance understanding of local-scale environmental stewardship through an in-depth exploration of stewardship work in an empirical context, the thesis provides the following conclusions. First, this thesis provides support for the significant role that context plays in environmental stewardship work, and the importance of considering the social-ecological context in undertaking both environmental stewardship initiatives and in scholarly research. The thesis also provides support for published research on elements of local environmental stewardship and factors making for success. Namely, in validating the stewardship elements identified in the conceptual framework put forth by Bennett and colleagues, (2018), as well as other studies stressing the importance of individual elements (e.g. Bramston et al., 2011; Cockburn et al., 2018; Mathijs, 2003). Overall, environmental stewardship is complex, and is largely impacted by the empirical context in which it occurs. There are many interacting elements and factors that result in successful stewardship initiatives, and they may differ based on the social-ecological context.

4.3 Recommendations

The research undertaken and presented here provides a comprehensive summary of environmental stewardship in the Niagara Region and offers opportunities to practitioners working within this context. The research also fills important gaps in the environmental

stewardship literature and provides a novel basis on which to base future empirical research on local environmental stewardship. Recommendations for practice and future research follow.

Understanding local-scale environmental stewardship in an empirical context was emphasized throughout this work. As such, the study informs those involved with stewardship in the Niagara Region as well as in other contexts working 'on the ground'. Practically, the results of this thesis research may be used to aid in decision-making and to advocate for enhanced stewardship work. The following recommendations are offered to those making decisions about local stewardship, managing local ecosystems, and engaging in stewardship initiatives:

Recommendation one: funders should expand the scope of grant criteria to include monitoring and evaluation initiatives.

The results of this research indicate a significant need for additional funding for monitoring and evaluation efforts; these results may be used to develop a strong case for practitioners to discuss this possibility with funders. However, given the reduced capacity of many of the organizations conducting this type of work, the onus should be on funders to expand their scope, rather than on the organizations to initiate this discussion.

Recommendation two: members of staff-based organizations should expand their focus to foster motivations within their staff and volunteers.

There was a difference in how staff- and volunteer-based organizations perceive the importance of motivations to stewardship success, with volunteer-based organizations placing more of an emphasis on fostering motivations, volunteer appreciation, and having motivated individuals involved (Study Two). As such, this result provides a new perspective for staff-based organizations to consider. With the knowledge of the emphasis that volunteers place on motivations and appreciation, staff-based organizations can use this to improve volunteer retention and motivate new individuals to join their work, whether in a staff or volunteer capacity. By enhancing volunteer engagement through fostering motivations, staff-based organizations may also work to improve their capacity.

Recommendation three: organizations should continue to pursue diverse collaboration opportunities.

The importance of collaboration in environmental stewardship work was stressed throughout this thesis. It was found that collaboration was important for stewardship success (Study Two), and that it was an important element of environmental stewardship work (Study One). As such, organizations should continue their efforts to foster collaborative opportunities with diverse organizations that are working toward similar goals. Additionally, a common concern brought forth in this research is the competition among groups working toward similar goals; this concern may be mitigated through explicit discussions with collaborative partners on how to reduce competition and work together more effectively.

Recommendation four: organizations should focus efforts on public communication.

The results of this research also indicate the importance of public support and community buy-in for successful stewardship work. When more effort is placed on fostering motivations to engage in stewardship, and in pursuing new partnerships, community support for the organizations' work will continue to grow. This support is important because it can feed back to attracting new volunteers, public perception of the organizations' work, and in new funding and collaboration opportunities of mutual benefit (Study Two). By focusing attention on public communication efforts, community support and volunteer engagement is likely to improve.

This research also has implications for future scholarly work in environmental stewardship research to include consideration of the contextual factors and to use the newly expanded framework for local environmental stewardship. Based on the results of this thesis research, the following recommendations for future work have emerged:

Recommendation one: this work should be replicated across various contexts and scales with an aim to validate the framework and expand understanding of success factors and stewardship elements.

An initial investigation of stewardship in an empirical context was conducted, filling a significant gap in the environmental stewardship literature (Bennett et al., 2018; Johnson et al., 2019) and addressing a common problem in social science research that tends to aim for generalizations and develop broad theories (Honadle, 1999). The results of this research highlight the importance of the social-ecological context in the nuances of local environmental stewardship work. As is common in scientific research, this study should be replicated across various contextual spaces. Replications of this work will likely uncover additional elements of environmental stewardship, factors of success, and new knowledge on local environmental stewardship.

Recommendation two: in-depth investigations into each of the success factors with the aim of validating their importance to stewardship work and its success should be undertaken.

This research answered initial calls in the literature for work to investigate elements of environmental stewardship success (Bennett et al., 2018), uncovering new information regarding stewardship success factors. As such, the study provides an initial exploratory base on which future work may build. An opportunity exists for future research to investigate the factors identified in this research and to uncover new additional factors. Additionally, there is a need for further investigation into the relationship between organizations and perceptions of success and success factors.

Recommendation three: expand on this initial research to incorporate additional measures of environmental stewardship success.

As this was an initial exploratory study, expanded definitions and measures of success were outside the scope. As such, organizational perceptions of success were relied upon. However, there is an opportunity for future work to expand on this to include multiple measures of stewardship success (Bennett, 2016; Mallette, et al., 2021; Mountjoy et al., 2013). Interesting

findings may result from an investigation of organizational perception of success, third-party measures of success, and identified success factors.

Recommendation four: to create inclusivity and to ensure future holistic research in this realm, Traditional Ecological Knowledge and diverse perspectives should be an important factor in future work.

The lack of Indigenous perspective in this research is an important gap that should be addressed in future work on local environmental stewardship. The framework for local stewardship was expanded here to include Traditional Ecological Knowledge as a contextual factor, providing an expanded framework for future research to use. Incorporating diverse perspectives into investigations of local environmental stewardship work will provide a fuller, more holistic account of the social-ecological context as well as the environmental stewardship work being undertaken (Berkes, 1993; Ens et al., 2016; Kimmerer, 2002; Reo et al., 2017; Turner et al., 2000).

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Appendices

Appendix 2/3-A: List of Organization Search Terms

<i>Search terms used to identify environmental stewardship organizations within the Niagara Region</i>
stewardship Niagara Region
conservation Niagara Region
stewardship Niagara
conservation Niagara
naturalists Niagara
nature club Niagara
environmental protection Niagara
environment Niagara
environmental management Niagara
nature Niagara
stewardship Niagara-on-the-Lake
stewardship Niagara Falls
stewardship Fort Erie
stewardship St. Catharines
stewardship Thorold
stewardship Welland
stewardship Port Colborne
stewardship Lincoln Ontario
stewardship West Lincoln
stewardship Grimsby
stewardship Wainfleet
stewardship Pelham

Appendix 2/3-B: REB Informed Consent Forms

Phase One: Questionnaire

Informed

Consent

Date: July 3, 2018

Project Title: Exploring Environmental Stewardship in the Niagara Region of Canada: How do elements of stewardship relate to success?

Principal Investigator (PI): Dr. Ryan Plummer (Supervisor), Professor and Director, Environmental Sustainability Research Centre, Brock University, 905-688-5550 x4782, rplummer@brocku.ca

Student Principal Investigator (SPI): Brooke Kapeller, Master of Sustainability Candidate, Environmental Sustainability Research Centre, Brock University, bk17ey@brocku.ca

INVITATION

You are invited to participate in a study that involves research. The purpose of this study is to develop an understanding of environmental stewardship in the Niagara Region. The focus will be on determining what configurations of stewardship elements (actors, motivations, capacity, actions, and outcomes) relate most to desired social and ecological outcomes as well as stewardship initiative success.

WHAT'S INVOLVED

As a participant, you will be asked to complete the following questionnaire as well as participate in an in-person interview. This questionnaire will ask you a series of questions regarding each stewardship initiative that your organization has implemented that meet the criteria we previously discussed. The first section will ask you a series of general questions about the site, then the rest will ask about other actors involved, your organization's motivations for implementation, your organization's capacity to implement the initiative, what actions were taken, and what the outcomes were. The questionnaire is designed to be filled out multiple times for each initiative of interest.

Participation in the questionnaire will take approximately 30 minutes of your time. I will contact you shortly after to set up the follow-up interview for Fall 2018. Upon request, I can send you a copy of your questionnaire answers.

POTENTIAL BENEFITS AND RISKS

Possible benefits of participation include assisting in the development of an in-depth understanding of environmental stewardship in the Niagara Region that will potentially help improve stewardship efforts in the future. Additionally, upon completion of this research, a summary of your organization's initiatives will be provided to you that summarizes the stewardship elements, outcomes, and success for each initiative. The questions that you will be asked will be regarding your organization's practices and the success of various stewardship initiatives. Therefore, the social risks associated with participating are minimal. Your identity will be kept private in any reports or publications that are made publicly available following the study. However, other members of the organization may be aware of your identity and/or participation in this research.

CONFIDENTIALITY All information you provide is considered confidential in that your personal name and/or position will not be attached to the data in any way in subsequent reports. However, your organization's name will be. Due to the nature of this study, the organizations are an important part of the research, and will not be kept confidential unless otherwise requested by you.

Data collected during this study will be stored under password protection on the researcher's computer, and will only be accessible by the student researcher, the supervisor, and if necessary the two faculty thesis committee

members. The information that you provide may be important for further studies of environmental stewardship in different contexts. Data will be kept after study completion for subsequent use by the supervisor and/or research group. However, you have the option to consent to this below.

VOLUNTARY PARTICIPATION

Participation in this study is voluntary. If you wish, you may decline to answer any questions or participate in any component of the study. Further, you may decide to withdraw from this study at any time and may do so without any penalty. To withdraw, please send an email to Brooke Kapeller (bk17ey@brocku.ca) informing her of your desire to withdraw from the study. Any data or other information provided by you will be permanently deleted should you choose to withdraw from the study.

PUBLICATION OF RESULTS

Results of this study may be published in professional journals and presented at conferences. Feedback about this study will be available from Brooke Kapeller, who can be contacted at bk17ey@brocku.ca once the study has been completed.

CONTACT INFORMATION AND ETHICS CLEARANCE

If you have any questions about this study or require further information, please contact Dr. Ryan Plummer or Brooke Kapeller using the contact information provided above. This study has been reviewed and received ethics clearance through the Research Ethics Board at Brock University [file no. 17-406]. If you have any comments or concerns about your rights as a research participant, please contact the Research Ethics Office at (905) 688-5550 Ext. 3035, reb@brocku.ca.

Thank you for your assistance in this project. Please keep a copy of this form for your records.

I agree to participate in this study described above. I have made this decision based on the information I have read in the Information-Consent Letter. I have had the opportunity to receive any additional details I wanted about the study and understand that I may ask questions in the future. I understand that I may withdraw this consent at any time. (1)

I do not wish to participate in the study described above and would not like to proceed to the questionnaire. (2)

Skip To: End of Survey If Informed Consent Date: July 3, 2018 Project Title: Exploring Environmental Stewardship in the Nia... = I do not wish to participate in the study described above and would not like to proceed to the questionnaire.

Q2 Use of responses as secondary data for future research:

I permit my responses to be kept indefinitely after the study is completed and used as secondary data for use in future research studies which further examine elements of environmental stewardship in different contexts. (1)

I would not like my responses to be kept or used as secondary data in future studies which further examine elements of environmental stewardship in different contexts (data will be destroyed following completion of this study and publication of results). (2)

Phase Two: Interview

Stewardship Interview: Informed Consent Letter

Date: January 1, 2019

Project Title: Exploring Environmental Stewardship in the Niagara Region of Canada: How do elements of stewardship relate to success?

Principal Investigator (PI): Dr. Ryan Plummer (Supervisor), Professor and Director,
Environmental Sustainability Research Centre
Brock University
905-688-5550 x4782; rplummer@brocku.ca

Student Principal Investigator (SPI): Brooke Kapeller, Master of Sustainability Candidate
Environmental Sustainability Research Centre
Brock University
bk17ey@brocku.ca

INVITATION

You are invited to participate in a study that involves research. The purpose of this study is to develop an understanding of environmental stewardship in the Niagara Region. The focus of which will be on determining what configurations of stewardship elements (actors, motivations, capacity, actions, and outcomes) relate most to desired social and ecological outcomes as well as stewardship initiative success.

WHAT'S INVOLVED

You are invited to participate in a semi-structured interview. The goal of this interview is to develop an in-depth understanding of how the different configurations of stewardship elements that your organization has (previously determined from your participation in the questionnaire) relate to desired social and ecological outcomes as well as initiative success. Your responses will be audio recorded, and I will take notes throughout to ensure that I do not miss anything you say.

In the first section of this interview, you will be asked to speak about the context of environmental stewardship in the Niagara Region generally. The second section will then focus more specifically on the preliminary results from the questionnaire that you filled out previously. Participation in this interview will take a maximum of 1 hour of your time.

Following the interview, you will be sent a transcript of the interview to review. I will request that you review it and add any changes that you feel necessary within two weeks of receiving it. This is expected to take you approximately 30 minutes or less to do. If the transcript is not returned within two weeks, it will be assumed that the information provided is all correct.

POTENTIAL BENEFITS AND RISKS

Possible benefits of participation include helping to develop an in-depth understanding of environmental stewardship in the Niagara Region that will potentially help improve stewardship efforts in the future. Additionally, upon completion of this research, a summary of your organization's initiatives will be provided to you that summarizes the stewardship elements, outcomes, and success for each initiative. The questions that you will be asked will be regarding your organization's practices and the success of various stewardship initiatives, which you may otherwise be asked to answer in your professional capacity. Therefore, the social

risks associated with participation are minimal. Your identity will be kept private in any reports or publications that are made publicly available following the study. However, other members of the organization may be aware of your identity and/or participation in this research.

CONFIDENTIALITY

All information you provide is considered confidential in that your personal name and/or position will not be attached to the data in any way in subsequent reports; however, with your permission, anonymous quotations may be used. Depending on the location of this interview (at your organization's office or not), full confidentiality of your identity and/or participation in this research may not be possible. Due to the nature of this study, the organizations are an important part of the research, so organization names will not be kept confidential unless otherwise requested. After the interview, I will send you a copy of the transcript to give you an opportunity to confirm the accuracy of our conversation and to add or clarify any points that you wish.

Data and audio recordings collected during this study will be stored under password protection on the researcher's computer, and will only be accessible by the student researcher, the supervisor, and if necessary the two faculty thesis committee members. Any hardcopy information (notes, etc.) collected during this interview will be stored in a locked cabinet that only the student researcher has access to. The information that you provide may be important for further studies of environmental stewardship in different contexts. Data will be kept after study completion for subsequent use by the supervisor and/or research group. However, you have the option to consent to this below.

VOLUNTARY PARTICIPATION

Participation in this study is voluntary. If you wish, you may decline to answer any questions or participate in any component of the study. Further, you may decide to withdraw from this study at any time and may do so without any penalty. To withdraw, please send an email to Brooke Kapeller (bk17ey@brocku.ca) informing her of your desire to withdraw from the study. Any data or other information provided by you will be permanently deleted should you choose to withdraw from the study.

PUBLICATION OF RESULTS

Results of this study may be published in professional journals and presented at conferences. Feedback about this study will be available from Brooke Kapeller, who can be contacted at bk17ey@brocku.ca once the study has been completed.

CONTACT INFORMATION AND ETHICS CLEARANCE

If you have any questions about this study or require further information, please contact Dr. Ryan Plummer or Brooke Kapeller using the contact information provided above. This study has been reviewed and received ethics clearance through the Research Ethics Board at Brock University [file no. 17-406-PLUMMER]. If you have any comments or concerns about your rights as a research participant, please contact the Research Ethics Office at (905) 688-5550 Ext. 3035, reb@brocku.ca.

Thank you for your assistance in this project. Please keep a copy of this form for your records.

CONSENT FORM:

- I agree to participate in this study described above. I have made this decision based on the information I have read in the Information-Consent Letter. I have had the opportunity to receive any additional details I wanted about the study and understand that I may ask questions in the future. I understand that I may withdraw this consent at any time.

Use of responses as secondary data for future research:

- I permit my responses to be kept indefinitely after the study is completed and used as secondary data for use in future research studies which further examine elements of environmental stewardship in different contexts.
- I would not like my responses to be kept or used as secondary data in future studies which further examine elements of environmental stewardship in different contexts (data will be destroyed following completion of this study and publication of results).

Name: _____ Position: _____

Organization: _____

Signature: _____ Date: _____

Appendix 2-C: Questionnaire

Q11 Section 1: General background questions about the initiative

Q12 Name of the initiative:

Q13 On the map below, please indicate where this initiative is located. Note that you can either drag and drop the pin or type an address in to the search box.

Q14 In the event that the above mapping question does not work, please enter the initiative location into the text box below:

Q15 What was the main purpose (or goal(s)) of this initiative?

Q16 Who/what entity owns the land that this initiative is located on? (note that you may select multiple if relevant)

- Private landowner
- Organization: _____
- Government: _____
- Other: _____

Q17 Please indicate the year(s) that this initiative has taken place. (Please answer all three parts of this question)

- Year initiative planning began: _____
- Year initiative implemented on the ground: _____
- Year initiative completed: _____

Q18 What did this initiative entail? Please provide a brief description.

Q19 Section 2: Actors

This section focuses on the actors, or **stewards**, who were involved in this initiative. For the purposes of this questionnaire, a steward will be defined as any entity that undertakes stewardship actions.

Q20 Stewardship is carried out by stewards, or actors. Stewards may include individuals, collectives (groups, organizations, or government), and networks (relationships between

different parties/levels or stewards). To what extent was each type of steward involved in this initiative? Please answer for each type.

	Not at all involved	Slightly involved	Moderately involved	Very involved	Extremely involved
Individuals (stewardship volunteers)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Groups (self-organized groups of individuals)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Organizations (stewardship organizations, NGOs, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Government (municipal, provincial, federal, government agency, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Networks of actors (networks/relationships between different parties of stewards)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q21 Section 3: Motivations The focus of this section is on what motivated your organization to implement this initiative. Motivations can be either **internal** (ie; there is no outside force motivating the organization) or **external** (ie; outward incentives or pressures that motivate your organization to conduct this initiative). Examples of **internal** motivations may include things such as the organization’s core values or mandate. Examples of **external** motivations may include external funding, organizational reputation, or through a cost-benefit analysis. (Note that these are only a few examples; there are a range of other motivations that may be relevant for your organization or this particular initiative.)

Q22 On the moving scale bar below, please indicate what the motivations were that spurred this initiative to occur:

Internally	Mainly	Both	Mainly	Externally
motivated	internal,	internal	external,	motivated
only	slightly	and	slightly	only
	external	external	internal	
		equally		



Q23 Section 4: Capacity

This section of the survey focuses on your organization’s ability (or capacity) to successfully

implement this initiative. For the purposes here, there are six different types of assets that may affect the capacity to implement a stewardship initiative.

Q24 Please rate the extent to which each of the assets outlined below were important in the implementation of this initiative

	Extremely important	Very important	Moderately important	Slightly important	Not at all important
Social Capital (the relationships/networks that help facilitate or support stewardship)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cultural Capital (the local connections to place, traditions, and practices that support stewardship in the area)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Financial Capital (the financial resources available to implement this particular initiative)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical Capital (the technology/infrastructure available to implement/support this particular initiative)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Human Capital (the knowledge/skills/experiences of the people involved in this initiative)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Institutional Capital (the broader laws/policies, organizations, decision-making processes, and power/politics that may affect this initiative)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q25 Section 5: Actions

This section focuses on the specific actions undertaken by your organization to implement this initiative.

Q26 From the following list of stewardship purposes, which is the most relevant for this particular initiative?

- Restoration
- Preservation
- Sustainable use
- Other: _____

Q27 Stewardship actions can be targeted at different levels of complexity that may range from focusing on a single individual species, to targeting entire ecosystems or landscapes.

From the following list, please select the level of complexity that most represents what this initiative is targeted at:

- Individual species
- Multiple species
- Individual habitat
- Entire ecosystem
- Other: _____

Q28 Section 6: Outcomes

This section focuses on both the social and ecological outcomes of this initiative, as well as whether your organization perceives those as successful.

Q29 What were the **ecological** outcomes of this initiative? Please indicate all that apply on the following list: (note that if you have multiple 'other' outcomes, please separate them into their own text boxes)

- **Species abundance** (the number of individuals of a given species in an area)
- **Habitat quality** (the ability of a habitat to provide appropriate resources for species survival)
- **Area coverage** (the total area of natural land)
- **Ecosystem productivity** (the rate of biomass produced in an ecosystem)
- **Sustainability** (the ability of an ecosystem or site to continue meeting its current needs without compromising its future ability to do so)
- Other: _____
- Other: _____
- Other: _____
- Other: _____

Q31 What were the **social** outcomes of this initiative? Please indicate all that apply on the following list: (note that if you have multiple 'other' outcomes, please separate them into their own text boxes)

- **Wealth/poverty** (the impact that this initiative has on the wealth and/or poverty in the Niagara Region)
- **Livelihoods** (the ability of a person(s) to meet their needs)
- **Employment** (the impact that this initiative has on employment in the Niagara Region)
- **Wellbeing** (an individual's state of being happy, healthy, or prosperous)
- **Food security** (the ability of people to have reliable access to healthy food)
- Other: _____
- Other: _____
- Other: _____
- Other: _____

Q37 Thank you for providing information on this initiative. Do you have more stewardship initiatives to fill out information for?

Please note that selecting "no" will end this survey. **When you are finished providing information for all initiatives, you must select "no" for your responses to be recorded.**

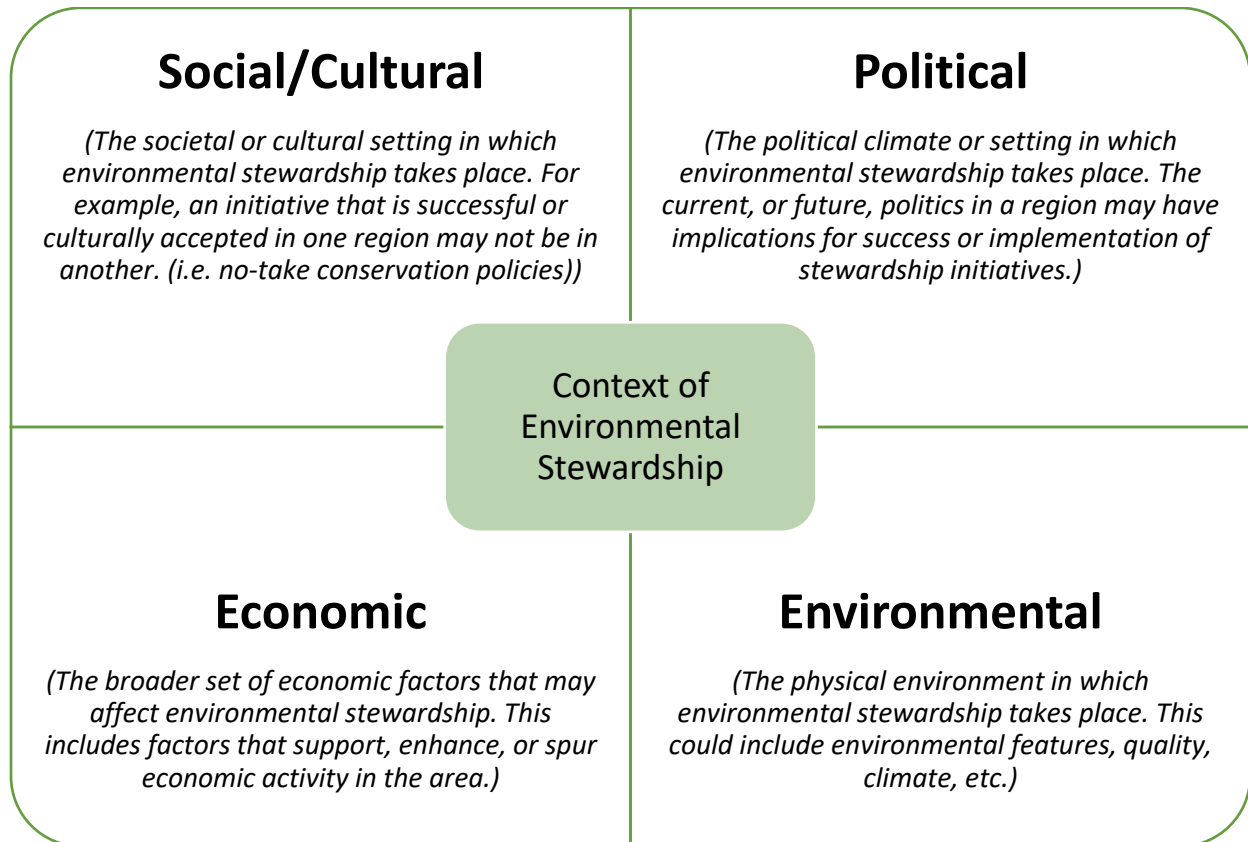
- Yes, my organization does have more stewardship initiatives to provide information for. I wish to restart this survey for the next initiative.
- No, this is the final stewardship initiative. I am done the survey.

Appendix 2-D: Interview Question

The Context of Environmental Stewardship in the Niagara Region (max 15 mins)

Environmental stewardship in Niagara can be shaped by several contextual factors, such as social/cultural, political, economic, or environmental factors. With these in mind, can you tell me about the state of environmental stewardship in the Niagara Region as a whole?

Four Contextual Factors:



Appendix 3-C: Questionnaire

Section 1: General questions about your organization

Q1 Please enter your organization's name

Q2 What types of environmental stewardship activities does your organization focus on?
(Please select all that apply)

- Conserve or preserve the local environment
- Take care of a place in the local environment (e.g. a community garden, empty lot, riverbank, forest preserve, etc.)
- Restore or transform local habitat
- Monitor the quality of the local environment (e.g. air/water quality monitoring, species monitoring, etc.)
- Advocate for the local environment
- Educate the public about the local environment
- Other (please specify) _____

Q3 Considering all of the other programs or activities that your organization works on, what percentage of your efforts are on environmental stewardship?

- 0-19%
- 20-39%
- 40-59%
- 60-79%
- 80-100%

Q4 Where does your organization typically focus its stewardship efforts? Please select all that apply.

- Watershed
- Stream/river/canal
- Waterfront/beach/shoreline
- Wetland
- Prairie
- Forest/woodland
- Park
- Community garden
- Urban farm
- Botanical garden/arboretum
- Trails/bike paths
- Dog run or dog park
- Residential grounds
- Vacant land
- Other (please specify)

Q5 Do you have any more information to provide about your organization? If so, please use the text box below:

Section 2: General background questions about the initiative

Q6 Name of the initiative:

Q7 On the map below, please indicate where this initiative is located. Note that you can either drag and drop the pin or type an address in to the search box.

Q8 In the event that the above mapping question does not work, please enter the initiative location into the text box below:

Q9 What was the main purpose (or goal(s)) of this initiative?

Q10 Who/what entity owns the land that this initiative is located on? (note that you may select multiple if relevant)

- Private landowner
- Organization: _____
- Government: _____
- Other: _____

Q11 Please indicate the year(s) that this initiative has taken place. (Please answer all three parts of this question)

- Year initiative planning began: _____
- Year initiative implemented on the ground: _____
- Year initiative completed: _____

Q12 What did this initiative entail? Please provide a brief description.

Section 3: Success

This section focuses on the overall success of this stewardship initiative, as well as the relative importance of each of the four stewardship elements for initiative success.

Q13 Please rate whether this initiative was a success overall:

- Extremely successful
- Very successful
- Moderately successful
- Slightly successful
- Not at all successful

Q14 Please rate each of the following stewardship elements based on how important you believe them to be to the success of this initiative:

	Extremely important	Very important	Moderately important	Slightly important	Not at all important
Stewardship actors (yours and other organizations or stewards) (survey section 2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Organizational motivations to implement this initiative (survey section 3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Available capacity (survey section 4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Actions taken to undertake stewardship (survey section 5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q15 Please rank each of the following stewardship elements based on how important you believe them to be to the success of this initiative.

(To do so, please type a number between 1 (most important) and 4 (least important) into each of the text boxes. Please do not use the same number twice.)

_____ Stewardship actors

_____ Organizational motivations

_____ Available capacity

_____ Actions taken to undertake stewardship

Appendix 3-D: Interview Questions

The two interview questions that were asked include:

Q1:

*The survey was divided into sections which aligned with the elements of environmental stewardship. These elements were the actors, motivations, capacity, and actions associated with each initiative. The following results show how you ranked and rated the importance of these elements for the success of your stewardship initiatives. (Please note that if you filled the survey out for multiple initiatives, the values presented are averages) **Keeping these results in mind, please discuss why you rated/ranked these elements in the way that you did?***

Q2:

Based on the previous discussion, do you think there are any important aspects/elements of environmental stewardship that are not included in this framework? If so, why do you think those are important? (i.e. what else is important for the success of environmental stewardship initiatives?)