

Reaching common ground: The potential for interagency collaboration in UNESCO biosphere reserves

Julie A. Ostrem¹ and Glen T. Hvenegaard²

¹ University of Alberta, 116 St 85 Ave, Edmonton, AB, T6G 2R3

Julie Ostrem | 434-22550 TWP 522, Sherwood Park, AB | ostrem@ualberta.ca

² University of Alberta Augustana Campus, 4901 46 Ave, Camrose, AB, T4V 2R3

Abstract: In an increasingly urbanized and degraded world, protected areas provide opportunities for people to connect with nature. Biosphere reserves strive for coexistence between the conservation of biodiversity and sustainable development practices through people and agencies living and working in harmony with nature at a regional scale. This article explores the potential for collaboration among stakeholders in biosphere reserves. The diverse range of social actors involved in biosphere reserves provides a good environment for implementing collective impact theory and trust theory. These theoretical frameworks allow for deeper understanding of how stakeholders connect through a more holistic and cohesive decision-making process. Envisioned to facilitate social innovation, these theories have emerged in a variety of settings across the globe to enable collaboration. However, little is known about the implementation and success of these theories in biosphere reserves. This article evaluates the feasibility of the practical implementation of these theories through the lens of environmental education and heritage interpretation in the Beaver Hills Biosphere in central Alberta, Canada.

Keywords: Collaboration, Biosphere Reserve, Collective Impact Theory, Trust Theory, Environmental Education, Interpretation

INTRODUCTION

The scale and complexity of environmental issues our world faces today is overwhelming, and many agencies are addressing these challenges with comprehensive solutions. The United Nations Educational Scientific and Cultural Organization (UNESCO), formed in 1945, created Biosphere Reserves in the 1970s through the Man and the Biosphere (MAB) Programme. Biosphere reserves are designed to revitalize the dysfunctional relationship between humans and nature. The Programme manifests in the form of a global network of 701 biosphere reserves worldwide as of April 2020. Although established in over 60 percent of the world's countries and accredited with a UNESCO designation, biosphere reserves are a commonly misunderstood concept across the globe (UNESCO, 2017).

Appointed no legal authority, biosphere reserves pragmatize recommendations to achieve UNESCO goals throughout various strategic action plans. Previous to 1995, biosphere reserves were created without a Statutory

Framework. These 'first generation' biosphere reserves focused on conservation and scientific research of the natural world, with minimal to no emphasis on cultural, sociological, or economic aspects of such designations (Reed & Price, 2020). More recently, biosphere reserves are gradually shifting this focus towards sustainable community development (Stoll-Kleemann & Welp, 2008). Biosphere reserves explore the potential for local solutions to global challenges to yield a more sustainable future (UNESCO, 2015). With the growing complexity of current environmental crises, strategies from multiple disciplines are called upon to involve the public in finding sustainable solutions (Monroe et al., 2008).

Decision-making processes that incorporate a range of social actors have long been challenging to organizations (Glasbergen, 1998). Biosphere reserves are no exception. Their broad, yet inclusive nature encourages taking a multi-stakeholder approach in problem-solving endeavors. Collaborating on controversial issues can help address stakeholder concerns and

perspectives from multiple disciplines (deBruin & Morgan, 2019). However, a key question in collaborative processes is why some attempts fail, while others succeed (Saarikoski, 2013). Admittedly, there is no precise answer to this question as many aspects of collaboration are context-specific. However, steps towards achieving successful collaboration can be explored through appropriate theoretical frameworks. Collective Impact Theory (CIT) and Trust Theory actively seek to understand and enhance collaboration through structured approaches. Both theories have their benefits and constraints as they are applied to biosphere reserves; nonetheless, they are useful tools to explore collaborative approaches and instill optimism in stakeholders (Hanleybrown et al., 2012).

This article explores multiple case studies of collaboration in biosphere reserves with a special focus on the Beaver Hills Biosphere (BHB) in Alberta, Canada. The BHB provides a good environment to study collaboration and opportunities for synergies between various

stakeholders and their pursuit for sustainable development. In addition, we analyze the opportunities and constraints of collaboration in biosphere reserves through various local and international examples. However, collaboration can be explored amidst any of the various sectors of operations in biosphere reserves. Our focus will be on the potential for collaboration in environmental education and heritage interpretation. Environmental education and heritage interpretation are relevant operations in the BHB (and biosphere reserves throughout the world) as several partnering agencies specialize in this field, providing a variety of unique creation and delivery methods. As an overarching theme, this article investigates the following question: *What is the potential for interagency collaboration in UNESCO biosphere reserves through the lens of environmental education and heritage interpretation?*

THE BEAVER HILLS BIOSPHERE

Decision makers in the Beaver Hills area of central Alberta collaborated in 2002 to create the

Beaver Hills Initiative (BHI) (BHI, 2016). The BHI attempted to unite the local community, all levels of government, industry, non-government organizations, and academia through the shared goal of a more sustainable future. After over a decade of shared initiatives and coordinated action on sustainable development, the BHB was designated a UNESCO biosphere reserve in 2016. Located just east of Edmonton in central Alberta, the BHB encompasses five rural municipalities (Strathcona, Leduc, Beaver, Lamont and Camrose Counties), along with Elk Island National Park, Miquelon Lake Provincial Park, and several other parks and protected areas (BHI, 2016). Undeterred by the impending threats of urbanization, the BHB provides an ideal setting for coexistence between conservation of biodiversity and sustainable development in Alberta. The BHB is home to unique terrestrial and aquatic ecosystems and hosts a diverse abundance of flora and fauna. Likewise, the BHB hosts over 12,000 permanent inhabitants (Indigenous communities, rural farmers, acreage owners, and village residents) who live, work, and interact with nature on a

daily basis (BHI, 2015). As agriculture provides a livelihood to the majority of these inhabitants, the quality of life and economic potential of the BHB is closely tied to nature.

Every day the local communities in the BHB illustrate how to achieve this delicate balance of living and working in nature, while supporting sustainable development. Due to the increasing pressures of urbanization and development, the BHB is compelled to develop partnerships with academic institutions, and to integrate partners at the regional level by working cooperatively with other levels of government agencies, and private individuals (Swinnerton & Otway, 2003). Amidst the inhabitants of the BHB, we can recognize unique partnerships with all orders of government (municipal, provincial, and federal), as well as academic, industrial, and non-government organizations. However, the BHB reaches far beyond established partners and will require inclusivity and collaboration with all members of the local community, Indigenous peoples, and civil society organizations. In order to mitigate conflict, it is essential that these

diverse perspectives are acknowledged during decision-making processes. This raises the question: *How can biosphere reserves facilitate interagency collaboration?*

INTERAGENCY COLLABORATION

As collaborative efforts become increasingly valued endeavors in biosphere reserves, the challenges and opportunities that arise can generate valuable lessons. Even though connection is easier than ever before in today's world, meaningful collaboration is anything but widespread. The Oxford dictionary (2020) defines collaboration as "the action of working with someone to produce or create something". This shared goal of "creating something" is of critical importance to successful collaboration. Rather than simply approaching partners asking for cooperation in a preconceived goal by one party, there is increasing benefit in including partners in the goal creation efforts. Admittedly, finding common ground in goal creation can be a long and tiresome process and, like all collaborative efforts, they have their limitations.

BARRIERS TO COLLABORATION

From a broad perspective, there are systematic constraints within the biosphere reserve concept itself. The sheer complexity, frequency, and uncertainty of challenges faced by biosphere reserves present themselves as barriers to collaboration (Walker & Daniels, 2019). Capacity is amongst one of the top constraints for any collaborative effort. Lack of available funding, resources, staff, and time needed to tackle a problem through a collaborative approach has the potential to be a biosphere's greatest downfall (Cuong, 2017). Contingencies to the organizational sustainability of biosphere reserves may also pose barriers through staff turnover, operational changes, and dynamic governments. Additionally, one of the greatest obstacles organizations encounter in the face of collaboration is unrealistic predetermined solutions (Kania & Kramer, 2013). Due to the unpredictable nature of challenges faced by biosphere reserves, going into decision-making processes with an empathetic understanding and

an open-mind towards a broad range of solutions is far more likely to yield success.

Moreover, one major constraint to collaboration is the adequacy of representation. Inappropriate coordination mechanisms for moderating stakeholder interests can threaten the ability of parties to express their perspective on the topic at hand (Ishwaran et al., 2008). Parties' willingness to compromise goes hand in hand with their ability to empathize with opposing points of view. Stakeholders that feel as if their identities are being threatened by potential decisions are far more likely to react with hostility (Hurst et al., 2019). It is imperative not to devalue the perspective of stakeholders while pursuing any collaborative effort. Doing so can lead to feelings of marginalization which will foster distrust and inhibit conflict resolution (Davenport et al., 2007). Along the same lines, communication challenges persist across disciplines as decision makers struggle to articulate their ideas in layperson's terms for other stakeholders. Duinker et al. (2010) explore the dangers of communicating in a language that is

incomprehensible by the various stakeholders. Misinterpretation by parties on the receiving end can lead to defensive responses and unproductive relationships (Hurst et al., 2019). Providing inclusive definitions to facilitate dialogue can be a valuable preventative measure before attempting any collaborative effort (Duinker et al., 2010).

BENEFITS FROM COLLABORATION

Despite the constraints of collaboration, there are numerous benefits. The advantages of integrating multiple perspectives in biosphere reserve decisions stem far beyond merely adhering to UNESCO recommendations. There is value in diversifying knowledge leading to a more cohesive and comprehensive outcome. Within biosphere reserves, tackling complex and controversial issues is unavoidable. An ideal narrative of interagency collaboration diversifies knowledge in decision-making processes to assuage conflict, enhance innovation, distribute power, and build consensus (Hurst et al., 2019). In the context of biosphere reserves, inclusive decision-making is an integral process to produce

mutually beneficial outcomes. In addition, these efforts at inclusion will catalyze a broader acceptance for management decisions and decrease public push-back (Renn et al., 1995). Engaging a diverse set of stakeholders can lead to increased innovation, as well as reduce duplication of efforts. Collaboration can aid administrators understand the breadth of issues faced by individual stakeholders and address them appropriately. In turn, these collaborative efforts initiated by the biosphere reserve can yield mutual understanding from the public. Biosphere reserves can share their current initiatives with the public and provide tangible ways for local stakeholders to help. As expressed through analyzing collaborative constraints, there is increasing importance in the facilitation mechanism for these efforts. Creating a safe environment, where positive interpersonal connections can be generated, promotes trust and easy sharing of information, ultimately benefiting productivity (de Bruin & Morgan, 2019).

At the international level, UNESCO Biosphere Reserves have clearly outlined collaborative efforts as a priority through objectives identified in the *Seville Strategy* (1995) and the *Madrid Action Plan* (2002). *The Madrid Action Plan* promoted collaboration in three objectives and multiple action items (Table No. 1). Most recently, the *Lima Action Plan* (2016) highlights this strategic direction toward collaboration through a variety of outcomes (Table No. 1). Although over a decade has passed between them, both international plans highlight collaboration as an essential outcome for biosphere reserves.

Likewise, on a national level, the Canadian Biosphere Reserves Association encourages collaboration through a document of best practices from Canada's UNESCO biosphere reserves (2019) (Table No 2.).

COLLABORATION IN BIOSPHERE RESERVES

Table No. 1. Objectives and action items for collaboration recommended by UNESCO Biosphere Reserves' international strategic action plans: Madrid Action Plan (2002) and Lima Action Plan (2016).

International Strategic Plans	Objectives	Action Items
Madrid Action Plan (2002)	E.1-Cooperation, Management and Communication	Increased cooperation and coordination of biosphere reserves with existing international programmes and initiatives
		Integrated information & communication strategy
		Participatory regional networks that are managed in a manner assuring adequate representation of biosphere reserve managers/coordinators
		Enhanced cooperation between experts and practitioners in relevant key issues
		Communication strategies for each biosphere reserve, integrated with national and higher levels
		Functional MAB National Committees in each country managed in a manner assuring adequate representation of biosphere reserve coordinators and other key stakeholders
		Open and participatory procedures and processes in the designation, planning and implementation of biosphere reserves
	E.3-Science and Capacity Enhancement	Biosphere reserves to have research programmes on analyses of ecosystem services and their management through stakeholder participation
		Exchange of educational resources for widespread adaptation and application
	E.4-Partnerships	Improved financial mechanisms for biosphere reserves and regional networks
		Increased involvement, support and buy-in of private sector
Exchanges between biosphere reserves		
Promote partnerships		
Transboundary biosphere reserves		
Lima Action Plan (2016)	A4.-Research, practical learning and training opportunities that support the management of biosphere reserves and sustainable development in biosphere reserves	Establish partnerships with universities, research institutions, educational and training institutions, UNESCO Chairs, and encourage managers, local communities and other BR stakeholders to collaborate in designing and implementing projects that inform the management and sustainable development of their BR.
	B1.-Effective BR managers/ coordinators and engaged stakeholders of biosphere reserves	Organize global and regional education, capacity building and training programmes.
	B2.-Inclusive regional and thematic networks	Ensure the participation of all relevant stakeholders in regional and thematic networks.
	B4.-Effective regional and thematic level collaboration	Create opportunities for collaborative research, implementation and monitoring.
	B6.-Transnational and transboundary cooperation between biosphere reserves	Create and implement twinning arrangements between biosphere reserves in different countries.
	C8.-Enhanced synergies between biosphere reserves	Encourage joint promotion and marketing of biosphere reserve products and services among biosphere reserves and beyond.

Table No. 2. Objectives and action items for collaboration recommended by the Canadian Biosphere Reserves Association (2019).

Objectives	Actions
Partnership	Work in partnership with all orders of government, Indigenous peoples, the private sector, civil society organizations, academic institutions, youth, and residents
Communication	Facilitate dialogue, showcase models of co-governance, and coordinate projects that bridge environmental, economic, social, and cultural divides
Reconciliation	Foster reconciliation between Indigenous and non-Indigenous peoples through land-based programs and stewardship

Finally and more specifically, the BHI planted seeds of collaborative outcomes throughout their biosphere reserve nomination document (BHI, 2015). Among their key objectives is to enhance internal partnerships and clearly illustrate the benefits of collaboration. Case studies developed from past BHI surveys give insight into the synergies generated by combining resources of diverse partners (BHI, 2015). The BHB encourages collaboration through their strategic planning documents as well. *The Beaver Hills Heritage Appreciation Development Plan* (Hubsy

& Fast, 2004), for example, encourages agencies to collaborate more extensively in order to broaden the audience, widen the scope of services, and reduce duplication. More recently, the BHB’s strategic plan (2016-2019) pursues collaborative efforts under two of its main objectives (Table No. 3) (BHI, 2016).

Table No. 3. Objectives and action items for collaboration recommended by the Beaver Hills Biosphere Strategic Plan (2016-2019).

Objectives	Actions
[1E] - Collaboration: Collaboration provides the basis for knowledge and information sharing for conservation and stewardship	Data sharing, develop inventory of land uses, develop matrix of conservation methods, engage municipal and provincial economic development and tourism departments, evaluate and determine BHB members.
[4B] - Partnerships: Partnerships to support understanding of climate change impacts are established.	Identify potential sources of expertise to develop and implement climate change strategy, and support Beaver Hills Tourism partners with tools to adapt to climate change.

Not only do these objectives serve as tangible imperatives to foster collaboration, but they serve as tools to initiate action across biosphere reserves. Complex issues require engagement at a local level to facilitate a reciprocal relationship where the biosphere and the local community are mutually benefiting (Chiara, 2015). Biosphere

reserves offer a “new paradigm for protected areas” as they commit to meaningful involvement of local people through sustainable development initiatives (Swinerton & Otway, 2008, p.1).

Sustainable development requires an interdisciplinary approach to create broad, long-lasting synergies. As planning and management issues are constantly evolving, stakeholders are inundated with demands from collaborative partners. Biosphere reserves pursue a cooperative environment where stakeholders feel their perspectives are being accurately represented during the decision-making process.

Research has shown that collaboration is critical for effective functioning of biosphere reserves. For example, in examining key factors for the success or failure of biosphere reserves, stakeholder participation and collaboration were regarded as the most important functions (Cuong et al., 2017). Across the globe, the concept of collaboration in biosphere reserves has long been explored. This collaborative potential was first explored locally in 1979, when Alberta designated its first biosphere reserve at Waterton. Since its designation, one of their most successful

collaborative efforts has been the “Carnivores and Communities” program (Quinn & Alexander, 2011). Through laborious efforts with the municipality, local ranchers, landowners, and Indigenous communities, biosphere reserve administrators continue to successfully collaborate to minimize human-wildlife conflict. This success is driven through compromise, environmental awareness programming, and a shared goal of coexisting with large carnivores (Quinn & Alexander, 2011). In the same way, a case that earned international recognition in its collaborative efforts was the “War in the Woods” in Clayoquot Sound Biosphere Reserve, British Columbia. The conflict stemmed from controversial natural resource management practices as environmentalists protested logging practices that devastated the integrity of one of the world’s last remaining temperate rainforests (Zietsma et al., 2002). Gradually, stakeholders began forming alliances with the notion of endorsing ecosystem-based management and an integrated approach to including local people and First Nations in governance. The fallout of this collaborative effort fostered sustainable resource

management, as well as increased education and tourism opportunities surrounding the forest (Saarikoski et al., 2012).

Aside from collaborative efforts in Canadian biosphere reserves, we can see successful collaboration across the globe. Allariz Biosphere Reserve in Spain undertook a collaborative effort through their organic waste composting program. The Ministry of Environment introduced this sustainability initiative in response to the public demand to improve urban waste management.

Aside from biosphere managers, the collaborative effort included local citizens, food companies, and internal and external experts working together to achieve a common goal (Reed & Price, 2020). Other examples of collaboration at a larger scale are the “UNESCO Ecoparks” of Japan. Following a period of dormancy as Japanese biosphere reserves, five parties (Forestry Agency - national government, Miyazaki Prefecture - provincial government, Aya Town - municipal government, a nation-wide environmental NGO, and a local NGO) undertook a collaborative effort which facilitated

a bottom-up approach to enhance conservation and education efforts within the biosphere reserve (Reed & Price, 2020; Tanaka and Wakamatsu, 2018). Still recognized as biosphere reserves through UNESCO, Japan changed their recognizable name to “ecoparks”. Japan completely revitalized their biosphere reserve concept through the establishment of a platform that promotes the empowerment of local actors, as well as encourages collaborative efforts, cooperation, and multi stakeholder awareness (Reed & Price, 2020).

THEORETICAL FRAMEWORKS FOR COLLABORATION

The examples of collaborative efforts in biosphere reserves are endless; however, not all of them have been successful. Despite the outcome, the lessons learned from merely trying collaborative efforts are invaluable. Collaboration challenges agencies to think creatively and holistically, likely generating benefits that outweigh the risks. As collaborative efforts become more widespread in biosphere reserves,

calls for evaluating the success of these initiatives are becoming increasingly common (Conley & Moote, 2003). This interest is fueled by biosphere administrators, public participants, funders, and academics, as they seek to identify potential opportunities and constraints. However, evaluating a concept with intangible measures of success like collaboration can be a daunting task. Biosphere reserves often lack the capacity for such evaluation and become reliant on informally evaluating collaborative efforts. This creates a gap between theory and practice as biosphere reserves expedite collaborative efforts in hopes of achieving their UNESCO-designated goals, while failing to measure their effectiveness (Cuong et al., 2017). Incorporating academic researchers into this process itself can be an example of mutually beneficial collaboration. Researchers can identify the challenges, evaluate the risks, and strengthen the benefits associated with current collaborative efforts by employing appropriate theoretical frameworks. In particular, the Collective Impact Theory (CIT) and Trust Theory provide helpful insights about the inclusion of multiple stakeholders in actively

achieving consensus in the decision-making process.

The sheer number of challenges biosphere reserves face can be daunting, and undoubtedly, the solutions lie within a range of expertise from diverse organizations. CIT was first articulated by American social scientists John Kania and Mark Kramer in 2011 with the intent of offering a model for cross-sector collaboration. CIT strives to initiate long-term commitment of important stakeholders to a common agenda for solving a specific problem (Kania & Kramer, 2011a). The versatile approach of CIT tackles prominent issues in the community, encouraging a multi-stakeholder approach (Sagrestano et al., 2018). Through the facilitation of a backbone support organization, CIT is a structured process that facilitates a common agenda, shared measurement, continuous communication, and mutually reinforcing activities among all participants (Kania & Kramer, 2011a). The backbone support organization is arguably the most important condition as it facilitates successful employment of the other conditions

(Anderson, 2015). The framework also clearly outlines three necessary pre-conditions: adequate financial resources, influential champion(s), and a sense of urgency for change (Hanleybrown et al., 2012). Together, these three pre-conditions and five conditions can facilitate long-lasting, holistic outcomes to any challenge undertaken collaboratively. Employing all five conditions effectively, while simultaneously driving change, is an arduous, yet rewarding, experience (Weaver, 2014).

CIT efforts have gained momentum across the globe, including attempts to reduce childhood obesity through a program called “Shape Up Somerville”, the Global Alliance for Improved Nutrition in Switzerland, and Centers for Disease Control and the Social Innovations Fund initiated by the USA (Kania et al., 2014). A successful collaboration story was the implementation of CIT in the Elizabeth River Project (1993) of southeastern Virginia, USA. After decades of industrial waste disposal into the Elizabeth River, over 100 stakeholders came together with the mission to restore the ecological integrity of the

river (Kania & Kramer, 2011b). Dozens of local government authorities, local businesses, schools, community groups, environmental organizations, and universities collaborated to create a structured plan using CIT framework. Each organization played a different role, based on their expertise, to actively facilitate the work of another organization. For instance, one organization coordinated scientific research, another communicated findings to the public, and another created grassroots support and engaged local citizens. Over fifteen years later, the river saw many tangible results including improved water quality, pollution reductions by more than 215 million pounds, a sixfold cut in the concentration of carcinogen levels, as well as the conservation of over 1000 acres of watershed (Kania & Kramer, 2011b).

Certainly, the potential for successful collaboration using CIT is high; however, the potential for its application in biosphere reserves is largely unknown. Biosphere reserves provide a good environment for implementing CIT initiatives as they involve a wealth of

stakeholders and an opportunity for inclusive and consensus-based decision-making. CIT can facilitate meaningful involvement of actors and can provide a framework to address the complex and contentious challenges faced by biosphere reserves. CIT offers an advanced method of structured collaboration to address the many systemic challenges biosphere reserves face (Anderson, 2015).

However, the supporting theories of CIT are contingent on building on existing collaborative efforts. CIT refers to a supporting dimension: *relationship and trust building among stakeholders*. Hanleybrown et al. (2012) refers to trust as a “softer” dimension, essential to successfully achieving social change through collective impact. The notion of trust pertains to all collaborative efforts as it relates to human psychology and processes that include more than one individual. Trust can be best defined as “a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviors of another” (Rousseau et al., 1998, p. 395). As a

concept, trust has been extensively studied and associated with many benefits including facilitating goal attainment and cooperative behaviour (Davenport et al., 2007). In the context of biosphere reserves, trust is a crucial component for virtually every stakeholder involved. Not only is it important to grant trust to partnering agencies, but also sustaining this trust throughout the entirety of the relationship. A lack of trust can have destructive effects that can undermine constructive debates and stakeholder inquiries during decision-making processes (Davenport et al., 2007)

Trust theory embeds itself in four types of trust (Stern & Coleman, 2015). Dispositional trust is a general predisposition to trust based on past experiences of the trustor (Stern, 2018). Rational trust grounds itself in the trustor’s evaluation and prediction of the probable outcome of the action. Affinitive trust is based on the relationship of the participating actors. Feelings of social connectedness, shared values, and positive shared experiences can enable affinitive trust. Systems-based trust is the trust in the process and

procedure, rather than trusting an individual or organization. This leads to the perception of a low risk trust activity (Stern, 2018).

There is a significant body of research pertaining to trust theory and its applications to natural resource management situations. The Midewin National Tallgrass Prairie, in Illinois, USA, explored the perceived role of trust between local communities and USDA Forest Service personnel (Davenport et al., 2007). This study reveals many parallels to the potential of biosphere reserves as agents of trust. Analogous to biosphere reserves, Midewin was established through local efforts and largely relies on the participation of these local actors. Davenport et al. (2007) also explored the importance of the Forest Service being seen as individuals that the community can relate to and interact with rather than a “nameless faceless entity” (p. 365). This process draws on the relevance of affinitive trust in biosphere reserves to create genuine social connections to individual biosphere administrators. Strengthening interpersonal connections has strong potential to positively affect one’s

willingness to trust, thus facilitating collaboration (Davenport et al., 2007).

Both collective impact theory and trust theory have their advantages and disadvantages, but both can be used as frameworks to evaluate collaborative efforts. Trust theory accounts more directly for interpersonal interactions and focuses on individual attitudes and behaviours (Stern, 2018). As a precursor to CIT, creating relationships with the foundation of trust can help mitigate unnecessary conflict. Due to the complexity and scale of challenges faced by biosphere reserves, CIT appears to be a better suited core model as it oversees collaboration from the agency level. However, trust theory has potential for supporting microscale collaboration at the individual level. Even so, trust theory may be difficult to apply to biosphere reserves for whom individual actors are constantly changing.

Drawing conclusions from past CIT and trust theory applications can help direct future collaborative efforts. These theories can also provide a framework to collaborative

investigators as they weigh the benefits and costs of collaboration in their sector. Understanding the proposed theories will enable agencies to investigate collaborative potential where they may have previously overlooked such potential. However, it is important to note these theories do not solve the problem at hand, but rather seek to understand and improve the situation. The attempt itself is an important step and offers the intangible benefit of hope that can bring optimism to stakeholders about successfully working together (Hanleybrown et al., 2012).

ENVIRONMENTAL EDUCATION & INTERPRETATION

The framework of collaboration can be applied to any discipline, in any domain. Biosphere reserves are composed of several domains including, but not limited to, land use planning, research, enforcement, and municipal operations. However, this article focuses on interagency collaboration through the lens of environmental education and interpretation. One of the main objectives of biosphere reserves is to foster

environmental education for sustainable development (Marks et al., 2017). Through an investigative study conducted in 2015, the potential to examine collaboration through strategic internal partnerships in environmental education was found to be particularly attractive to BHB partners (BHI, 2015). The BHB hosts a considerable variety of agencies engaged in environmental education efforts. Examples of primary interpretive stakeholders in the BHB include, Elk Island National Park, Miquelon Lake Provincial Park, Cooking Lake-Blackfoot Provincial Recreation Area, Ukrainian Cultural Heritage Village, Strathcona Wilderness Centre, Ministik Game Bird Sanctuary, and various representatives from municipal, provincial, and federal agencies (Reinicke, 2016).

Not only is there variation in environmental education stakeholders, but also vast differences in their programs offered and styles of delivery. Environmental education in biosphere reserves comes in many shapes and forms, from community-based environmental monitoring, teaching about local environment through to

school programming, park interpretive programs, and partnerships in learning and research (Marks et al., 2017). This variation provides an opportunity for extensive knowledge-sharing opportunities, as well as the identification of the most effective and innovative methods of communication. Collaboration between these agencies could manifest itself in joint training and job sharing opportunities, interagency planning meetings, identification of key themes, inventory of existing strategies, and cross-program marketing efforts.

Collaborative initiatives can also benefit these education efforts by reducing duplication and increasing productivity. Due to the variability in audiences and educators, there is no 'one size fits all' approach to the creation and delivery of environmental education and interpretation programs. Monroe et al. (2008) highlights four purposes of environmental education: to convey information, build understanding, improve skills, and enable sustainable actions. Collaborative strategies of community education is essential to the success of educators in reaching these goals

(Monroe et al., 2008). Generally, biosphere reserves strive to achieve education that meets all four purposes, which is why collaboration is so important.

Not only can collaboration benefit environmental education, but environmental education and interpretation equally hold significant potential as tools to facilitate interagency collaboration.

Serving as frontline methods of communication for visitors and the local community, environmental education serves to increase public awareness of the conservation efforts tackled by the biosphere in order to foster stakeholder support and cooperation. Collaboration by the major education agencies within the biosphere can help deliver the message to the greatest amount of individuals. Education has powerful potential in bringing together stakeholders to achieve a common goal. Biosphere reserves provide stakeholders with the opportunity to further this relationship by becoming environmentally literate through environmental education as they pursue a livelihood through nature. Environmental education can help

minimize the predefined risk of collaborating in a language incomprehensible to the various parties. In this way, environmental education and interagency collaboration can be mutually beneficial.

Another benefit of analyzing collaboration through an educational lens is its applicability to the aforementioned theories. For instance, CIT outlines a clear process to implement collaboration: identify the problem, identify key stakeholders, and create common goals. Drawing from a previous example, Waterton Biosphere Reserve initiated its “Carnivores and Communities” program in 2009. Building on existing community initiatives, Waterton worked with several partners to support community-based and landowner-driven initiatives to reduce human-wildlife conflict (Quinn & Alexander, 2011). Applying the early steps of CIT in regards to this environmental education initiative would materialize as follows:

Identify the problem: conflict between large carnivores and people in southwestern Alberta

(special focus on agricultural conflicts: livestock, grain, infrastructure and fencing).

Identify key stakeholders: ranchers, local landowners, farmers, Indigenous communities, parks, biosphere administration, tourists, municipalities, etc.

Create common goals: raise awareness through environmental education (increase public support and understanding of the importance of large carnivores in the area), replace current waste disposal bins with “bear proof bins”, host workshops for farmers and ranchers to minimize the risk of wildlife vs livestock conflict, etc.

CIT has the potential to generate more efficient and holistic environmental education in biosphere reserves by bringing individual stakeholders together towards a common goal. Environmental education should encourage the participation of individuals within the biosphere to play their part in “building a better tomorrow” (UNESCO, 1980, p.12).

CONCLUSIONS

This article sheds light on the applications of collaboration in biosphere reserves. Through an analysis of its promises and perils, potential theoretical frameworks, and scope for environmental education, collaboration remains a constructive endeavor for stakeholders. This research has already begun to foreshadow a sense of the challenges faced by biosphere reserves. Collaborative constraints such as a lack of capacity, identity and trust risks, and skepticism of success, are commonplace among biosphere stakeholders. However, education has the potential to minimize these risks and generate benefits from collaboration. A more thorough investigation will reveal the relevance and frequency of collaborative benefits and challenges within biosphere communities. Investigating and analyzing real collaborative efforts currently practiced in the BHB will highlight the benefits of collaboration summarized in this article.

This research encompasses several limitations. First, with a theory as complex and comprehensive as collaboration, the specificity of

the research itself can be a constraint. The limitation of focusing too broadly can overwhelm researchers and restrict their ability of seeing important details. However, narrowing in on collaboration for environmental education may reduce attention to pertinent collaborative challenges faced in other sectors of biosphere reserves. Additionally, this research lacks tangible data to support or oppose the authors' assumptions.

In terms of future research, it is important to further document the benefits, costs, and other dynamics related to collaboration in a variety of biosphere reserves, and the BHB in particular. Researchers could survey stakeholders to better understand the specific barriers and enablers faced by the BHB in light of interagency collaboration. This understanding of the broader issues in achieving successful collaboration could then be applied more specifically to a single operation within the biosphere. With respect to collaborating on environmental education and interpretation efforts, research could be conducted evaluating current communications

efforts in place, their efficiency, and their potential for improvement.

This research article focuses on the potential for collaboration in environmental education and heritage interpretation of biosphere reserves. However, it would be equally beneficial to investigate the potential for collaboration using collective impact theory and trust theory for any component of biosphere reserve operations (e.g. enforcement, planning). This could generate more holistic partnerships and collaborative efforts that include a true diversity of stakeholders. More broadly, this research could be extended beyond the scope of the BHB. An investigation into collaborative efforts nationally across Canada may also lead to other beneficial findings. For example, are the collaborative barriers faced by this biosphere a result of internal operations, or rather are these challenges entrenched in the structure of Canadian biosphere reserves themselves? Future research could compare collaborative results within many biosphere reserves, and seek out a set of best practices.

AUTHOR INFORMATION

Corresponding Author

Julie Ostrem

Contact Information: ostrem@ualberta.ca

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