HAUDENOSAUNEE FOREST STEWARDSHIP

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by

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ABSTRACT

Indigenous Communities throughout Canada and the United States pose unique challenges for resource management on reservations due to their ecological and political history with settler-colonial states and their biocultural context (i.e. context specificity). Context specificity emphasizes the diversity of Indigenous Communities and limitations of a one-size-fits-all strategy. The Kanienkehaka (Mohawk) Community of Akwesasne, an Indigenous Community straddling the US and Canadian border, was the site chosen for the development of biocultural land stewardship strategies for existing and new settled Land Claims handled by the St. Regis Mohawk Tribe (governing body in the southern portion of Akwesasne). This research utilizes a participatory action approach that is informed by Akwesasronon (Akwesasne Community Member) voices and context specificity. Interview analysis revealed the complex connectivity of Akwesasronon with forested landscapes through various values and sub-values. This research conveys the importance of paralleling land and cultural stewardship in strategies for successful implementation within Indigenous Communities.

BIOGRAPHICAL SKETCH

Abraham Francis was born and raised all over Akwesasne. Francis studied Biological Sciences at Cornell University. His inquiry into the Traditional Ecological Knowledge of *Akwesasronon* began with an independent study on the importance of traditional medicines in Akwesasne, which was advised by Dr. Mt. Pleasant. After graduating with B.S. in 2014, Francis stayed at Cornell University to work in a Microbiology lab for Dr. Angert on the Epulopiscium spp. genome. He would late move back to Akwesasne to work for the Mohawk Council of Akwesasne as a Community Health Representative, Prevention/Intervention Coordinator, and Environmental Project Coordinator. As an Environmental Project Coordinator, he would carry the responsibility of coordinating research and assessing minnow populations in Akwesasne due to community connection and concerns of population decline. The position provided the opportunity to be engaged in research that was grounded in community and traditional ecological knowledge. In 2016, Francis joined the Department of Natural Resource at Cornell University to study with professors Angela Fuller and Karim-Aly Kassam. He would return to his community in 2017 to conduct his Master's thesis research and the results are presented here.

In memory of

Florence Cook,

Maureen Lazore,

Carol Warrior,

and Harriet Boots

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GLOSSARY

Onkwehshòn:'a – The people

Ionkhi'nisténha Ohónstia – mother earth

Ohneka'shòn:'a – The waters

Kentsion'shòn:'a – The fishes

Ohenten'shòn:'a – The grasses/plants

Ononkwa'shòn:'a – Medicines

Kaienthóhsera – Food Plants

Kahihshò:'a - The Berries

Kontírio – The animals

Okwire'shòn:'a – The trees

Otsi'ten'okòn:'a – The birds

Ionkhihsothokòn:'a Ratiweras – The Thunderers

Kaié:ri Nikawerá:ke – The four winds

Shonkwahtsì:'a Enkiehkehnéhkha Karáhkwa – The sun

Ionkhihsótha Ahshonthenhnéhkha Karáhkwa – The moon

Otsistohkwa'shòn:'a – The stars

Kaié:ri Niionkwè:take – Four Beings/Great Teachers

Shonkwaia'tíson – The creator

Kanienkeha – The language

Kaniataraowaneneh – St. Lawrence River

Akwesasronon - Community members of Akwesasne X

Kanienkehaka – Mohawk X

Tsi Kiotonhwentsiatáhsawen – Creation Story/Start of the Earth

Kaianerekowa – The Great Law

Sken:nen – Peace

Kasatstenhtshera – Power

Kanikonri:io – Good Mind

Ohenton Karihwatehkwen – Thanksgiving Address/Words that come before all else

Tahatikonhsetónkie – 7 Generations/Coming Faces

Tsi Ní:ioht Tsi Wa'akwa'tá:raien – Origin of Clans/How we got out clay

Tsia:ta Nihononhwentsia:ke – Seven Nations Fire/Seven Nations of Canada

Ohero:kon – Under the Husk, which refers to a group that is seeking to reclaim coming of age ceremonies in Akwesasne

Konien:ah – My Child

Wahta – Maple

Kariwiio – Handsome Lake's Code

Kana:takon – St. Regis District in Northern Portion of Akwesasne

INTRODUCTION

I was born in Cornwall, Ontario at Hotel Dieu Hospital, which is a city and hospital bordering northern Akwesasne. I spent the first part of my life in *Kana:takon* (St. Regis) District exploring the river's edge and the various ecologies emanating from *Rakosai* Point. My earliest memories and passion for learning and discovery emerged from my childhood home as I put on my best rubber or cowboy boots to set off on a journey to find new creatures. I was always outside under the watchful eye (sometime not so much) of my father's, Abraham Leo Francis', family.

My intellectual journey did not begin in academia. It started at kitchen tables and in church pews, as I followed my mother, Kathy Herne, all over Akwesasne visiting elders and attending church. My mother has a long history of connection to the Catholic Church through her own singing as part of the Akwesasne Mohawk Choir and at funerals. I have so many memories of sitting in the church pews while my mother played the organ and an older *Akwesasronon* (Akwesasne Community Member) women taught me to read the *Kanienkeha* (Mohawk Language) hymns. She is a powerful source of knowledge and connections through the numerous relationships across the community. I can always count on her to know about a person and their family within Akwesasne. I have always been an inquisitive person and sought the answer to complex questions, which my mother helped foster through deep and thoughtful questions as well as discussions. She imbued me with a thirst for knowledge that I still carry with me today.

I did not grow up in the longhouse learning my people's history and knowledge about relationships with our history and land. In high school, I did not understand that Indigenous people were still thriving and drawing on the power embedded in their cultural knowledge and relationships, but Harriet and John Boots took the time to educate me about the *Kaianerekowa* (Great Law) over a long lunch at

Jreck's Subs. I continued my exploration of my people's knowledge during my undergraduate education at Cornell University. I learned the power and support embedded in my people's knowledge through my struggles to remain present and motivated. My first independent research project was guided by Professor Jane Mt.Pleasant and explored *Akwesasronon* Traditional Medicines. This research project taught me about the determination of my people to hold on to their knowledge when everything around them told them to let it go. I do not think this discussion about my connection to my community's cultural knowledge can happen without acknowledging and celebrating my experiences with *Ohero:kon* (Under the Husk/Coming of Age Ceremony). I remember seeing and being in awe of this group of brilliant *Akwesasronon* engaged in empowering our youth through a coming of age ceremony. These youth were guided by and gained access to cultural knowledge holders, and fasted in connection with the land. I learned so much from the youth and the various supporters of this powerful movement that has resounding impacts across Akwesasne as well as within myself. *Ohero:kon* served as an access point for me to enter into ceremony - previously I felt like I did not have a right to be in ceremony with my people because I grew up in the church and not the longhouse. They created an open and inviting space for me to learn, help, and support the youth and provided me with knowledge about my cultural connection to them. I am thankful for all the people that helped me gain access to this tradition and taught me about my community's cultural knowledge and associated relationship.

I received my B.S. in Biological Science from Cornell University in 2014. In the same year, I would begin working for my community and learn about the labor of love behind community engagement. My first position was as community health representative for the Mohawk Council of Akwesasne (MCA). This position taught me about my passion to educate and engage my community through coordinating events

and awareness campaigns. I would move on from this position to become a Prevention/Intervention Coordinator, which gave me the freedom to develop information, programming, marketing, and strategic collaborations around creating safe spaces for LGBTQ+ youth in Akwesasne. My passion for this project emerged from my own understanding of my two-spirit identity as well as being *Akwesasronon*, which was impacted by the ways that colonialism had imposed gender and sexuality norms on my people. I think this was my first experience invoking my culture in my work, and would carry this insight into my final position in Akwesasne before coming to graduate school. I worked as an Environmental Project Coordinator that was responsible for coordinating research and assessing minnow populations in Akwesasne due to community concerns of population decline. I believe this research was extremely important to my graduate studies because I was mentored by amazing Haudenosaunee researchers and professionals. These knowledge providers helped see the ways I could do holistic research grounded in our biocultural context and understand the ways that environmental violence impacted our people. I carried this passion into my graduate studies, which helped me expand my knowledge and utilize new tools for analysis.

These chapters explore the complex connectivity of kinship networks and knowledge systems that aid in the conceptualization of "Indigenous Forest Stewardship" within the context specificity of Akwesasne. I was delighted to be a student, researcher, and community member throughout this project, which opened avenues of connection to cultural knowledge sharing and understanding. I am so incredibly thankful to all the *Akwesasronon* that shared their time and thoughts to make this project a reality. This body of work is the culmination of many hours of labor and deep contemplation, which I hope my community can utilize to empower

themselves and future generations that are to come and appropriately own this knowledge as part of their birthright.

The concept of forest stewardship is explored as it relates to Indigenous People. This requires traversing various terminology as it related to Indigenous People and forest stewardship. Stewardship as a term is helpful and more representative of relationships between Indigenous People and the land, which is not about hierarchal relationships and is instead grounded in caring for one another. The literature review was means of exploration, lesson learning, and conceptualization of "Indigenous Forest Stewardship," which is the basis of **Chapter 1**. Throughout the review, I was concerned with representation and proper engagement with Indigenous Peoples represented in global and local mechanisms. Additionally, a consistent emphasis on context specificity was highlighted throughout the discussion of "Indigenous Forest Stewardship" about the ways that Indigenous People should be engaged and understood. The idea of context specificity is used to emphasize the political and environmental histories that have implication for forest stewardship as well as the biocultural context. It reveals values about a variety of knowledge, and relationships with the land. Furthermore, this literature review suggests that "Indigenous Forest Stewardship" needs to reflect the diversity of Indigenous People in the world. Therefore, "Indigenous Forest Stewardship" requires different approaches that properly acknowledge and integrate Indigenous Peoples through their knowledges, kinship networks, and values, which are all intimately interwoven and land-based.

"Indigenous Forest Stewardship" helps situate the research conducted throughout the summer of 2017. The research sought to answer one multi-layered question: What is important about the forest to *Akwesasronon*? I have contemplated this question with many different people from my community throughout my research journey through a Collaborative Gathering and semi-structured interviews in

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Akwesasne. This question was useful in helping create a snapshot of *Akwesasronon* values, which I use to inform forest stewardship strategies that meet the community's biocultural needs on Newly Settled and Future Land Claims. The results of the interviews are discussed in **Chapter 2** and convey the complexly interconnected values network, which were explored using a network analysis. The network analysis helped uncover the concept within Akwesasne culture that "everything is connected" through engaging the moments where values within interviews intersect with each other. The results revealed that Akwesasronon knowledge and kinship systems are firmly embedded in the land, which is informative to forest stewardship strategies. Specific mechanisms of knowledge sharing, and species were apparent and became an important component of forest stewardship strategies.

These two chapters complement each other in their presentation within this thesis. Chapter 1 conceptualizes "Indigenous Forest Stewardship" and the ways it fits into the context specificity of Indigenous Communities. Chapter 2 utilizes the guidance and takes direction from Chapter 1 to help in conceptualizing a context specific exploration of *Akwesasronon* relationships with the land. Further, the combination of the two chapters are used to generate a biocultural forest stewardship strategy for Akwesasne, which I hope will help promote better management and relationships between *Akwesasronon* and forest landscapes. This research would not have been possible without the support of my community and the relationships I built throughout my career and volunteer experiences as well as my personal familial connection within Akwesasne.

CHAPTER 1

CONCEPTUALIZING "INDIGENOUS FOREST STEWARDSHIP" THROUGH

CONTEXT SPECIFICTY

Introduction

      Indigenous People's involvement in discussions and decisions that affect their representation has been limited. Indigenous people have been treated as a *problem* to be addressed rather than meaningfully engaged through understanding their unique context. Context specificity in this literature review speaks to the particular Indigenous Peoples' political and environmental history with settler- and post-colonial-states. Additionally, the use of context specificity is meant to bring light to the diversity of Indigenous Peoples and biocultural contexts, which reveal their values, knowledges, and relationships with land. Karim-Aly Kassam (2009, p. 48) provides insight into relationship between Indigenous Peoples and their biocultural connection to land within his book, "Biocultural Diversity and Indigenous Ways of Knowing: Human Ecology in the Arctic;" he states, "The roles of cultural and social processes as conceptually independent, but mutually interdependent, yields interesting insights into the complex connectivity that compromise relations with biological foundations." Forest stewardship, as an approach to environmental management, focuses on the connection between people and land (Sayre et al., 2013). The use of forest stewardship is potentially beneficial to Indigenous Communities as they have a framework of reciprocal relationships with the land. Indigenous peoples' cultures emerge from the landscape, which is affected by their cultural practices. The literature pertaining to the concept of 'Indigenous forest stewardship' varies from stewardship to co-management and varies in the ways that the term 'Indigenous,' is used and described. This review seeks to describe the different kinds of forest stewardship that operate on global and local levels as well as demonstrating varying levels of engagement (i.e. transactional

or participatory) with Indigenous Peoples. "Indigenous Forest Stewardship" should be reflective of Indigenous Peoples' context specific relationships with land, such as their location, history, cultural identity, and practices.

The term 'Indigenous' is an umbrella-term with diverse meanings and applications that vary across imposed settler- and post-colonial-state boundaries. The term on a global level for Indigenous People works to build community between different Indigenous Communities around the world. The use of 'Indigenous" as a community builder within this literature review is inspired by the term 'Two-Spirit' which is an umbrella term used by some Indigenous North Americans to describe gender-variant individuals (i.e. lesbian, gay, transgender, and gender-nonconforming) to connect with each other across cultural boundaries, but is not meant to replace context specific cultural relationships such as languages and spiritual roles (Medicine, 2002). 'Indigenous' confronts similar challenges as 'Two-Spirit' because it does not convey the context specificity of the Indigenous Peoples discussed as well as can be limiting and susceptible to hasty generalizations. Umbrella-terms are useful for community building but are unable to represent the diversity present among communities around the world, which emerge from their biocultural relationship with the land. Further, this literature review will make it apparent that there are diverse terms employed which are reflective of relationships between Indigenous Communities and their respective settler- and post-colonial-states, such as "Tribes", "Aboriginals", "Indians", "First Nations", and "Native American". The relationships are layered in histories of genocide, displacement, assimilation, and various forms of discrimination that have produced both racialized and politicized identities. There are implications for the conceptualization of "Indigenous Forest Stewardship" when situated within Indigenous Peoples' context specificity.

To adequately characterize forest stewardship in Indigenous communities, it is necessary to understand the various expressions of 'Indigenous' and 'Stewardship', such as Aboriginal Forest Stewardship, Tribal Forest Stewardship, Indigenous Forest Management, Aboriginal Forest Management, Tribal Forest Management and Tribal Forest Co-Management. At the global level, attention is given to two mechanisms used to regulate forest stewardship, namely the Forest Stewardship Council (FSC) and United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD). These global organizations are directly linked back to the Earth Summit held in Rio de Janeiro on 1 June 1992. Two major international treaties, Framework Convention on Climate Change (UNFCCC) and Convention on Biological Diversity, were established along with a broad statement of principles for protecting forests (Fletcher, Library of, United Nations Conference on, & Development, 1992). In local level engagements, mechanisms to connect with Indigenous communities in Forest Stewardship include community forestry, payment for ecosystem services (PES), and agroforestry. These are important tools for "Indigenous Forest Stewardship," but require attention to the context specific relationships of Indigenous Communities.

Indigenous Communities have worked diligently to have their voices heard and acknowledged throughout their history. "Indigenous Forest Stewardship" presents a discussion around the dimension of Indigenous Peoples' relationships with the land that are necessary to understand for enactment of successful forest management. Additionally, "Indigenous Forest Stewardship" seeks to explore the dimension of a respectful partnership between Indigenous and non-Indigenous Peoples. Indigenous people have confronted various barriers to have access to as well as the ability to manage their lands that is reflective of their relationship. "Indigenous Forest Stewardship" can help facilitate the necessary tools, approaches, and partnerships that

can help Indigenous Peoples' cultural continuity and contribute to the management of valuable forest resources that meet their needs in culturally sensitive manner.

Indigenous

For centuries, Indigenous Peoples have fought for recognition due to the precedent set by the Doctrine of Discovery or the Papal Bull "Inter Caetera," issued by Pope Alexander XI in 1493, which gave Christian Rulers the right to "discover" and exploit lands not inhabited by Christians. Effectively, it relegated Indigenous People as non-human (R. J. Miller, Ruru, Behrendt, & Lindberg, 2010). Linda Tuhiwai Smith states, "Colonized peoples have been compelled to define what it means to be human because there is a deep understanding of what it has meant to be considered not fully human, to be *savage*" (Smith, 2013, p. 27). The categorization of Indigenous People as non-human has led to their exploitation and disposition of their lands. However, there was no global platform available to Indigenous People to hold imperial- and settler-states accountable for their actions. In the 1920s, Deskaheh, hereditary chief of the Cayuga, and a delegation of Indigenous nations journeyed to address the League of Nations in Geneva but was not given an audience (Anaya & Anaya, 2004). Their journey could be perceived as unsuccessful due to the delegation's inability to speak at the League of Nations. Nonetheless, through the lengths taken by the delegation to have their voices heard, successful or not, is a clear demonstration of Indigenous Peoples' resistance and resilience. Furthermore, it shows the unwillingness of imperial- and settler-states to engage Indigenous Peoples at that time and even today.

The term 'Indigenous' would not emerge on a global platform until 1957 at the International Labour Organization Convention (ILO) Convention (No. 107), which was concerned with addressing the "indigenous and other tribal and semi-tribal populations independent countries." There was concern around the protection and integration of these communities, due to their "lagging" development, which created

an accompanying ILO Recommendation (No. 104) with 11 provisions (Niezen, 2003). The importance of this moment represents the changing terminology, which was previously regarded exclusive to ecological sciences. But now it referred to a human community. Linking Indigenous Peoples to their ecological context. Additionally, it provided a set of recommendations for engagements with Indigenous People that recognized them as unique peoples with needs and concerns. This provided a rallying call for Indigenous people around the world to have their voices heard together and would provide the impetus for more work concerning Indigenous Peoples' rights.

Indigenous People did not find success in engaging the League of Nations, but would be more successful with its second iteration, the United Nations (UN). Following the lead of the ILO, the UN was unable to resist the push of Indigenous People to be heard and devoted commissions and research to address the topic. As part of the Commission on Human Rights' Sub-Commission on the Prevention of Discrimination and Protection of Minorities in their Thirty-fourth session, it was proposed to conduct a "Study of the Problem of Discrimination Against Indigenous Populations" also known as the Cobo Report (Cobo, 1981). This study was a powerful means of engaging and addressing the diversity of relationships present between Indigenous people and their settler- and post-colonial-states. Further, it provided a detailed resource and account of these experiences and relationships. Additionally, it provided a comprehensive discussion around the definition of the term 'Indigenous,' which was built around information provided by different States, Non-Governmental Organizations (NGOs), and Indigenous Communities. The information was organized into 12 dimensions:

(1) Ancestry
(2) Culture
(3) Language
(4) Group Consciousness
(5) The Multiple Criterion (A combination of other individual criteria)
(6) Acceptance by the Indigenous Community

(7) Residence in Certain Parts of the Country
(8) Legal Definition
(9) Change in Status from Indigenous to Non-Indigenous
(10) Change in Status from Non-Indigenous to Indigenous
(11) Registration and Certification
(12) The Authority Which Decides Whether a Person Is or Is Not Indigenous
(Cobo, 1982)

This was not the first attempt at defining 'Indigenous' identity around the world, which was attempted by individual states. However, the Cobo Report appears to be the first examination of the various criteria utilized by those individual states. It served as a starting point, or working definition, for the discussion around the complexity of engaging Indigenous Peoples' identity at a global level. However, this report is only the beginning of continuing discussion around Indigenous Peoples' identity and rights, which also occurs within Indigenous Communities.

The Cobo Report was a powerful means of connecting with the complexity of issues that affected Indigenous Communities on a global scale. It provided guidance for next steps to engage with and respect Indigenous Communities. In particular, it made a recommendation for the establishment of a Working Group on Indigenous Populations for their rights (Cobo, 1983). The study presented a clear need for more work regarding Indigenous Peoples' rights. The efforts of the working group over 3 decades resulted in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), which was adopted by the UN in September 2007 and contained 46 articles outlining the rights of Indigenous People (Nations, 2007). The actual impact of the UNDRIP on the lives of Indigenous Peoples and their relationships with their respective settler- and post-colonial-states is debatable, but it is a moment to be celebrated. This declaration was almost a hundred years in the making and would not have been possible without the resilience and persistence of Indigenous Peoples to be heard on a global platform. The UNDRIP was a means of affirming Indigenous Peoples' identity on a global level as well as affirming that "indigenous peoples are

equal to all other peoples" (U. Nations, 2007, p. 2). The affirming of Indigenous Peoples as "*peoples*" helped shift discussions around and recognition of their rights and needs, which is important for the successful implementation of forest stewardship within Indigenous Communities.

There is no global definition or description of 'Indigenous.' In 2004, prior to the adoption of the UNDRIP, a workshop on "Data Collection and Disaggregation for Indigenous Peoples" concluded that a formal universal definition of the term "Indigenous Peoples" is unnecessary and the Cobo Study's conceptualization could be used for practical purposes of understanding the term (*The Concept of Indigenous People*, 2004, January 19 - 21). This working group's conclusions speak to the fluidity and context specificity of the term "Indigenous Peoples." This is a valuable aspect because it has the potential to aid Indigenous Peoples that were displaced from their land and stripped of their culture and language through assimilation. Thus, there is a space for resurgence by groups that suffered greatly in the wave of colonization. The communities can work diligently to reclaim their relationships with land, which can be manifested in forest stewardship. Furthermore, the fluid definition of "Indigenous Peoples" makes their identity less susceptible to exploitation by settler- and post-colonial-states. The fluid definition complemented by context specificity further stresses the diversity of Indigenous People and the need for diverse approaches to forest stewardship.

The fluidity of expression in defining 'Indigenous Peoples' is valuable. However, this literature review proposes a deeper engagement with context specificities of different Indigenous People around the world to be manifested through forest stewardship. This aspect of the discussion is strongly influenced by a A'aninin (a.k.a. Gros Ventre) author, Dr. Carol Warrior. In her dissertation, "Baring the Windigo's Teeth: Fearsome Figures in Native American Narratives," she attempts to

use the name of a tribe, nation, or people when engaging Indigenous Peoples whenever possible (Warrior, 2015). This is an important consideration to be made for Indigenous People because their relationships with the land are specific. For example, the Haudenosaunee stories, teachings, ceremonies, language, and relationships with land revolve around their traditional northeastern territorial expanse, which may not relevant in other ecological landscapes. Thus, there are values, knowledge, and traditions that cannot be reflected in such a large category as 'Indigenous People.' Being specific about their identity is not only a means of respecting them through research collaborations, but it creates a meaningful environment for more effective forest stewardship strategies.

Forest Stewardship Council (FSC)

The FSC is an organization that seeks to aid in the conservation of forests around the world. The organization was established following the failure of the 1992 Earth Summit in Rio to reach an agreement on stopping forest loss. In 1993, a group of businesses, environmentalists, and community leaders came together at the first General Assembly in Toronto where they developed a market-based approach to improve forest management practice (Council, 2018). This organization was not satisfied with previous attempts to regulate and address deforestation, so it was decided that a capitalistic approach could be more effective. This was a means of incentivizing better forest management practices by communities and connecting them with the global market. The Purepecha, Indigenous forest community in Nuevo San Juan, Mexico, worked with researchers to map natural resources and identify potential opportunities for economic activities. The results of the study were utilized by the community to obtain green certification (Smart Wood) by the FSC (Bocco, Velázquez, & Siebe, 2005). The successful certification gave the Purepecha access to the global economy and represents an empowerment mechanism for the community through their

forest stewardship. The FSC certification was a facilitator for the Purepecha community to access a global market, which is an opportunity for the community to support themselves that would not have been possible without certification.

However, the FSC has come under criticism for their approaches at the local level in different parts of the world. In northern Sweden, northern Finland, and three regions in northwest Russia, it was revealed that certification was not considerate of the national infrastructure and market characteristics because there was dissatisfaction Sami, local reindeer herders, (Sweden and Finland) as well as lack of enforcement (Russia) (Keskitalo et al., 2009). This important critique is potentially connected to the limitations of a global organization when attempting to meet the needs of local Indigenous Communities. Furthermore, it could be an indication that the FSC should devote more attention to the context specificity in which their certifications are enacted. Through the use of an equity framework, the FSC was shown to have a strong commitment to empowering non-producers through the applications of global and regional standards to prevent industry practices from negatively impacting the environment, Indigenous Peoples' rights, and to a lesser degree, workers and local communities; however, it was noted that the global distribution of certifications tends to reflect existing inequalities in trade with Northern dominance in industrial wood production and global trade (McDermott, 2013). The findings appear contradictory to the FSC's commitment regarding local voices and concerns. The FCS's market-based approaches should be adjusted to prioritize the cultural needs and values of Indigenous Communities in forest management rather than the needs of the global economy. Markets have the potential to empower Indigenous Communities, but they need to be sensitive to Indigenous Communities ability access to forest resources for cultural practices. Current research showed that Indigenous Communities struggled to resolve conflict with forest industry in Chile as well as lost certification in Papua New Guinea

due to their inability to adhere to FSC principles (Scudder, Herbohn, & Baynes, 2018; Tricallotis, Gunningham, & Kanowski, 2018). These results speak to the need for the FSC to shift their approaches in engaging Indigenous Communities, so their voices and concerns are respectfully acknowledged and addressed. The FSC could benefit from a more nuanced and pragmatic method to addressing the context specificity of Indigenous Communities to anticipate potential problems leading to social conflict or the of loss certification. Furthermore, careful attention to context may help in fulfill their commitment to supporting the rights of Indigenous People and with greater distribution of benefits.

United Nations

The UNFCCC, signed at the Earth Summit in 1992, laid the framework for the Conference of Parties, which in 2007 would create the Bali Action Plan. As part of this Plan, an Ad Hoc working group was formed to address reducing emissions from deforestation and forest degradation in developing countries, which would later become known as the UN-REDD (Levin, McDermott, & Cashore, 2008). The way UN-REDD approaches forest management is market-based, similarly to FSC, and recognizes the importance of forests in the sequestration of carbon from the atmosphere. Thus, forests are recognized by the UN-REDD as a priority for conservation through management practices. The UN-REDD and their market-based approaches have been shown to disproportionately serve powerful players and raises concern around the uncertainty in protecting Indigenous People and sustainable community development (Okereke & Dooley, 2010). The issue of market-based approaches is not inherently disruptive to Indigenous Peoples and their cultural practices. However, the market-based approaches need to shift their focus away supporting powerful players and towards valuing the forest resources that Indigenous People need. The UN-REDD and other global mechanism of forest management, such

as FSC, need to negotiate and evaluate forested resources with Indigenous Communities, so their relationships with land are maintained and not unintentionally obstructed or eroded. The UN-REDD Advance Negotiating Text includes references to the rights of Indigenous People, but there is concern about implementation of rights within tropical rainforest countries and requires a more detailed legal analysis of transparency norms, legal standing, and access to decision-making (Lyster, 2011). Additionally, an analysis of UN-REDD development, 2004 to 2011, revealed that there is struggle present around the definition and scope of UN-REDD+, the use of markets and funds, and the measures for social and environmental protection (Den Besten, Arts, & Verkooijen, 2014). This research supports the need for more context specific investigations into the implementation of strategies and transparency within UN-REDD. The rights of Indigenous people are complex, varying from nation to nation, and are reflective of historical and contemporary relationships, which could be barriers to successful implementation. The UN-REDD needs to be clear in their engagement and support of Indigenous Peoples' rights because overlooking the details can have severe implications for cultural integrity and livelihoods of communities. Furthermore, the enactment of UN-REDD within smaller Indigenous Communities with control over smaller forested landscapes may not be feasible due to the lack ability to meet the needs of a global market.

The limitations of UN-REDD policies in their engagement with Indigenous Peoples appears to revolve around their lack of attention to the context specificity and their prioritization of powerful actors in global markets. Therefore, there needs to be a shift in their approach. In an incendiary critique of UN-REDD, Brockhause et al. (2014) suggests that narratives need to move beyond the international debates of social justice (i.e. including Indigenous People's voices) towards domestic governance structures, which requires the gathering of powerful policy actors from various sectors

that enable deforestation and forest degradation. Their critique of its apparent limitation provides an important statement about the context specific relationships that occur at local levels where UN-REDD policies are enacted and serve as barriers to success. However, the removal of social justice from the conversation is a dangerous move for Indigenous People, who typically do not have a voice present among the powerful policy actors. The incorporation of social justice into conversation provides an interesting space for discussion around the need to challenge deeply rooted institutional structures that enable the continued degradation of forest resources and marginalization of Indigenous peoples' voices. The dangers of not engaging Indigenous Peoples was made apparent in a case study on UN-REDD policies implemented in Vietnam, which demonstrated an exacerbation of pre-existing conflict between the K'ho, a hilltribe, and the Forest Management Board over the right to govern and manage forest resources (Hoang, Satyal, & Corbera, 2018). The UN-REDD failed to implement successful forest management policies that were inclusive of the various social groups' voices within the context specificity of the post-colonial-state of Vietnam. The main weakness of the policies was the lack of mechanisms to address entrenched conflict between social groups. Furthermore, this failure exposes a lack of due diligence on the part of the UN-REDD because the struggles of Indigenous People do not occur within a vacuum of nation-state boundaries and are well documented by different Non-Governmental Organizations (NGO). For example, the International Work Group for Indigenous Affairs has issued yearly reports since 1968 and are now readily available online (Affairs, 2019).

Globalization

The need for international mechanisms of influence is a byproduct of globalization, which is manifested politically, socially, and economically. Globalization presents challenges for local and Indigenous communities around the

world that depend on the availability of resources for their health and the continuity of their land-based knowledge. For example, globalization of herbal medicines pushed many of Nepal's medicinal plants to near extinction, which are inseparably connected to local livelihoods and health (Kunwar et al. (2013). Access to a global market may not be the best solution for Indigenous Communities because the impacts on their traditional resources, such as medicinal plants, could be unsustainable. The loss of species from the landscape can have ripple effects across Indigenous Communities' relationships with land (i.e. health and livelihoods) as well as the ability of communities to care for themselves in a sustainable manner. A potential bridge between local and global forest management is ecotourism if correctly enacted with Indigenous Communities. Barkin and Bouchez (2002) provide a comprehensive analysis of the negative impacts from a mega-tourist project development in Oaxaca, Mexico, on local Indigenous Peoples and the role of an NGO, the Centre for Ecological Support, in addressing the issue. The researchers noted the importance of the local NGO in facilitating a community-directed regional resource management strategy that sought to empower the local Indigenous Peoples by channeling the economic benefits of ecotourism and drawing on the community's knowledge and strong communal organizations to support resource management activities. Ecotourism is a potentially beneficial option, but it must support equitable and conscious distribution of benefits in order to be successful. Indigenous Communities are important actors in ecotourism due to their knowledge of and relationships with each other and the land, which can help in resource management. In Langong Hill, Kenya, ecotourism appeared to support environmentally responsible behavior, but it was missing outreach and engagement with the Indigenous People, the Orang Asli, residing within the forest reserve (Er, 2010). Ecotourism in Langong Hill appears to focus on the distribution of fiscal benefits from ecotourism, which can benefit

Indigenous Communities. However, ecotourism in Langong Hill failed to adequately acknowledge the deeper issues and ramifications for the Orang Asli in terms of benefits from ecotourism beyond monetary gains and engaging their concerns and rights. This case presents a warning for the enactment of ecotourism in other contexts, as such fiscally focused actions have the potential to displace Indigenous People from the land in efforts to promote economic growth.

Joint Forest Management

The local level of engagement is potentially a more effective collaborative approach for Indigenous forest stewardship. Joint Forest Management (JFM) was a strategy for forest conservation in India that grew out of their New National Forest Policy in 1988 and shifted state recognition of the connection between forest health and the health of forest-dependent Indigenous Communities but it did not shift land ownership (Sarin, 1995). This shift in Indian politics was a positive move to recognize the relationships present between Indigenous Communities and the forests. However, the lack of land ownership places a barrier on their ability to engage in forest management on their own terms. In a comparative study between JFM and Regional Forest Agreements in Australia, JFMs were shown to have a substantive democratic process for addressing issues with public forests and accommodating the needs of Indigenous groups through collaborative decision-making and distributive outcomes (Rangan & Lane, 2001). Commitment to a process of engagement is essential to the maintenance of relationships between Indigenous People and Indian states. There may not be the transfer of property to Indigenous Communities, but there are actions being taken to accommodate the needs of these communities. JFM is manifested in various ways through local organizations, such as Non-Governmental People's Organization (NGPO), Government-Engineered People's Organization (GEPO), and Indigenous Participatory Strategy (TMR – Traditional Management Regime); Sekher (2001)

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expressed that TMRs have better community engagement, but warns about the possible resource abuses resulting from a breakdown in the collective decision-making process. Indigenous Communities are more actively involved when TMRs are engaged, which leads to more sustainable practices of forest resource management. However, there appears to be fear of giving power to Indigenous Communities, which could be steeped in discriminatory assumptions. Furthermore, JFM appears to be a good strategy for conserving forest resources, but it is critiqued for its cookie-cutter approach, lack of mutual accountability between communities and the Forest Department (FD), overinvolvement of the FD, lack of management objectives in decision-making, and the target-driven approach of FD (Conroy, Mishra, & Rai, 2002). As such, there still appears to be an imbalance of power existing in the framework of JFMs as well as a lack of context specificity. Indigenous Communities need to be meaningfully engaged so that there is a balanced distribution of power and input. Furthermore, the inclusion of the context specific knowledge and relationships of Indigenous Communities, varying across landscapes, could provide more successful forest management outcomes.

Community Forests

Community forests provide a local approach to forest stewardship that centers control within Indigenous Communities. Nepal passed legislation in 1978 enabling government forests to be transferred to villages for protection and management, which evidence suggested were improving (Bartlett, 1992). Thus, the forest user groups were able to utilize and manage forest to meet their specific needs. Additionally, the improvements acknowledged showed progress through the decentralizing of forest management. In contrast, Chinese government policy changes in the 1960s disrupted traditional forest management of the Jinuo community through shifting to more national approaches, which did not help preserve biodiversity or develop better

forestry practices (C. L. Long & Zhou, 2001). This example shows the damaging effects of disrupting the traditional practices of Indigenous People, which were informed by centuries of traditional relationships with the forests built into their social framework. The practices of Indigenous People can be threatened by interests to centralize power over resource management into larger national interest and can have negative impacts for forests. Furthermore, the barriers confronted by Indigenous People are strongly influenced by the power structures around them. The Karen, a hilltribe, of Thailand utilized the Community Forests movement to secure resource rights and substantive citizenship rights - the very rights denied to the Karen by lowland people (or dominant social group in Thailand) and the forestry department, which criminalized them as the source of deforestation (Vandergeest, 2003). Community forests have the potential to produce social shifts through effective enactment of forest stewardship by Karen. However, the irony of the situation presented in Thailand demonstrates the dangers that Indigenous People face through the scapegoating by society at large, which were unsubstantiated and reflect social relationships of power. Nhem et al. (2018) characterized income inequality as composed of three dimensions (agriculture, forest related resource, and self-employment and wages), which resulted in a recommendation for policy makers to consider supporting community forestry and protected areas by integrating them with PES. Community forests can be a powerful mechanism for empowerment and support around forest stewardship when integrated with PES. Different approaches to managing forests can be incentivized with PES within Indigenous Communities to offset dependence on forest resources. Furthermore, the community forests are beneficial to Indigenous Communities through their ability to help with food security and access to forest resources.

Payment for Ecosystem Services

PES is a local approach to forest stewardship that has the potential to engage and empower Indigenous Communities. A Chinantec community in Oaxaca, Mexico, implemented a PES in the form of formal Voluntary Conserved Areas, which affected their food security and created dependence on external food supplies due to limited access to ancestral agricultural land and reduction of hunting. Displacement of Indigenous People in PES approaches should be considered because it can potentially cause losses of agrobiodiversity, dietary diversity, hunting skills, and associated environmental knowledge (Ibarra et al., 2011). The Chinantec's involvement in PES was an attempt to help the community offset their losses that resulted from lack of access to forest resources. However, the situation revealed the more severe implications that can result without a comprehensive understanding of the relationships Indigenous people have with the land. In China's Wolong Nature Reserve, a spatial explicit agent-based model was created to evaluate human and natural interactions under different policy scenarios. The model showed the potential of PES to increase forest cover area by offsetting the energy needs (i.e. firewood) of Indigenous People accessed within the nature reserve. However, the results could not account for the behavior of newly formed households if they are not included in the payment scheme (Chen, Viña, Shortridge, An, & Liu, 2014). The results of the model are hopeful that PES can increase forest cover and could be a sign of the viability in Indigenous Communities. However, a flaw in the model is the assumption that the Indigenous Communities only rely on forests for firewood. Indigenous Communities relationship with forests are more complex than is accommodated by the model. Therefore, there is a need for the creation of more sophisticated models that assess PES to meet the needs of Indigenous Communities, such as foods, medicines, and other nontimber forest products.

PES have the potential to be successful in increasing conserved forest, but there are context specific (political and environmental history, and biocultural context) considerations that need to be thoroughly engaged and explored in relationship to Indigenous Communities. The Peruvian Ministry of Environment launched a PES program in 2010, which Boerner, Wunder, and Giudice (2016) in their ex-ante assessment showed important tradeoffs in hypothetical cost-effectiveness, poverty alleviation and equity outcomes suggesting adjustments to the strategy for improved cost-effectiveness and equity outcomes. The engagement with equity outcomes is enticing, as they are indicative of the potential for incorporation of the cultural implications on Indigenous People and their relationship with forests. This would require a deeper understanding of the context specificity of different communities, but it could anticipate the hypothetical outcomes and outline potential for adaptations. Denham (2017), in an analysis of PES in the Mexican Cloud Forest, notes the attention to Indigenous sovereignty and self-determination in such a successful program and points out the need for a paradigm shift in understanding relationships present between Indigenous Communities and poverty that is not grounded in shortcoming, but in contributions to public good. Sovereignty and self-determination can and should be supported in forest management, which can aid in the success of PES programs. The engagement with these dimensions is an empowerment tool and a mechanism to affirm Indigenous Peoples' rights. Further, the reconceptualization of poverty in Indigenous Communities is an important shift towards recognizing the valuable knowledge and resources, which can be used in forest stewardship.

Agroforestry

Agroforestry is another local approach to forest stewardship that shows promise at the community level within Indigenous Communities as knowledge production systems and cultural connection to forest are captured within this context.

Agroforestry contributes to food sovereignty, while enabling communities to maintain cultural practices. Early research on Indigenous agricultural practices in relationship with forests or agroforestry were not perceived as a full domestication process, rather, Indigenous Communities showed elaborate processes that translated selected trees and even whole forest structures from the sphere of 'nature' to that of 'agriculture' (Michon & De Foresta, 1997). The acknowledgment of Indigenous Communities' engagement in agroforestry is important because it shows respect for their knowledge of the land. Indigenous Communities were not passive recipients of environmental resources, but active participants in the shaping of forest landscapes. As such, it is not a taming of the wild 'nature,' but the building of a relationship with the land that is reciprocal.

Agroforestry can contribute to the empowerment of Indigenous Communities at the local scale. However, it needs to engage the community in their context specificity with the land. Agroforestry needs to center Indigenous Communities in conversations about planning, implementation, and the reaping of benefits with a focus on the impact of sustainability of food sources, energy, and environmental management (A. J. Long & Nair, 1999). This could provide a means for successful engagement of Indigenous Communities in agroforestry as a means for forest stewardship. However, this engagement needs to be taken a step further to engage the biocultural relationship present between the land and Indigenous Communities. The agroforestry practices present in Indigenous Communities demonstrate resistance against colonialism and an effort to maintain traditional knowledge. There is potential for increased productivity for community food security and access to markets (R. P. Miller & Nair, 2006), but the ability of the ecosystem to provide food for communities and resources for markets may be susceptible to climate change (Hanif et al., 2018). The acknowledgement of the ecosystems susceptibility to climate change is a

statement to the importance of Indigenous Communities' agroforestry practices in the past, present, and future. The communities would not hold on to the knowledge so strongly if it did not aid in supporting their community needs. In Malaysia, the practices of Orang Asli communities showed different lands made available for agroforestry, forest-gardens and home-gardens, which are sustainable, contribute to villagers' income, conserve agrobiodiversity, and increased food security (Keat, Nath, & Jose, 2018). The value of agroforestry appears to be an important mechanism for forest stewardship at the local level. Additionally, agroforestry serves as a source of food, potential means of income, and affirms the value of the Orang Asli's land-based knowledge.

Discussion of "Indigenous Forest Stewardship"

The conceptualization of "Indigenous Forest Stewardship" as an approach to forest management is a means to center Indigenous voices, concerns, and knowledge and maintain a connection between people and the land. Indigenous People need to be active participants in the creation of forest management approaches rather than an afterthought. Furthermore, "Indigenous Forest Stewardship" engages with Indigenous communities' values, relationships, and knowledge embedded in the land, which is clearly crucial as Indigenous Communities need the land for their cultural integrity and continuity. "Indigenous Forest Stewardship" has the potential to operate at global and local levels, but it requires the presence and engagement of Indigenous People. Historically, Indigenous voices were silenced or ignored, but Indigenous peoples' resistance and resilience launched their rights onto a global platform through the UNDRIP. "Indigenous Forest Stewardship" must embed this same spirit in its approaches that affirm the rights of Indigenous People to self-determine their future within the realm of forest management. This shift requires a dimension of

empowerment for Indigenous Communities through valuing their knowledge systems and relationship to land.

"Indigenous Forest Stewardship" requires a definition that encompasses the biocultural relationships of Indigenous Communities with the land. Sayre et al. (2013) provide a holistic approach in their notion of stewardship, as follows:

> **(1)** Encompasses all lands and waters: urban as well as rural; the open oceans as well as lakes, rivers, and coasts; and areas actively managed as well as those set aside from direct human exploitation
> **(2)** Includes people not only as variables affecting ecosystems but also as participants in those ecosystems and in the practice of science itself
> **(3)** Recognizes that social justice and environmental health are not separate or separable concerns, but are interconnected
> **(4)** Values diverse "ways of knowing", including Indigenous knowledge, about landscapes and natural resources
> **(5)** Embraces an ethical outlook to the practice of science.

This multidimensional definition of stewardship eliminates the lines that separate communities from the land. The land is a part of Indigenous Communities that is inextricably connected through relationships. Indigenous Communities require space to enact their relationships with the land, so their knowledge can continue to grow and adapt to changing circumstance, such as climate change. Furthermore, the conversation surrounding "Indigenous Forest Stewardship" needs to translate into context specific approaches that are reflective of Indigenous Communities' relationships and seek to break down barriers of resistance in all their forms, such as ability to access resources unmolested and ability to manage their land to meet their needs.

The literature reviewed was critical of the FSC and UN-REDD due to their dependence on markets and generalized engagement with Indigenous Communities. Markets are not incompatible with Indigenous Communities because they have traded goods and knowledge with each other and settlers for hundreds of years. Further, the FSC and UN-REDD are necessary regulators within global forest management and

have the power to protect and support Indigenous Peoples' rights, but a shift in perception and understanding of Indigenous Peoples' relationships with land is required. In an application of indices to commercial logging and subsistence use indices in Guyana, a majority of plants had higher subsistence value indices than logging, which could be used to inform UN-REDD policies (Shah & Cummings, 2018). This demonstrates the importance of use value to the community rather than the monetary value of logging for external markets. The UN-REDD could find stronger support from Indigenous Communities through approaching policies that properly engage Indigenous Peoples' context specific relationships with resources. The valuing of resource by Indigenous Communities may come into conflict with the market-based approaches of UN-REDD. However, a shift in evaluation of resources that are reflective of Indigenous Peoples' contexts could serve to aid in the continued support for Indigenous Peoples' rights and access to their resources. Additionally, Indigenous Communities can be powerful supporters of forest management and protection, which is part of their relationship with the land. Socio Bosque, a national government program in Ecuador, showed a successful storage of 5% of total biomass throughout the country and introduced economic incentives that reach the real conservation stewards, which in this case are Indigenous Communities (Kichwa, Shuar, Cofan, Sapara, Siona, Chachi, and Shiwiar) responsible for 71% of the protected forest area (De Koning et al., 2011). UN-REDD and FSC could take a lesson from the engagement that was present in Socio Bosque to increase efforts to engage Indigenous Communities for more effective and impactful forest management around the world.

Ecotourism has the potential to be harmful in Indigenous Communities if not implemented with an attention to Indigenous voices and concerns as well as the context specificity. In Oaxaca, Mexico, researchers analyzed the intersection of local context and PES implementation/outcomes which showed nine focal variables of the

characterization of the local context: "Forest cover", "Opportunity costs", "Livelihoods", "Trust and cooperation", "Motivations toward conservation", "Management practices", "Internal organization", "Land tenure", and "Rules for the management and use" (Rodríguez-Robayo & Merino-Pérez, 2018). This multidimensional characterization of the local context is helpful to understanding the context specificity of Indigenous Communities. The trust and cooperation, management practices, and land tenure were of particular interest due to the way they center a community in the research. Indigenous Communities have a lot to offer to forest conservation, which can manifest in the form of "Indigenous Forest Stewardship."

     "Indigenous Forest Stewardship" requires an attention to the history present between settler- and post-colonial-states and Indigenous Communities. The history includes complex rights, laws, and regulations that often serve as barriers for Indigenous Peoples' relationships with the land and each other. In the United States, there was a series of Acts and Laws passed that enabled Indigenous People to manage their forests, which were: Indian Forest Resources Management Act of 1990 asserting trust responsibilities towards Indian forest lands and the Tribal Self-Governance Law of 1994 supporting direct management privilege to tribal governments (Yazzie-Durglo, 1998). These laws were important to shift the management of forests back to Indigenous Communities in the United States. The succession of these laws culminated in the Tribal Self-Governance Law of 1994, which affirms Indigenous Communities' rights to manage their own forest lands. The shift in laws disrupted the power dynamic between Indigenous Communities and the United States, which allowed Indigenous Communities to steward their forests to meet the needs of their communities that meet their context and in a way that reflects their cultural needs. Ironically, the rights to resources were outlined in Indigenous Peoples' treaties signed

with the United States, which preceded the succession of laws. Long and Lake (2018) noted the United States has begun to recognize tribal rights to resources on public lands as well as the right to participate in management, but found many long-standing factors stemming from colonization that included legal and political barriers to accessibility; forest declines connected to lack of natural disturbances and Indigenous practices; competition with non-Indigenous People; invasive species; and degrading traditional ecological knowledge and relationships with the land. The longstanding factors are affecting both the health of the forest and their respective Indigenous Communities. Understanding the impact of the long-standing factors can help in the conceptualization of "Indigenous Forest Stewardship" through centering concerns of Indigenous Communities and their engagement with colonization.

There is potential for beneficial partnerships to form between Indigenous and non-Indigenous Peoples. However, the partnerships require substance behind the claims to engage Indigenous Communities, which can be accomplished through understanding social-ecological relationships present between the land, Indigenous Peoples, and Government agencies. In Canada, there was a shift to promote aboriginal participation in forestry (described as aboriginal forestry), but research noted that the models used are trying to integrate First Nations into established forestry models rather than creating new models that reflect aboriginal values, systems, and paradigms (Wyatt, 2008). There is a need for new models to capture the relationships of Indigenous Peoples with the land, which current models do not represent. This can only be accomplished through acknowledging, understanding, and incorporating the concerns and voices of Indigenous People. Additionally, the creation of new models and understanding of historical relationships between Indigenous peoples and settler-states could provide insight into the conceptualization of "Indigenous Forest Stewardship." It is through acknowledgement and engagement of the history that

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healing in Indigenous Communities can be accessed and relationships with settler- and post-colonial-states can move forward into potentially successful collaborations.

"Indigenous Forest Stewardship" can be empowered through collaborations grounded in respect that bring diverse minds together to address complex issues. There are a variety of methods available for successful collaborations to occur. In Canada, the Eastern Ontario Model Forest was a collaborative project that brought together local landowner values, native philosophies (*Kanienkehaka*), and scientific knowledge, but was grounded with three tools: Respect, Equity, and Empowerment, at the community level (Story & Lickers, 1997). This collaboration utilized a diverse collection of minds to address forestry in Canada and was grounded in Haudenosaunee principles. Further, the guidance provided was focused on breaking down power dynamics and uplifting people. The Nuwuvi's (Southern Paiute) have an important relationship with the Spring Mountain Landscape because it is the center of their creation story. They worked with US Forest Service and other partners to develop collaborative management events (e.g. whipping trees to dislodge pine cones, needles and other debris, and cleaning out dead underbrush and mistletoe) following Carpenter One, which were reflective of traditional practices and different Nuwuvi responsibilities to the landscape (Spoon, Arnold, Lefler, & Milton, 2015). The collaboration between US Forest Services and Nuwuvi produced a very effective collaboration by acknowledging the Nuwuvi practices and connection to the land. Additionally, this collaboration helped facilitate the Nuwuvi ability to fulfill their responsibilities to the land. A similar approach was taken by the Klamath Tribe who worked with the US Forest Service to develop a Master Stewardship Agreement for forested lands within their reservation and provided guidance for restoration activities that reflected their interests and responsibilities and helped with building capacity and expanding career opportunities (Hatcher et al., 2017). The power in this collaboration

lies in the ability of the Klamath to control implementation of a restoration project of their forested lands. The shift in power to Indigenous Communities achieves restoration of relationships with the forest that were historically displaced by institutionalized barriers. Dockry et al. (2017) were interested in the characteristics of successful partnerships with Indigenous Communities, which were found in the formal, informal, and personal relationships based on respect, trust, and mutual benefits. The elements described above demonstrate a removal of hierarchy and potential paternalism. Further, successful partnerships appear to be imbued with dimensions of familial expansion as people are engaging in a way that can create a space for a sincere relationship grounded in respect and support. The establishment of a healthy relationship with Indigenous Communities is a necessary part of collaboration in "Indigenous Forest Stewardship."

Another dimension of "Indigenous Forest Stewardship" is the incorporation of the context specific values framework of Indigenous Communities, which cannot be generalized. Values need to be understood and respected in their complex web of complex connectivity with the land. Research focused on the valuation of berry-harvesting by Gwich'in women in Fort McPherson, Canada, showed that the values of women to the land are not fixed in time and space and are fragile insofar as they depend on a healthy land because the absence of healthy resources can have implications for Gwich'in women, their families, and communities (Parlee & Berkes, 2005). The importance of acknowledging the flexibility of values of Gwitch'in women combats narratives of ossification and mystification of Indigenous people. Additionally, there is a clear connection present between the health of people and land, which are embedded in the value network. Similar valuing of land is seen in Australian Aboriginal Communities, as interviewees had feelings of spiritual or sentimental connection to forests in their homelands, which provides insight into

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disputes over natural resource management (Trigger & Mulcock, 2005). Drawing on those emotional and spiritual relationships can impact the way stewardship strategies are received by Indigenous Communities. A study in Northwest Ontario with four stakeholder groups (Aboriginal groups, Forest industry, Environmental NGOs, and Ontario Ministry of Natural Resources) sought to understand forest value preference, which showed that Aboriginal people considered spiritual value the most important value in relationship to environmental, recreational, economic services, and economic product values (Kumar & Kant, 2007). This result speaks to the intimacy of relationships with the forest that are beyond the physical. However, this approach could be problematic because it creates a hierarchy around values, which are connected to each other in a web of relationships with the land. Sapic, Runesson, and Smith (2009) found that Aboriginal values are holistic, represent their land use, and are seen as an expression of culture, spirituality, history and social conditions, rather than simply a location on a map. This connection to land conveys an emergent property of the Indigenous communities' relationship with the land, which the values identified reflect. Thus, "Indigenous Forest Stewardship" needs to be cognizant that changes on the land (i.e. deforestation, pollution, and other sources of environmental violence) can dramatically affect the well-being of the people and their cultural integrity.

There is a difference between Indigenous and non-Indigenous peoples' valuation of land and natural resources. The knowledge and kinship systems embedded in Indigenous worldviews extend familial relationships to the land. In New Zealand, interviews with environmental managers, Maori community members, and community project leaders showed that Maori emphasized "Cultural Stewardship and Use", while the non-Indigenous People emphasized "Ecological Integrity" (Lyver et al., 2016). This result demonstrates the distinctions in valuation of land between

Indigenous and non-Indigenous people. However, "Cultural Stewardship and Use" and "Ecological Integrity" are not mutually exclusive. There is a feedback loop that connects the health of the land with the ability of the culture to be maintained; they cannot be separated. Thus, "Indigenous Forest Stewardship" must employ an approach that provides some mechanism of conveying the valuation systems of Indigenous People to non-Indigenous People, which can help in collaborations and building relationships.

Traditional Ecological Knowledge (TEK) is the intimate knowledge that emerges out of relational networks that expand across generations and are grounded in cultural practice and tradition within a context specific ecology. In a quantitative analysis of plant community and soil ecology, the Lacandon TEK was shown to employ practices in planting and protecting plants that preserve soil carbon and increase soil nutrients for agriculture, and stewarding forests for the provision of seeds and animal refuge (Diemont & Martin, 2009). These relationships have been cultivated for hundreds of years and passed generation to generation, which is a powerful tool for food security, sovereignty, and forest conservation. This system helps Indigenous Communities to work in chorus with forests in a symbiotic relationship where the needs of both are met. In a review by Uprety et al. (2012) it was noted that there was a lack of research on traditional medicine usage by Indigenous communities in the western Boreal Forests of Canada, which indicated a need for the stewardship of these plant species and associated TEK. Traditional medicines are an important means of maintaining health in Indigenous Communities, as well as the TEK. The knowledge and relationships with the medicines emerges through engagement with them on the land and are supported by traditional knowledge sharing mechanisms, such as storytelling. Traditional medicines are a major factor in the community's health security, especially for those with a lack of access to other

healthcare. Furthermore, TEK transmission occurs within daily living, social interactions, and long-term historical accounts of ecological characteristics (Bussey, Davenport, Emery, & Carroll, 2015). TEK is present throughout the Indigenous Communities and embedded in the community structure. The community needs to promote relationships that draw on traditional kinship networks to build and maintain intergenerational knowledge or TEK. "Indigenous Forest Stewardship" needs to employ a framework that seeks to engage Indigenous communities with the land in a purposeful approach.

TEK is susceptible to environmental degradation and change due to its connection with the land, which makes it an important aspect of "Indigenous Forest Stewardship." It is not to say that the system would not shift to accommodate the change because Indigenous Knowledge Systems are dynamic and adaptive. However, the loss of a single relationship has a ripple effect across the system and means that the knowledge may not be available for future generations. The importance of a healthy land was reflected at a Black Ash Symposium, which gathered harvesters and scientists together to discuss responses to Emerald Ash Borer through a combination of TEK and scientific knowledge and produced the following recommendations: (1) slow the insects spread; (2) harvest, pound, and split quality black ash for baskets; (3) Develop collaborations between state, federal, and tribal agencies to establish memorandums of understanding or joint agreement (Costanza et al., 2017). This approach is being proactive in addressing invasive species that could disrupt importation relationships and connection between TEK and the land. The loss of the Black Ash would create a gap within Indigenous knowledge systems, which could have impacts on the cultural identity of Indigenous Communities that utilize it for medicines or basket-making material. In a similar situation, the Douglas-fir tree is threated by climate change and its loss would affect the Mescalero Apache's coming

of age ceremony because Douglas-fir trees are used for teepee poles (Mockta et al., 2018). Stewarding forests is important because they are critical access points to the Indigenous knowledge systems and the maintenance of cultural identity and connection. Furthermore, these two cases provide examples of ways that "Indigenous Forest Stewardship" can bring TEK and Scientific Knowledge together for proactive conservation of forests and cultural continuity. However, attention needs to be paid to the relationships between Indigenous and non-Indigenous People, so it is not imbalanced in either direction. Otherwise, a respectful and trusting relationship cannot be built, which is at the foundation of "Indigenous Forest Stewardship."

Conclusion

The history of the term "Indigenous" showed the resistance, resilience, and persistence of Indigenous People to be recognized on a global platform. Indigenous People engaged in a long and arduous process of recognition that took almost 100 years to accomplish and was aided by the support of non-Indigenous allies, but it is now codified in the UNDRIP. The various dimensions of the definition of "Indigenous" outlined in the Cobo Report are valuable, but they are and should remain fluid because a concrete definition could be co-opted by settler- and post-colonial-states to further oppress their Indigenous Peoples. However, the level of engagement sought after in this discussion on "Indigenous Forest Stewardship" requires an attention to context specificity.

Global mechanisms have been heavily critiqued for lack of engagement with Indigenous Communities. However, markets are not the enemy of Indigenous People and can be utilized to empower Indigenous Communities with proper considerations and evaluation. Kassam (2009) research with Artic Inuvialuit community of Ulukhaktok makes an important note about the use value of animals and plants to the community rather to an outside market. However, it is important to note that due to

globalization there is a need for global mechanisms like FSC and UN-REDD to provide guidance and aid in forest management that protect Indigenous Peoples' rights from exploitation by global markets. The important piece of this discussion connects back to listening and engaging Indigenous Communities and making sure that their rights are not violated by various forest stewardship strategies employed.

"Indigenous Forest Stewardship" needs to be sensitive to the diverse relationships different peoples have with the land. This emphasis on context is why a one-size-fits-all approach is inappropriate for Indigenous communities (Tarbell & Arquette, 2000). Collaboration needs to be participatory involving Indigenous Communities and their relationships with the land as well as their values and knowledge, which need to be built, cultivated, maintained, and passed on. There are multiple approaches to promote proactive planning and relationship building with non-Indigenous people from various social sectors through respectful and trusting collaborations and the integration of TEK with Scientific Knowledge. However, this process must be reciprocal, done in with a context specific understanding, and be accompanied by respect through relationship building and knowledge sharing. Therefore, "Indigenous Forest Stewardship" is an approach that centers Indigenous peoples' voices and relationships with the land. This has the potential to provide a means for aiding in community empowerment and environmental management for cultural continuity.

AKWESASRONON VOICES: CONNECTING COMMUNITY AND FOREST
STEWARDSHIP

Introduction

In the 21st century, the world is confronting many complex and interconnected social and environmental challenges. Forest stewardship is an approach to conservation that emphasizes the connection between people and the environment (Sayre et al., 2013). Stewardship could be a powerful means to addressing a plethora of challenges located at the intersection of people and land, such as climate change, conservation of biodiversity, protection of soil, water and other ecosystem services, provision of socio-cultural services, livelihood support, and poverty alleviation (FAO, 2010). Indigenous communities have cultures that emerge from their long history of engagement with the land, which tells a storied history of reciprocal relationships. Drawing on the reciprocal relationship, there is a story and reflection of people and culture on the land that did not form passive engagement with the land, but active efforts of stewardship. Thus, forest stewardship can draw upon the biocultural context and relationships of Indigenous communities in approaches to research, planning and conservation activities. However, the biocultural context is not the only specific understanding that is necessary to engage with an Indigenous community because there are historical, political, and environmental contexts that have disrupted their relationships to land. This research seeks to center *Akwesasronon* voices to draw out their relationship with the land that will inform biocultural forest stewardship strategies for their community. Furthermore, the analysis is empowered through situating the *Kanienkehaka* community of Akwesasne within their context specificity.

Akwesasne is *Kanienkeha* for "Land where the partridge drum" due to the sound made by the ruffed grouse (*Bonasa umbellus*) when they beat their wings against logs during mating season. This translation is debated, and the alternative

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refers to the sounds that the rapids made on the *Kaniataraowaneneh* (St. Lawrence River). In either translation, they both speak, literally and figuratively, to the connection of *Akwesasronon* to the land. Akwesasne was established in 1755 when 100 *Kanienkehaka* moved from the Kahnawake Indian Mission (Fenton & Tooker, 1978). This move was motivated by the land's strategic location, historical connection, and availability of resources. Historically, Akwesasne was known for its many islands along the *Kaniataraowaneneh*, which were used seasonally to grow crops, hunt, and fish (Ireland-Smith, 1980). The return of *Kanienkehaka* to this landscape was and continues to be an act of remembrance, and refusal to be removed. Furthermore, forest stewardship can serve as a means of reclamation for *Akwesasronon* to reconnect and fulfill their roles and responsibilities to land.

Politically, Akwesasne is a single community that has three governments: in the northern portion ("Canadian") is the Mohawk Council of Akwesasne (MCA); in the southern portion ("American") is the Saint Regis Mohawk Tribe (SRMT); and within the Haudenosaunee Confederacy is the holder of the fire for the *Kanienkehaka*, Mohawk Nation Council of Chiefs (MNCC). Additionally, Akwesasne resides at the intersection of two Canadian provinces, Ontario and Quebec, and an American state, New York, which lead to complicated issues of jurisdiction and funding. Through a recounting of Akwesasne's political history, the complexity of relationships between *Akwesasronon* with each other, themselves, settler-colonial states, and the land becomes apparent. Forest stewardship draws on the relationship between people and their environment, but this connection was disrupted by impositions (i.e. patriarchy) and pressures from settler-colonial states and societies. Power relationships and actions promoted a negative connotation with *Kanienkehaka* identity and culture. Catholicism is situated within the discussion of political history because it is intimately interwoven with politics and was a strong part of Akwesasronon identity

because the 100 *Kanienkehaka* were accompanied by Jesuit priests and set up a mission in Akwesasne in 1755 (Bonaparte, 2005c). The governance structures present in Akwesasne are reflective of long histories of struggle and resistance. There were bleak moments in the political history, but *Akwesasronon* continued to fight for their rights to the land, ability to govern themselves, and express their biocultural context. A forest stewardship strategy needs to be cognizant of these histories and engage them to fit into the Akwesasne social structure because there are funding and jurisdiction issues as a result as well as social shifts needed to return to traditional relationships grounded with women and the land.

Exploring the environmental history of Akwesasne is needed to inform forest stewardship because it provides insight into the environmental violence experience in Akwesasne as well as associated implications for the people and disrupted relationships with the land. Additionally, it holds stories of resistance and the drive of a people to fulfill their roles and responsibilities to the land. The land is at the core of Indigenous knowledge systems and relationships and is reflected in languages, traditional ecological knowledges (TEK), stories, ceremonies, and kinship relationships. In a reciprocal manner, the land reflects the people, their activities, and stewardship. The relationship is not passive, but active in both directions. Thus, impacts on the land affect the people and their relationships with the land, and vice versa. The lands and people are susceptible to the dangers of environmental violence produced from the ongoing colonialism, which seeks to extract both renewable and non-renewable resources. Akwesasne's experience with the colonialism's impact is most well documented through exposure to environmental contaminants from factories in the air, water, and land. As previously noted, the *Kaniataraowaneneh* runs through Akwesasne and receives the outflows of three other rivers: the Grass, Raquette, and St. Regis. These rivers were a rich source of fish and *Akwesasronon* identity was affected

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by industrialization in the area, demonstrating the severe impacts on people's health and relationships with the land. A less well documented and understood relationship is with the forests, which this research helps explore. Industrial development and agriculture placed strong pressure on the forests, so the current forests are mostly secondary and reflect shifts away from agricultural practices. Forest stewardship must incorporate an aspect of environmental justice in Indigenous communities because the health of the community is connected to land, just as the health of the land is connected to the people.

The biocultural context of Akwesasne is an important consideration in forest stewardship because it is through stories and teachings that a deeper understanding of the complex kinship relationships and knowledge systems are generated. Biocultural context allows for an expansion of considerations to be made in forest stewardship strategies that are reflective of *Akwesasronon* identity and relationships with each other and the land. *Akwesasronon* relationships with the each other and land were disrupted and are susceptible to further degradation without an understanding of the complexity of complex connectivity present between the people, the land, and culture. The teachings and stories discussed are *Tsi Kaianerekowa* (Great Law), *Tahatikonhsetónkie* (7 Generations), *Ohenton Karihwatehkwen* (Thanksgiving Address), *Kiotonhwentsiatáhsawen* (Creation Story), Origin of Ceremonies, and *Tsi Ní:ioht Tsi Wa'akwa'tá:raien* (Origin of Clans). It is through these interwoven and connected sources of knowledge that the complex connectivity between the people and the land is made apparent as well as their roles and responsibilities to each other. Additionally, a discussion on *Kanienkeha* provides insight into the holistic *Kanienkehaka* paradigm. Within the Kanienkehaka paradigm and stories, personhood is extended to other aspects of creations and shows the ways in which these relationships are reinforced through cultural practices, such as ceremonies.

Additionally, other aspects of creation have familial connections that are outlined in *Kiotonhwentsiatáhsawen*. The biocultural context conveys concepts that inform decision-making, relationships with all aspects of creation, the importance of women, and the roles and responsibilities embedded in these relationships. These biocultural contexts provide insight that can help in conserving biocultural diversity in Akwesasne, specifically through a forest stewardship strategy.

This research was preceded by years of relationship building between a Cornell University professor, Dr. Karim-Aly Kassam, and SRMT – Environment Division. Together, they identified the need for a biocultural forest stewardship strategy to proactively manage both newly settled and future settlements of Land Claims, an issue for almost 40 years in Akwesasne (Tribe, July 17, 2014). Figure 1 shows the 4 different Land Claims areas, which are color coded and marked with letters. The successful reclamation of these territories would more than double the land base of the southern portion of Akwesasne from ~14,000 to ~27,400 acres. Further, the relationship was strengthened by the choosing of an Akwesasronon to conduct the research in their master's thesis, which would aid in increasing the capacity of the community and increase attention to the nuance of the community's context specificity. These relationships were essential to create and reinforce, so Akwesasne needs and concerns were represented in the forest stewardship research project.
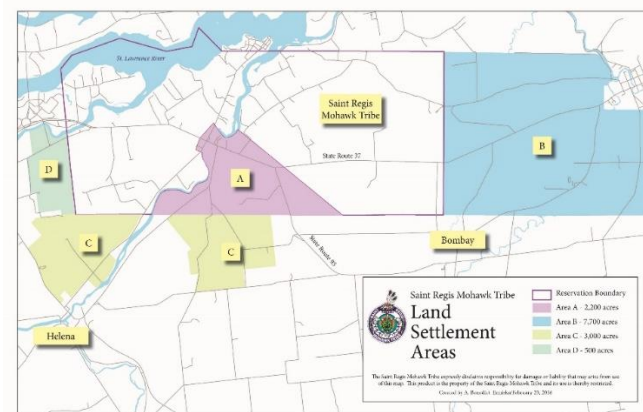
Figure 1: Saint Regis Mohawk Tribe Land Settlement Areas

Akwesasne has a geographical location with ramifications for forest stewardship due to political and environmental history as well as biocultural context. These interwoven facets of Akwesasne will be explored and engaged more throughout this chapter. Additionally, this research seeks to inform proactive management of Akwesasne lands and future Land Claim purchases and center the community's political and environmental history, as well as biocultural context. To understand the community's relationship with the forest, we seek to answer, "What is important about the forest to Akwesasne and the people?" The results will be applied to biocultural forest stewardship recommendations for the community.

Political History

As a Kanienkehaka community, Akwesasne is connected to a cultural history with the other Haudenosaunee Nations (Seneca, Cayuga, Onondaga, Oneida, and Tuscarora), but they were not a part of the Haudenosaunee Confederacy since their settlement. Instead, they belonged to a governance system called *Tsia:ta Nihononhwentsia:ke* or "Seven Nations of Canada" or "Seven Nations Fire" based on the *Kaianerekowa* that binds the Haudenosaunee Confederacy together, but left the confederacy due to conflict with competing colonies and other Indigenous Nations seeking to control the fur trade (Bonaparte, 2007). It was a strategic move to maintain

neutrality from the conflicts taking place during the colonial era, prior to the American revolution. Further, it allowed them to practice Catholicism freely without being bothered. Initially, Catholicism was not forced upon or used as a tool of assimilation. It was chosen by *Kanienkehaka* by choice. This is an intriguing aspect of *Kanienkehaka* when, today, Catholicism receives a lot of negative discourse, rightfully so, from Indigenous Communities. Although, this speaks to agency and having the choice, which has not always been the case. As there is still significant number of Akwesasronon Catholics, the implications for forest stewardship is the need for space to be safe and inclusive for individuals with various faiths and backgrounds.

The Land Claims, SRMT's three-chief systems, and the imaginary line or border splitting Akwesasne between "America" and "Canada" have roots connecting back to *Tsia:ta Nihononhwentsia:ke* and alliances with settler-colonial states. *Tsia:ta Nihononhwentsia:ke* formed an alliance with the British through the Act of Capitulation or Treaty of Kahnawake in 1760 (Bonaparte, 2005a). This alliance would prove to be problematic during the American revolution because it provided the impetus for the establishment of the border. This boundary was established by the British and Americans with the Treaty of Paris in 1783 (Silverman, 1976), but oral tradition tells Akwesasronon that they were told it did not apply to them (Bonaparte, 2007). The settler-states placed importance on this boundary, but Akwesasronon existed outside it, maintaining their sovereignty and identity as a single community. *Tsia:ta Nihononhwentsia:ke* was aligned with the British, but this sentiment was not held by all *Kanienkehaka*. Following the American Revolution, the boundaries of Akwesasne were set and the 3-Chief system, formerly a trustee system, was formed by the Seven Nations of Canada Treaty of 1796, which was reluctantly signed by a delegation from *Tsia:ta Nihononhwentsia:ke*, aligned with the Americans (Bonaparte, 2007). It is this treaty that SRMT draws their claim and their authority as a governance

system in the southern portion, "American," of Akwesasne. Although, Akwesasne still remained one community and maintained their power to govern themselves and identity.

Historically, *Akwesasronon* decision-making over lands and a single unified community was disrupted by uneven power relationships with the United States. Forest stewardship must be attentive to this history of disrupted decision-making. For a time, Akwesasne retained control over decision-making over a unified territory, not separated by political boundaries, due to their ability to remain neutral. However, the War of 1812 disrupted this neutrality when a skirmish between British and American soldiers occurred in St. Regis on October 23rd, 1812 (Bonaparte, 2007). Internally, *Akwesasronon* relationships with each other became more stressed between those that supported the British or Americans, which aided in the entrenching of the border separating the northern and southern portions of Akwesasne. In 1824, 45 Akwesasronon in the southern portion of Akwesasne, or "American St. Regis Indians," would submit a declaration of allegiance to America (Bonaparte, 2007). This moment reflected the internal struggles of Akwesasne with later implications. At this time, the power structure still favored *Akwesasronon* because they maintained power over decision-making on their lands. Starna (1993) noted that the New York State (NYS) Comptroller in 1835 received complaints of interference from "British" Indians in the Akwesasne Trustee election, which resulted in a censusing in 1859 of Indians associated with the "American side." The census further reinforced the entrenching of the separation between northern and southern Akwesasronon. Additionally, this was followed by a power shift over decision-making in Akwesasne and according to the "Laws of 1861, chapter 325, an act appointing an attorney for, and providing for the payment of and duties of" (New, 1889). Legislatively, the Trustees were stripped of their power over decision-making in Akwesasne and an uneven power relationship

was codified. This would severely limit *Akwesasronon* ability to make decisions over the future of their land and reinforces an uneven power relationship in favor the America Government. Forest stewardship should be understood through this historical perspective because it helps situate *Akwesasronon* distrust for outside influence and imposed political boundaries. However, an effective forest stewardship strategy can be attentive and work to negotiate in favor and prioritize *Akwesasronon* assertion of sovereignty over current and future lands.

Considering the shift of power, *Akwesasronon* continued to resist by disregarding the rules laid out by NYS. This resistance was demonstrated by the continued operations and influence of the Hereditary chiefs, associated with *Tsia:ta Nihononhwentsia:ke*. The fight for the ability to govern Akwesasne and Akwesasronon future was seen in 1888 when the Akwesasronon were adopted back into the Haudenosaunee Confederacy (Bonaparte, 2007). This made a statement that rejected settler-colonial control over *Akwesasronon* life and land. However, the power and influence of the hereditary chiefs would not last because it threatened the settler-colonial control. The Americans passed chapter 642 of the laws of 1898 and the Canadians passed the Indian Advancement Act of 1889 which did away with hereditary chiefs (Bonaparte, 2007). The community continued to resist despite these statements made by the American and Canadian governments. However, resistance changed on May 1st, 1899, when Jake Ice, *Akwesasronon*, was shot by Canadian Dominion Police and other chiefs were imprisoned, which forced the traditional governance system in Akwesasne underground (Bonaparte, 2005b). This made the reality of resistance dangerous, so the Traditional Governance system had to be less pronounced in the community. The limited ability of the Traditional Governance system's ability to operate aided in distancing *Akwesasronon* from having a say over their future and ability to steward the land.

An effective forest stewardship strategy in Akwesasne must create mechanisms to address the impacts left by residential schools on *Akwesasronon*. Residential schools were imposed education by the Catholic church which was supported by American and Canadian governments and utilized severe repercussions (i.e. beatings and other harmful as well as deadly methods) to promote an environment of fear and stigma for practicing and accessing cultural knowledge. Canada began supporting Catholic residential schools in 1884 ("The Indian Advancement Act," 1884) and the United States with the Carlisle Indian School in 1879 (Witmer, 1993), which were meant to assimilate "Indian" children into "Western" civilized productive citizens. However, the result was Indigenous children being stripped of their cultural identity and dislocation from their communities. Further, these children would be returned home carrying the weight of the trauma they experienced from residential schools and left the community to deal with the manifestations of their trauma. Doug George-Kanentiio (2016), *Akwesasronon*, shared his experience at the Mohawk Institute in Brantford, residential school, where *Kanienkehaka* students were beaten, raped, and intimated. This is a sad history to recount about Akwesasne, but it is important to draw attention to the injustices that *Akwesasronon* experienced and dislocated cultural connections and knowledge. Additionally, residential schools promoted stigma around Indigenous culture as being "uncivilized" and "bad." In light of these atrocities, *Akwesasronon* culture was maintained by the work of underground knowledge holders and the whispers in kitchens and backrooms. The underground knowledge holders were unable to outright claim connection to cultural knowledge and practice for fear of repercussions, but it was done out of cultural responsibility. Forest stewardship can help in the distribution of cultural knowledge and reclamation of relationships that was severely hindered by the residential schools. The reclamation of relationships with the land and self can help heal the historical wounds left on *Akwesasronon* and help

support effective forest stewardship as part of *Akwesasronon* responsibility. Furthermore, the knowledge and relationships will be strengthened and be more accessible for future generations of *Akwesasronon* to access and learn.

The impact of residential schools and the influence of the Catholic church in Akwesasne severely hindered access to cultural knowledge through the imposition of fear and stigma. Effective forest stewardship practices can help mend the disrupted relationships and revitalize cultural knowledge throughout the community. Drawing on an *Akwesasronon* cultural foundation is possible because the influence of the Catholicism has begun lessening to since the beginning of the 21st century. In the early half of the 19th century, a cultural revolution happened in Akwesasne and began with the establishment of the St. Regis Mohawk School where Ray Fadden taught sixth grade and help spread Haudenosaunee culture (Bonaparte, 2005d). The importance of this moment cannot be understated as it relates to forest stewardship because the culture removes the distinctions between the people and the environment and opens traditional kinship networks and knowledge systems. Further, this school represented a powerful statement for Akwesasne, as educating the youth was now within the control of Akwesasronon. Ray Fadden used his love for everything Haudenosaunee to teach the children in his classes about their cultural heritage, when it was not allowed to be practiced or celebrated. His work helped destigmatize *Kanienkehaka* identity and culture. His influence can be felt across Akwesasne through reminders like Akwesasne Notes, the White Roots of Peace[i], the Native North American Indian Travelling College, the Akwesasne Museum, the Akwesasne Freedom School, CKON Radio, and other community-driven efforts (Bonaparte, 2008). These establishments, most still in operation, work diligently to spread the *Kanienkehaka* culture and the importance of it to *Akwesasronon*. Ernie Benedict, a student of Ray Fadden, cultural knowledge holder, and activist, started groups to uplift *Kanienkehaka* culture like the Mohawk

Counsellor Organization which would later become the White Roots of Peace, a mobile group sharing Haudenosaunee culture and values (George, 2011). This was meant to not only promote and celebrate *Kanienkehaka* culture with *Akwesasronon*, but to share and educate those around them about the importance of their culture. The diligent work of these men and many others that *Akwesasronon* can respect their land and reclaim their cultural heritage. Their work was essential to creating moments of access to learn about Haudenosaunee culture and connection, which is the target foundation for forest stewardship. Forest stewardship could draw upon a base of knowledge and community passion made possible by the diligent work of *Akwesasronon* to reclaim connections to creation that would not have been possible or potentially successful a few decades ago.

The establishment of the St. Regis Mohawk School and the influence of Ray Fadden created change across Akwesasne that is still felt today. However, it was during this time that the final steps were made to establish SRMT's 3 Chief System, which have fought to rectify the injustice of lost lands in Akwesasne and be responsible for their future management. In 1942, Archie Phinney visited Akwesasne and authored a report that would cause problems in Akwesasne because it claimed that Hereditary Chiefs were still inhibiting the power of the elected council (Bonaparte, 2007). This part of history is evidence of resistance in Akwesasne because Canada and the United States had previously outlawed the Hereditary Chiefs, but they were still influencing Akwesasne's politics. In response to the Phinney report, a special referendum was held in 1948 where *Akwesasronon* rejected the imposed elected system and opted to be governed by the *Tsia:ta Nihononhwentsia:ke* and the Haudenosaunee Confederacy (Bonaparte, 2007). The community spoke and undermined the imposition of power by the settler-colonial state. However, it was not met with acceptance. Instead, a special election was held off-territory and guarded by

police soon after the referendum and a new council was elected (Bonaparte, 2007). This elected system is still in operation today and is represented by the SRMT's 3 chief system. The distrust for this system is deeply imbedded in the community and is demonstrated by the political history, which is a struggle that forest stewardship will have to overcome when enacted by SRMT's Environment Division. The relationship between SRMT and *Akwesasronon* requires healing, but the potential positive impacts to the land through forest stewardship are worth the careful negotiation and effort.

Today, Akwesasne could provide proactive management, decision-making, and assert cultural responsibilities through forest stewardship over stolen land, which are in the process of being reclaimed. SRMT, as the as the *Akwesasronon* political negotiating body, has fought since 1982 and filed a lawsuit to get the aforementioned stolen lands back (TV, 2016) and shown in Figure 1. SRMT has been seeking to right the historical wrongs of land loss in Akwesasne through litigation and negotiation with the St. Lawrence County, Franklin County, and New York State (NYS). In 2005, the negotiations appeared to be moving forward and a settlement agreement was proposed between SRMT, the two counties, and NYS. However, the two counties and NYS withdrew from the settlement agreement following the loss of Land Claim cases by the Cayuga and Oneida Nations (Tribe, July 17, 2014). The failing of the proposed settlement agreement and loss of Land Claim cases were a blow to the SRMT efforts to settle the Land Claims. However, SRMT persisted and signed a Memorandum of Understanding (MOU) with St. Lawrence County in 2014. The MOU is not a settlement agreement, but rather a commitment to move forward in good faith to settle Land Claims with SRMT and outlines compensation to St. Lawrence country for lost tax revenue (Tribe, July 17, 2014). The MOU was a major accomplishment by SRMT. Similarly, SRMT sought to establish a similar MOU with Franklin County because land-into-trust takes years to accomplish and leaves the counties without

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compensation for lost tax revenues (Sommerstein, 2017). The movement towards a settlement agreement is beneficial to both SRMT and counties. The settlements are ironic because Akwesasne needs to buy land back that was stolen. However, the efforts to return land are paramount to the growing needs of *Akwesasronon*. In 2018, SRMT was tired of negotiating with Franklin county and decided to file four trust applications rather than take the route of MOU (Tribe, 2018). SRMT actions in their dealings with Franklin country are clear demonstration of prioritizing the needs of and responsibility to *Akwesasronon*. As the lands are reclaimed, there is a need for proactive thinking about the management of these land with *Akwesasronon*, which forest stewardship can help meet the cultural as well as practical needs of the community. Furthermore, the community and land will be healthier for future generations.

Environmental History

Historically, forests in Akwesasne were dramatically impacted by the forced sedentarism of *Akwesasronon* through the establishment of reservations with treaties, the *Tsia:ta Nihononhwentsia:ke* of Canada Treaty of 1796, and industry. The Haudenosaunee were not a nomadic society. They practiced agriculture, which culturally is represented in the three sisters, corn, bean, and squash, which supported and maintained through intergenerational knowledge transmission of oral traditions in *Tsi Kiotonhwentsiatáhsawen*, *Kaianerekowa* and *Ohenton Karihwatehkwen* (Pleasant, 2010). This agricultural heritage was seen across Akwesasne and remains important. However, it is no longer practiced across the community as a result of social changes. The limited size of the reservation had a dramatic impact on forests because there was increased intensification of land-use in Akwesasne and need for timber (i.e. heating and building material) as the population grew. However, the main cause of deforestation in Akwesasne was due to the Potash industry in the 1800's with records

from 1845 showing 97 asheries in St. Lawrence county (Swamp, Tarbell, & Cree-Alvarez, 2009). The potash industry aided in the removal of forests from the landscape, creating the current second-growth forest condition in Akwesasne. Although, there is no research that explores the impact of disrupted relationships with forest within Akwesasne; it can be hypothesized that it affected *Akwesasronon* relationships with and knowledge of the forests. A biocultural forest stewardship strategy can help in the mending of these relationships that has been over a century in the making with increased opportunity due to the Land Claims and afforestation from unutilized agricultural lands.

Haudenosaunee and *Kanienkehaka* ideology are based on systems of roles and responsibilities that inform relationships with other aspects of creation (i.e. land, medicine and food plants, trees, birds, air, and others outlined in the *Ohenton Karihwatehkwen*), which are holistic, relational, and reciprocal. Forest stewardship must consider the history of environmental violence in Akwesasne and its influence on proposed management activities. The continued impact of industry on *Akwesasronon* relationships with land were more clearly demonstrated and researched through the waters in and around Akwesasne. The territory was known historically for its rich fishing opportunities. The beginning of the impact occurred through the construction of the Robert Moses-Robert H. Saunders Dam in 1957, which was preceded by the St. Lawrence Seaway project initiated in 1954 that widened river channels and built the lock system generation (Hoover, 2013). Akwesasne lost tracts of land and islands due to the widening of the *Kaniataraowaneneh*, which speaks to the continued displacement of *Akwesasronon* from the land and their relationships. Additionally, ecological processes were disrupted for migratory species and contributed to habitat loss for other species of fish. Drawing on Haudenosaunee and *Kanienkehaka* cosmology, forest stewardship must acknowledge and engage connections to other

aspects of creation, such as water, animals, food and medicinal plants and so on, because they provide insight into and are generative of *Akwesasronon* identity and knowledge.

Forest stewardship in Akwesasne has a variety of relationships to consider within the framework of reciprocal roles and responsibilities that are part of Kanienkehaka cosmology. For example, the water has many lessons to teach about the impacts of environmental violence on the people and land in Akwesasne. The dam drew industry to the territory with the offer of cheap hydroelectric power, which included Alcoa and General Motors in the United States and DomTar in Canada. This could be perceived as positive for economic development, but *Akwesasronon* did not carry this sentiment. In 1978, *Akwesasronon* raised concerns about high concentrations of Polychlorinated Biphenyls (PCBS), mercury, and Mirex, an organochloride that was commercialized as an insecticide and later banned for impacts on the environment, found in fish samples. A fish advisory followed and created recommendations for women of childbearing age, children under 15, and pregnant women to cease fish consumption, which the southern portion of Akwesasne would implement in 1986 after research into contamination (Hoover, 2013). This reality was incredibly disruptive because it worked to sway Akwesasronon away from the river and fish. Further, it generated fear around the potential impacts on Akwesasronon health. The concerns of Akwesasronon about the impacts on health helped make Akwesasne one of the most researched Indigenous communities in Canada and the United States with >50 academic articles published. The health impacts connected with environmental contaminants were explored in various Akwesasronon demographics, and were related to increased thyroid burden on youth (Schell & Gallo, 2010; Schell et al., 2004; Schell et al., 2008; Schell, Gallo, Ravenscroft, & DeCaprio, 2009), diabetes in adults (Codru et al., 2007), cardiovascular disease in adults

(Goncharov et al., 2008), cognitive functioning in youth (Newman et al., 2006; Newman et al., 2009), cognitive functioning in adults (Haase, McCaffrey, Santiago-Rivera, Morse, & Tarbell, 2009), disruption of menarche in female youth (Denham et al., 2005), and lowered testosterone in male adults (Goncharov et al., 2009). Research shows the health implications of environmental contaminants on *Akwesasronon* health and cultural practices. However, *Akwesasronon* have a responsibility to engage the fish and waters, but there are serious health risks associated with these activities. *Akwesasronon* have similar responsibilities to forests. Forests and water are connected from a material perspective of tools, such as fish boxes and baskets, created and utilized in the waters. However, the cultural relationship is much deeper than just utility and stems from the Haudenosaunee's holistic ideology around all of creation having roles and responsibilities to fulfill to each other. An effective forest stewardship strategy requires attention to the relationships affected by management and educational activities as well as support and reinforce relationships between *Akwesasronon* and all creation. Therefore, forest stewardship can be sensitive and holistic in approaches to management and education through the biocultural interactions between different aspects of creation (i.e. land, medicine and food plants, trees, birds, air, and others outlined in the *Ohenton Karihwatehkwen*).

Previous research focused primarily on the health of the people and the consequence of exposure through fish consumption, which did not take into account the implications on other *Akwesasronon* relationships with land and other aspects of creation. Fish advisories were shown to be successful and were reflected in changes in fish consumption patterns and reduction of PCBs in both women (Fitzgerald, Hwang, Bush, Cook, & Worswick, 1998) and men (Fitzgerald et al., 1999). The reduction in PCBs in both women and men is a positive result of the fish advisories, but there were cultural practices and relationships disrupted in the process. The cultural practices

were related to fishing such as knowledge and language of waters and fish in Akwesasne. Additionally, the relationships between the water, people, and each other were less pronounced because people were not on the water connecting, sharing, teachings, and learning life lessons as well as building respect and understanding of the water. Hoover (2013) conducted a comprehensive exploration of the cultural implications of fish advisories on *Akwesasronon*, which showed disruption of language, inability to fulfill roles and responsibilities, and knowledge systems. Her research showed that the implications of pollutants were beyond just health and include cultural consequences for Indigenous communities. *Akwesasronon* culture is connected to and emerges from their ecological context, so the damage to the land can result in cultural erosion of language and practices as well as health implications. The impacts on water from environmental violence demonstrate the importance of supporting relationships between land and water through cultural practices and relationship building are essential building block as part of forest stewardship. Forest stewardship can be empowered and more impactful in Akwesasne by understanding, supporting, and promoting activities cultural activities on the land that help build relationships with the land and people.

Prior to Hoover's work, *Akwesasronon* researchers critiqued collaborative institutions, research, and risk assessments that occurred in and around Akwesasne for not understanding or engaging the community's biocultural context. These *Akwesasronon* worked diligently to get their voices heard and respected. James Ransom, *Akwesasronon*, and Kreg Ettenger (2001) addressed collaborative institutions for not engaging with Indigenous knowledge and values and the way scientific validation and interpretation often removed local knowledge from its context. They utilized the community consultation process of St. Lawrence-FDR relicensing process as a case study to make their point. Further, these authors provided a framework of

engagement that was supported by *Kaswentha* (two-row wampum) teachings, which they interpreted as grounded in respectful, autonomous relationships; the *Kaswentha* can have different interpretations and is primarily used to speak to relationships, such as governments, people, and even the land. However, the *Kaswentha* was used by these authors to provide emphasis on inadequate engagement that reflected the biocultural context of Akwesasne, which *Akwesasronon* felt in their interactions. Their work is a statement that Indigenous worldviews and knowledge systems need to be respected and engaged. Understanding and respecting Indigenous worldviews can be generative to research and provide more holistic approaches to research and collaboration can be practiced. Another group of *Akwesasronon* researchers and collaborators critiqued risk assessment and management processes as well as decision-making for not incorporating a more holistic approach that is grounded in an Indigenous context (Arquette et al., 2002). It is through a holistic approach that the ripple effects of environmental contaminants can be understood. The complex connectivity of relationships within the cultural framework of *Akwesasronon* were disrupted and the fish advisory further distanced them from their relationships with the fish and waters. Further, *Akwesasronon* researcher, David (2005) in his Master's Thesis centered *Onkwenhonwehneha* (Indian way-of-life) in relation to critiquing a risk framework used in the Natural Resource Damage Assessment at the Superfund remediation site, which did not adequately capture the health and cultural implications on fishing. The assessment was not adequately engaging the Indigenous context of Akwesasne. Again, it was not just the immediate health of *Akwesasronon* in danger, as there were long-term damages to the culture that affected its integrity and continuity. This means that future generations access to cultural resources will be affected. Forest stewardship can draw on the work of these *Akwesasronon* researchers that have fought for the biocultural context to be acknowledged and engaged to inform strategies that

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are holistic and grounded in an Akwesasne context. Furthermore, drawing on the work of *Akwesasronon* researchers is a way to honor their hard work and empowering to forest stewardship as well as provide emphasis on the power of and need to include activities that utilize cultural teachings and practices provided on the land.

It is thanks to the foundational research by *Akwesasronon* and their collaborators that the cultural dimension of the environmental violence in and around Akwesasne were acknowledged and engaged. This shows the resiliency and persistence of the community to not be silenced and desire to heal historical wounds left by environmental violence. In 2013, their work made it possible for Akwesasne to receive $8,387,898 in reparations for the damages done to *Akwesasronon* culture and be utilized for Tribal Cultural Restoration projects ("United States of America, State of New York and St. Regis Mohawk Tribe v. Alcoa Inc. and Reynolds Metals Co.," July 17, 2013). This is a moment that hope is engaged because it is the product of long, consistent resistance by *Akwesasnronon*. The reality of the health and cultural implications from environmental contaminants could appear bleak and futile. However, it is the strength of the community that created space for *Akwesasronon* culture to be engaged and acknowledged as significant and necessary. Further, a portion of these funds were used to create the Akwesasne Cultural Restoration Program, which is an important program working toward reclaiming cultural practices that were affected by the environmental violence from the industrial sector (Alfred, 2014). The importance of this program cannot be understated because it is helping heal the disrupted relationships with the land and associated knowledge. Also, the funds are being used to help remediate the damage caused on the land, which will allow *Akwesasronon* to access the land without fear of exposure. There is a lineage of resistance (i.e. political and social) and research in Akwesasne that ground and support this research on forest stewardship. Forest stewardship builds on this lineage that

focuses on the connection to land and the need to be heal as well as support activities on the land for success in Akwesasne.

Biocultural Context

Akwesasne, as a *Kanienkehaka* community, is connected to a larger collection of nations through the Haudenosaunee Confederacy, which are united thorough three foundational principles of the *Kaianerekowa*. Additionally, these nations share a common cultural connection through stories, teachings, and a governance system, all of which are intimately interwoven. The Haudenosaunee Confederacy is composed of six different nations - Seneca, Cayuga, Onondaga, Oneida, Mohawk and Tuscarora (a later addition to the confederacy) - that are distinct nations and maintain their autonomy. According to oral tradition, these nations were once enemies and the Peacemaker united them with his message of peace (i.e. the *Kaianerekowa*). The *Kaianerekowa* disrupted the conflict between these nations and provided a means for peace and cooperation. This governance system serves as a source of cultural resilience for the nations due to shared cultural heritage. These nations can help each other with whatever needs arise, such as when knowledge is unclear or missing. Akwesasne received aid from other nations in the Confederacy to reclaim their ceremonies. The nations supporting each other can empower forests stewardship in the future and could be the foundation of additional work, which could add nuance to the needs of the different nations within the Haudenosaunee Confederacy. The future work is possible because the Haudenosaunee Confederacy is still in operation and the grand council meets regularly to address important issue that affect Haudenosaunee people. However, the introduction of forest stewardship would need to follow proper protocols of introducing this issue to the grand council. The nations are stronger together and have a responsibility to help uphold each other as part of the Haudenosaunee Confederacy. The *Kaianerekowa* was grounded upon three

foundational principles, which are Righteousness, Health and Power (Wallace & Ka-Hon-Hes, 1994). It was these three principles that have upheld the Haudenosaunee Confederacy since its formation and continues today. There is a diversity in the expression of these principles and their application, and they are not reserved exclusively to governance. The three principles have a resounding effect across the culture, people, and relationships. *Kanienkehaka* utilizes the words *Sken:nen*, *Kasatstenhtshera*, and *Kanikonri:io*, which translate to Peace, Power and a Good Mind, respectively. These concepts are interconnected, as there is power in a good mind that maintains peace. The unity of these concepts serves to inform all relationships with other aspects of creation and maintains peace with them. Within a forest stewardship perspective, the power of the good mind can be utilized to inform decisions and actions so the relationship with forest remains strong and peaceful. Furthermore, forest stewardship can ground activities in the three principles to reinforce them in the minds of *Akwesasronon* and has the potential to promote healthier relationships between the community and forests.

The teaching of *Tahatikonhsetónkie* is present across the Haudenosaunee Confederacy. The heart behind this teaching is about the consistent awareness for "those who are not yet born but who will inherit the world" (Haudenosaunee Confederacy, n.d.). There is a value embedded within this teaching that is situated within the minds of Haudenosaunee as they make decisions impacting the future generations' quality of life and ability to access valuable cultural knowledge and relationships. Oren Lyon's, turtle clan faithkeeper, placed emphasis on this teaching with his words, "When we walk upon Mother Earth we always plant our feet carefully because we know the faces of our future generations are looking up at us from beneath the ground" (Arden & Wall, 1990, p. 68). His statement speaks to a direct connection with the land, *Ionkhi'nisténha Ohóntsia* (Mother Earth), and makes the future tangible.

The *Tahatikonhsetónkie* is connected to conservation, as it is a means of linking forest stewardship with the Haudenosaunee valuing future generations and their land-based needs. Additionally, these future generations will carry the same responsibility of caring for the land, as the cycle repeats itself through time. In this way, time is displaced because the actions of this generation can impact the inheritance of future generations and their birthright to access cultural knowledge embedded in the land, as current generations benefit or suffer from the actions of previous generations. In a conceptualization by Philip White-Cree[ii], he asks people to situate themselves at the center and shows that an individual can be touching different ends of the *Tahatikonhsetónkie* within their own lifetime through great grandparents and great grandchildren. The reality of *Tahatikonhsetónkie* becomes personal and has resounding impacts across relationships. Additionally, *Tahatikonhsetónkie* generates an understanding of the knowledge transfer systems present within the Haudenosaunee that serve as a buffer. The buffer is a tool to access the possibility of reaching into the past through the elder's knowledge. The individual or youth that access the buffer or elder's knowledge become a conduit of knowledge transfer. This helps make the systems more resilient and works as a safeguard against breaks in knowledge from one generation to the next. Furthermore, it is reflexive because the transfer of knowledge carries a responsibility to pass it on. Forest stewardship can draw on the strength embedded in this structure to aid in distributing knowledge across the community for resilience and to reclaim the relationships with the forests. For this to occur, the next *Tahatikonhsetónkie* must be considered in each step and aspect of the strategy.

Ohenton Karihwatehkwen (Thanksgiving Address) is another teaching that is recited before and after all important meetings or decisions. It is meant to bring the people's minds together as they acknowledge the different dimension of creation that are continuing to fulfill their roles and responsibilities. Additionally, the kinship

relationships are revealed in recitation of *Ohenton Karihwatehkwen* and extends the personhood to other aspects of creation. A standardized version of the *Ohenton Karihwatehkwen* was created to help learning and provides insight into the framework of the diverse relationships present in Haudenosaunee ideology, which are *Onkwehshòn:'a* (the People), *Ionkhi'nisténha Ohónstia*, *Ohneka'shòn:'a* (the Waters), *Kentsion'shòn:'a* (the Fish), *Ohenten'shòn:'a* (the Plants), *Kahihshò:'a* (the Berries), *Kaienthóhsera* (Food Plants), *Ononkwa'shòn:'a* (the Medicine Plants), *Kontírio* (the Animals), *Okwire'shòn:'a* (the Trees), *Otsi'ten'okòn:'a* (the Birds), *Kaié:ri Nikawerá:ke* (the Four Winds), *Ionkhihsothokòn:'a Ratiweras* (the Thunderers), the *Shonkwahtsì:'a Enkiehkehnéhkha Karáhkwa* (the Sun), *Ionkhihsótha Ahshonthenhnéhkha Karáhkwa* (the Moon), *Otsistohkwa'shòn:'a* (the Stars), *Kaié:ri Niionkwè:take* (the Four Beings/Great Teachers), and *Shonkwaia'tíson* (the Creator) (Force, 1992). This is the way Haudenosaunee acknowledge their relationships with the world around them and remind themselves of their own roles and responsibilities to other aspects of creation. It is a system of reciprocity that helps in humbling Haudenosaunee people because they are a part of a complex web of relationships that need each other. Decision-making approached from this teaching makes sure that decisions engage all Haudenosaunee relations and do not only prioritize the needs of human beings. To further emphasize this, Audrey Shenandoah, in her keynote address to the 1990 Global Forum on Environment and Development for Survival, makes a call for three actions that are needed in the world: (1) Extends greetings to all the participants with the *Ohenton Karihwatehkwen*; (2) Makes a call for people to stop abusing mother earth; and (3) Shows the distinction between Haudenosaunee and Western ways of thinking, which she justifies with the absence of a word for the environment from their vocabulary and the closest word referring to things that support life (Arden & Wall, 1990). She uses the *Ohenton Karihwatehkwen* as means

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of conveying the relationships that Haudenosaunee have with the land and presents their paradigm. A Haudenosaunee paradigm is a different way of conceiving the world because all aspects of creation have agency and familial connection. They need to be treated with the same level of respect that a family member would receive. Thus, forest stewardship becomes a tool of caring for family. Forests have roles and responsibilities that are being hindered by environmental degradation, so efforts are required to reinforce kinship and knowledge networks.

Haudenosaunee kinship relationships are strongly influenced by a series of interconnected stories and provides the ontological basis of connection among the Haudenosaunee confederacy. The Creation Story speaks to the origin of *Onkwehonwe* (Original People) and has a diverse array of iterations that vary from storyteller to storyteller and among the nations of the Haudenosaunee. They can range from a very short overview to a long-detailed account of the events surrounding the Creation Story that require days to tell. However, the creation of world begins with a pregnant female being, skywoman, falling from skyworld into a world covered by water and aided by many animals to create North America on the back of a giant turtle (College, 2017). Skywoman is the seed that grew into the Haudenosaunee nations that eventually became connected through the *Kaianerekowa*. The power of creation is firmly situated with women and it is from this relationship that the Haudenosaunee draw strength and connection to the land. Further, in the Origin of Man, skywoman's daughter died while giving birth to twins, *Teharonhiawako* and *Sawiskera*, and she was buried in the land, which *Teharonhiawako* used to create humans and gave them the responsibility to care for other aspects of creation (Mitchell et al., 1984). These stories are showing a clear line of connection between the Haudenosaunee creation story and their existence. The land is a part of *Akwesasronon* contributes to the weight of Oren Lyon's statement on the *Tahatikonhsetónkie* teaching. Additionally, the familial relationships emerge

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from the Tsi Kiotonhwentsiatáhsawen, such as the *Ionkhi'nisténha Ohónstia* as a mother or *Ionkhihsótha Ahshonthenhnéhkha Karáhkwa* as a grandmother. Haudenosaunee culture, history, and familial relationships are embedded in the land, as well as their future. Forest stewardship is another mechanism for connecting with the history of the land and the potential for the future simultaneously. There is a lot of knowledge present in the forests that stems from its place within the interconnected kinship network and web of knowledge present in Akwesasne.

The Haudenosaunee were given the responsibility to care for the rest of creation and the means of doing this through acknowledging other aspects of creation for fulfilling their roles and responsibilities. The Haudenosaunee were gifted 13 ceremonies that follow changes in the land and celestial shifts through the year and serve as a reminder to acknowledge creation, which are: Midwinter, Maple Ceremony, Thunder Dance, Sun and Moon Dance, Seed Ceremony, Planting Ceremony, Strawberry Ceremony, String Bean, Corn, Harvest, Thunder, and End of Season (Haudenosaunee Confederacy, n.d.). Certain ceremonies are informed by the lunar calendar and others are informed by different phenological indicators, for example maple ceremony happen after maple sap stops flowing, but they all occur on a yearly basis. Thus, the community is consistently reminded to fulfill their roles and responsibilities to the rest of creation. The importance of these ceremonies is reinforced by a teaching about the consequences of not respecting and acknowledging. The consequences are loss of different aspects of creations, or extinction. This adds more urgency to maintaining and reinforcing these relationships within a Haudenosaunee context. Forest stewardship fits into this framework through the Maple Ceremony because it is the leader of trees and the sap is the first medicine of the year (Force, 1992), which is used in other ceremonies. Maple has many important teachings that stem from the stories shared about its connection to the people as well

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as the relationships that grow out caring for them and the community created around the process of making maple syrup. There are many other examples of different trees (i.e. Cedar, Black Ash, and many others) that carry similar complex relationships with the Haudenosaunee through the enactment of cultural practices. However, sharing specific knowledge about their uses as medicines and in ceremonies requires attention to community protocols of knowledge sharing. Additionally, some knowledge is reserved for the community and is not allowed to be shared with the public beyond the boundaries of Akwesasne. Forest stewardship can draw on these important connections that forests have to medicines and ceremonies to inform education and management activities. However, forest stewardship has the responsibility to understand the nuance of community and public (i.e. outside Akwesasne) knowledge, so their educational activities share appropriate knowledge with certain audiences.

The ceremonies are used to acknowledge other aspects of creation and are part of the Haudenosaunee responsibilities. However, the kinship connection to the land runs deeper and is reflected in the people. The *Tsi Ní:ioht Tsi Wa'akwa'tá:raien* was born out of the debilitating effects of grief from death, which created a situation where the Haudenosaunee were unable to fulfilling their roles and responsibilities to the rest of creation. A young man, *Ranikonhrowa:nen* (He who has great ideas), came up with a solution to this problem by following the example of creation, such as the wind is divided into different groups: cold winds from the north, warm wind from the south, wet wind from the west, and no planting wind from the east. The young man led half the people across a river and told each group of people to watch the land. Each morning over a series of days, the eldest woman from each family would collect water for the morning meal and note an animal, such as a deer, bear, and others. These animals would come to represent the families of the respective women and all their future generations (College, 1993). This summary of *Tsi Ní:ioht Tsi Wa'akwa'tá:raien*

shows a complex connectivity between the people, grief, solutions, land, and women. The land provided a solution to the people's grief, which women observe and carry the intergenerational responsibility. Haudenosaunee relationships with each other reflect the land and ensure that roles and responsibilities to the land are fulfilled. Drawing attention to the splitting of the people in *Tsi Ní:ioht Tsi Wa'akwa'tá:raien,* this was done purposefully to form two groups and create balance in the longhouse. One side was composed of Bear, Deer, Snipe, and Eel clans and the other made up of Wolf, Beaver, Turtle, and Hawk clans. The grieving side was provided 10 days to mourn their loss while the other side cared for them and continued to fulfill roles and responsibilities to the rest of creation (College, 1993). The clan system demonstrates a careful handling of death and grief through embedding it within their relational network with each other. Additionally, it serves as a safeguard to make sure that ceremonies continue, and relationships with other aspects of creation are maintained. These clans are animals that are found in forests, which forest stewardship can help in supporting their presence and providing the necessary resources utilized in the handling of death and ceremonies.

  Kanienkeha unites the different aspects of the biocultural context together and demonstrates complex connectivity. *Kanienkeha* is such a valuable resource of knowledge and insight into the Haudenosaunee paradigm because it is verb-based, relational, and descriptive language. However, it is important to acknowledge that there are certain ideas and concepts outside the capacity of the English language to explain. Arquette et al. (2002, p. 262) stated, "Within the Mohawk language, for example, we clearly find a cultural philosophy that is relational, integrated, holistic, and female focused." *Kanienkeha* is connected to the land and women, which are intimately connected to each other. Women are so much a part of everything that is part of Haudenosaunee identity. Katsi Cook (1997, p. 2), *Akwesasronon*, speaks to the

importance of women in "Women are the first environment" and states, "From the bodies of women flows the relationship of those generations both to society and to the natural world." Women are at the center of Haudenosaunee relationship with *Ionkhi'nisténha Ohónstia* and each other. They are the sources of clans and it is the responsibility of the clan mothers to name all the new babies in their clans. Additionally, *Kanienkeha* is connected to the land, which makes it an important part of conservation. Dan Longboat (2008, p. iv) stated, "As an Indigenous language exists within its culture, and that culture exists within its ecosystem, ecological restoration and sustainability then must also include linguistic and cultural restoration." *Kanienkeha* has complex connectivity with a diverse set of relationships with women and the land, which makes it a priority in conservation. Therefore, forest stewardship must be open to receiving, engaging, and aiding in the protection and maintenance of the language because it can help in the reclamation and healing process of knowledge systems and kinship networks in Akwesasne. The knowledge systems and kinship networks were disrupted by environmental and political violence in Akwesasne.

The biocultural context of Akwesasne is component of the context specificity that helps situate the changes and challenges the community experienced throughout their environmental and political history. Additionally, the biocultural context helps research properly engage with *Akwesasronon*, their knowledge, and relationships with other aspects of creation. Otherwise, it runs the risk of misinterpreting or not properly situating the concerns and values of *Akwesasnronon*. The environmental history demonstrates the persistence and resilience of *Akwesasnronon* to fight for their biocultural context to be recognized as well as being part of fulfilling their roles and responsibilities to the land. Similarly, the political history shares stories of resistance, but further contextualizes the current social and political reality of Akwesasne as it relates to Land Claims. The context specificity of Akwesasne reveals and emphasizes

the importance of relationships with the land and between *Akwesasronon* that affirmed in various forms (i.e. story, ceremony, and traditional practices). Additionally, these relationships are grounded with women and embedded in *Kanienkeha*. Drawing on these relationships in forest stewardship can help Akwesasne build support systems for resilience and help heal/grieve from the previous problems that created and dislocated relationships between *Akwesasronon*, forests, and all other aspects of creation. Additionally, newly reclaimed lands provide the prime opportunity to implement proactive planning and management of resources in those areas. A biocultural forest stewardship strategy is not just about maintaining and enhancing ecological integrity but is a means of aiding in the restoration and revitalization of connections between the *Akwesasronon* and their homeland that were historically compromised politically and environmentally. *Akwesasronon* have roles and responsibilities to fulfill to the rest of creation and forest stewardship can serve as a conduit to aid in the reinforcement and conservation biocultural diversity in Akwesasne through holistic approaches in research and associated recommendations, which will be demonstrated through this research.

Methods

Study Area

Akwesasne has a land base 14,648 acres in the Southern Portion and 7,400 acres of land in the Northern Portion (Hammill, 2004). The population of Akwesasne is approximately 12,000 *Akwesasronon (Akwesasne, 2019)* with 3,228 in the Southern Portion ("Geographic Identifiers: 2010 Census Summary File 1 (G001), St. Regis Mohawk Reservation, Franklin County, New York," 2010). Currently, there are approximately 7,070 acres of forest land in Akwesasne (~48% of total land), which are dominated by quaking aspen (*Populus tremuloides*), basswood (*Tilia americanan*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), silver maple (*Acer*

saccharinum) and bottomland hardwoods (Brigden and Easton, 2007). Agricultural lands have been reduced from ~ 54% in 1942 (~7,900 acres of total land) to ~8% in 2014 (~1,170 acres of total land). The soil profile of Akwesasne is characterized by underlying bedrock made up of Ogdensburg dolostone, saltwater intrusions, glacial till, and new deposits from stream channels (Trevail, 2005) with elevations ranging from 160 to 230 feet mean sea level.

The Stakeholder Interview Process

The research involved Human Participants, so an Internal Review Board (IRB) approval from Cornell University was required. This process created a collection of documents to be submitted: Recruitment Script for Collaborative Gathering in Akwesasne; Written Informed Consent for Collaborative Gathering in Akwesasne; Collaborative Gathering Guide for Akwesasne; Recruitment Script for Individual Interview in Akwesasne; Written Informed Consent for Individual Interview in Akwesasne; Individual Interviews Guide; and Contact Information Sheet. These documents can be found in the Appendix E - K. IRB approval was received on 10 May 2017.

Prior to the individual interviews, we hosted a Collaborative Gathering at the Akwesasne Authority's Training Center on 3 June 2017 to introduce the project and individuals involved. It was a chance to bring the community together and share their ideas about their culture reflected in Forest Stewardship. Even the name, Collaborative Gathering, required deliberation, as a workshop may be misconstrued to mean a teaching event within the community context. The gathering was attended by 26 individuals, *Akwesasronon* (Community Members; n=23) and Non-Community Members (n=3), and led by a combination of *Akwesasronon* and Cornell Collaborators. The participants were not individuals that would traditionally gather together in the same place due to histories of conflict over ideology that separated the

community, but they came to support the research and *Akwesasronon* researcher. The *Ohenton Karihwatehkwen* was recited by Mohawk Nation Longhouse Member, Edward Gray, to open the meeting and it was closed by a Kanienkehaka Longhouse Member, Harriet Boots. This moment speaks to the importance of drawing on Akwesasronon kinship networks to implementing a research project. People will put aside their differences to support the success of their youth. Further, there were intersecting affiliations and positions, which were SRMT (n=5), Mohawk Council of Akwesasne (MCA) (n=3), Catholic (n=2), Mohawk Nation Longhouses (n=5), Kanienkehaka Longhouse (n=2), Medicine People (n=4), Cultural Knowledge Holders (n=11), Leadership (n=7), Youth (n=6), Young Adults (n= 5), Adults (n=5), and Elders (n=9). The goal of this meeting was to elicit values, primarily accomplished by posing four questions:

(1) What is important about forests to *Akwesasronon*?
(2) What are aspects of forests that you feel strongly about?
(3) What activities do Akwesasronon engage in within the forests that are important?
(4) Are there important beings, such as plants, animals, and trees, that should be represented in this project?

The responses of those in attendance were recorded on a flip chart. Ideas shared in *Kanienkeha* were translated in real time by a fluent speaker, Kathy Herne. The ideas shared were reorganized through a reflexive process into value and sub-value categories, which were expressions of the information from the Collaborative Gathering (Appendix A). The values and sub-values were also visually expressed in a cognitive map to reflect their complex connectivity and aid in the interview process (Appendix B). These values and sub-values would be used in the semi-structured interview process and expanded upon to generate greater depth to the knowledge shared at the Collaborative Gathering.

Thirty-seven semi-structured interviews were conducted between 16 June and 15 August 2017. The interview process was chosen as a means to understand the relationship of Akwesasronon with their culture and forest stewardship, draw out personal interpretation and stories, and be flexible enough to follow and inquire particular dimensions of knowledge that are outside the questions of the Interview Guide (i.e. What is this tree used for?) (Seidman, 2013). Participants included 23 females and 14 males ranging in age from 25 to 88 years. Ten of those in attendance at the Collaborative Gathering, including the *Kanienkeha* translator, were interviewed to expand upon the values and sub-values. Snowball sampling was used to identify other Akwesasronon to interview that represented different groups and affiliations (i.e. Mohawk Council of Akwesasne, Saint Regis Mohawk Tribe, Mohawk Nation Longhouse, Kaniekehaka Longhouse, Medicine People, Clan Mothers, Catholics, and many others) present in Akwesasne. Interviews averaged 61 minutes (range: 25 - 156 minutes). Five interviews were conducted in groups of two at the request of the participants. Furthermore, one interview was conducted in an unstructured manner because the participant, an elder, did not understanding the framing of the questions, so questions were shifted towards an inquiry into the way forests fit into their life history. The other two unstructured interviews were opportunistic and explored medicines and the social structure of Akwesasne. Thirty-two interviews were audiotaped and transcribed verbatim and five were recorded by hand in a field notebook.

An individual interview guide was created to help guide the semi-structured interviews (Appendix J) and adjusted following the Collaborative Gathering (Appendix L). As a result of learning and experience from early interviews, the guide underwent a few iterations as the summer of 2017 progressed without changing the

key substance of the questions derived from the collaborative gathering. The guide had three sections of questions:

(1) Thoughts and Suggestions of Collaborative Gathering Results –
   a. Do you have values or sub-values to add to those identified at the Collaborative Gathering? If so, what is important about forests to the Akwesasronon?
   b. Would you explain these values in a different way or do you have any stories or examples to share for these values or sub-values?
   c. Can you draw connections between sub-values and explain them?
(2) Forest Stewardship –
   a. How would you recommend we care for forests with these values identified in mind?
   b. Are there any special rules and regulations for behavior regarding forest use?
   c. How do we remind the community of their responsibilities?
   d. Do you know of any traditional stories about the forests?
(3) And Context Specific Questions –

The third section varied in the number of questions, but they reflected the interviewee's background and knowledge regarding a particular relation to the community or culture.

This arrangement was slightly adjusted on July 10th, 2017 due to confusion from participants about what was meant by question 1.a (above). Further, the embedding of one question within another appeared to be the source, which was exacerbated by the valuation of the forest beyond practical usage for some individuals and language barriers. However, it was decided to split question 1.a into two questions: (1.a.a) What is important about forests to the *Akwesasronon*? and (1.a.b) Do you have values or sub-values to add to those identified at the Collaborative Gathering? The change was meant to help participants situate their thinking around forest stewardship. This appeared to alleviate the confusion in most cases, but in others it required further explanation and reiterating the question.

Qualitative Analysis

Initially, individual interviews were meant to expand upon the values and sub-values identified at the Collaborative Gathering. The individual interviews were coded on paper for the first cycle of coding to increase attention to detail and nuance. Further, this process of coding on paper provided an additional step to reorganize and reflect on the codes as they were uploaded and reorganized into ATLAS.ti (Muhr, 1997) for the second cycle coding. The values and sub-values identified in the Collaborative Gathering formed the basis of the first strategy for first cycle coding, which were 8 thematic codes and 21 sub-codes, plus an additional 3 codes, other, issues, and quotes, were used to capture emergent themes or important moments that were not or could not be captured in the original codes. A thematic code "is an extended phrase or sentence that identifies what a unit of data is about and/or what it means" and a sub-code is "a second-order tag assigned after a primary code to detail or enrich the entry" (Saldaña, 2015, p. 396). The following thematic codes and sub-codes were utilized in the first cycle coding strategy:

(1) Culture –
    a. Indicators
    b. Basket Making
    c. Teachings
    d. Language
    e. Names
    f. Lessons
(2) Connection to Land –
    a. Experience
    b. Roles and Responsibilities
    c. History
(3) Learning –
    a. *Ononkwa'shòn:'a* (Traditional Medicine)
    b. Role Models
(4) Spirit –
    a. Sacred Space
    b. Ohero:kon
(5) Recreation –
    a. Youth
(6) Biological –

       a. Tree Species
       b. Other Species
  (7) Life-Sustaining –
       a. Food
       b. Shelter
       c. Fuel
       d. Services
  (8) Wellness –
       a. Health
  (9) Other
  (10) Issue
  (11) Important Quotes

A color scheme was developed based on these thematic codes and sub-codes (Appendix C). The predetermined sub-codes utilized required expansion and fluidity, so they did not remain static. This was accomplished through adding additionally sub-codes to thematic codes as they emerged from the interviews. The addition of sub-code and evaluation of thematic codes were recorded with analytic memos taken throughout the process, to document the process of thought and changes (Saldaña, 2015).

Continuing with the first cycle of coding, a second iteration of the coding strategy produced 12 thematic codes and 23 sub-codes:

  (1) Suppression of Knowledge –
       a. Schooling
       b. Suppression of Stewardship values
  (2) Source of Knowledge –
       a. Language
       b. Roles and Responsibilities
       c. Connectedness
       d. Identity
  (3) Stewardship –
       a. Scientific
       b. Values
       c. Fulfillment of Roles and Responsibilities
       d. Connection to Land
  (4) Spirit
  (5) Medicine –

a. Being There
        b. Practicality
    (6) Diversity –
        a. Species (All Beings)
        b. Values
        c. Perspective/Outlooks
    (7) Holistic Wellbeing –
        a. Economic
        b. Spiritual
        c. Basket Making
        d. Livelihood
        e. Healing
        f. Health
        g. Protections (+ and – Outcomes)
    (8) Species
    (9) Concerns
    (10) Passing on Knowledge/Learning and Re-inserting Stewardship Values
    (11) Gender Roles
    (12) Additional Important Codes

A second color scheme was developed based on these thematic codes and sub-codes developed in the second iteration of the coding strategy (Appendix D). This coding strategy was like the previous approach of coding and writing of analytic memos for expanding codes and sub-codes where necessary and document thoughts and insights throughout. The second cycle of coding was employed as coded interviews were uploaded into ATLAS.ti (Development, 1997) and, through an iterative process of reorganizing thematic codes and sub-codes, the interviews produced a final set of thematic codes and sub-codes. These provide the basis for a network analysis to understand the complex connectivity of the values and sub-values of Akwesasronon in relationship to forests.

The network analysis was undertaken in a two-step approach. The first step looked at the overlap that occurred between thematic codes and sub-codes, using ATLAS.ti's Co-occurrence Tool for analysis. The tool produced a Microsoft Excel table of co-occurrences between different codes (Appendix M - Y) that was analyzed

to observe codes and their co-occurred with a threshold of 10 co-occurrences (a number set by user). These co-occurrences were used to create a network utilizing the Network Builder tool in ATLAS.ti that allowed connections to be made into a visual representation. The linkages provided insight into the complex connectivity of relationships and values associated with forests in Akwesasne that must be considered in the forest stewardship recommendations.

Results

There were 11 thematic codes in the final set, resulting in 3,339 codes (Figure 2). Six of the thematic codes contained over 150 codes, which required a more in-depth inquiry with sub-codes. Six thematic codes broken into sub-codes were "Passing on Knowledge," "Source of Knowledge," "Concerns," "Holistic Health," "Stewardship," and "Medicines." Each of the six thematic codes will be discussed individually with their associated sub-codes. Three thematic codes had less than 60 codes and were broken down into sub-codes. The three thematic codes were "Diversity," "Spirit," and "Suppression of Knowledge". The choice to break-down the thematic codes in sub-codes was a decision made by the researcher based on the number of codes generated by each thematic code. The thematic codes provided the foundation for the value system of *Akwesasronon* in relationship to the forests. The last thematic code of "Species" is not a value per se but speaks to the complex connectivity between the thematic codes and sub-codes with the variety of species mentioned by *Akwesasronon*. Thus, it will receive its own discussion relating it to the other thematic codes and sub-codes.
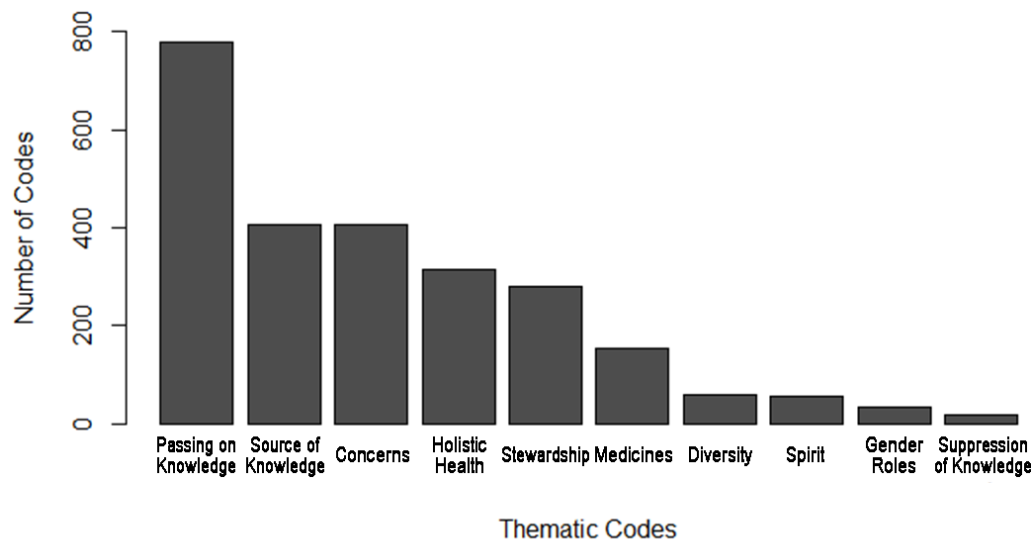
Figure 2: Thematic codes generated from 37 semi-structured individual interviews with Akwesasne community members conducted between 16 June 15 August 2017 with associated number of occurrence by interviewees (n), which are as follows: Passing on Knowledge (n=778); Source of Knowledge (n=407); Concerns (n=407); Holistic Health (n=316); Stewardship (n=280); Medicines (n=152); Diversity (n=58); Spirit (n=55); Gender Roles (n=33); Suppression of Knowledge (n=18)

Passing on Knowledge

"Passing on Knowledge" was a thematic code that spoke to the ways in which knowledge is shared throughout Akwesasne and across generations. Additionally, "Passing on Knowledge" was the most frequently mentioned thematic code (n = 778) in the participant interviews (Figure 2). This thematic code resulted in the creation of six sub-codes, including "Story," "Educate," "Practical Knowledge," "Knowledge Providers," "Resurgence," and "Teachings." (Figure 2). These are the various ways that knowledge is transferred across generations in Akwesasne and is accumulated. It is important to engage and access this so forest stewardship can target the sharing of information and engaging the Indigenous knowledge systems. The sub-codes create more specificity in the different mechanisms present in the Akwesasronon knowledge sharing, which forest stewardship can access and influence through the interconnected system present in Akwesasne
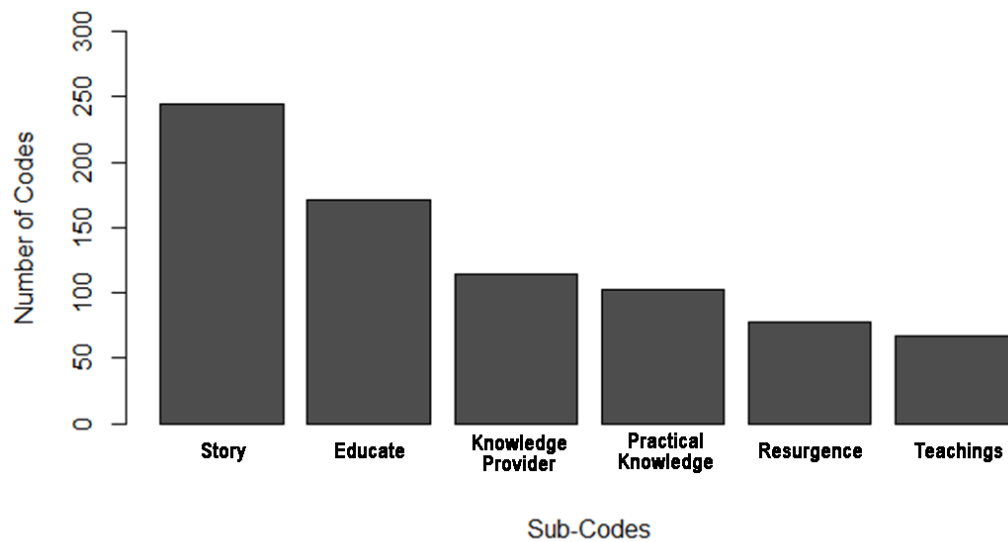
Figure 3: Sub-codes associated with Thematic code, Passing on Knowledge, generated from 37 semi-structured individual interviews with Akwesasne community members conducted between 16 June 15 August 2017 with associated number of occurrence by interviewees (n), which are as follows: Story (n=245); Educate (n=171); Mentors (n=114); Practical Knowledge (n=103); Resurgence (n=78); Teachings (n=67)

The sub-code "Story" was the most mentioned aspect of "Passing on Knowledge" (Figure 3). "Story" occurred in 245 moments across the participant interviews and was a common theme in almost all the interview stories shared. The stories were diverse, and relationships emerged from them that referred connections of family, culture, land, and forests. "Story" was composed of three different types of stories, which were personal, historical, and traditional. The personal stories were the most common and spoke about family, themselves, and community members. These stories varied in the times that they occurred, as some happened decades ago or within the days of the interview. However, they had something to share about a relationship with the forest. A story does not need to be considered "traditional" in order to convey a significant cultural connection to forests. They could be something as personal as telling your daughter stories that embedded knowledge about connection with the environment or a reflection on the beauty seen on a boat ride. The traditional stories

revealed a dimension of dynamic interpretation, which means that they changed across life and context. It may hold a meaning for a person in that one time and moment, but they find new meaning and knowledge as they move through different stages of their life. This was seen in the significance of the *Tsi Kiotonhwentsiatáhsawen* to interviewee, Amberdawn Lafrance, who reflected on hearing the story from different community knowledge holders. Different storytellers opened a whole new understanding of *Akwesasronon* knowledge and relationships. She said, "And now I have like three versions of [*Tsi Kiotonhwentsiatáhsawen*] in my head and a totally new understanding of what it means, and the whole story pertains to every little thing in your life." *Tsi Kiotonhwentsiatáhsawen* demonstrates the dynamic meanings and complex connectivity found in stories through the various interpretations and diverse applications about relationships and cultural knowledge. History was another dimension of the sub-code, "Story," which speaks to the importance of oral tradition within *Akwesasronon* knowledge networks. There were stories shared about the first encounters with settlers along the St. Lawrence and conveyed Traditional Ecological Knowledge (TEK) about the forests being denser with larger trees. Further, they reflected the history of basket-making in Akwesasne as means of income generation, the relationship between Catholics and Traditionalists, Artwork, and the relationships with Settler States. There is a rich history in Akwesasne that is about conflict, culture, resilience, and resistance, which are characteristic of *Akwesasronon* identity. Furthermore, the forests were demonstrated to be a significant source of knowledge and have a complex relationship with *Akwesasronon*. Forest stewardship can draw on the power of these stories to engage *Akwesasronon* and the forests in ways that meet their personal and cultural needs.

Following "Story," the sub-code of "Educate" occurred most as part of the thematic code of "Passing on Knowledge" and was mentioned 171 times during the

participant interviews (Figure 3). "Educate" refers to the purposeful transferring of knowledge or teaching and was utilized to reduce confusion with "Teachings," which is language used by *Akwesasronon* to refer to knowledge from ancestors. "Educate" was mostly discussed in two dimensions of strategies and characteristics of educating *Akwesasronon*. The most common theme contained in the sub-code was about different strategies that can be taken to engage a variety of demographics in Akwesasne. The main focus was on educating the youth through workshops, engagement with elders or family, *Ohero:kon*, storytelling, or a special curriculum similar to that used in the Akwesasne Cultural Restoration Program. The community has a strong desire to care for their greatest resource, which is the youth. It is their goal to engage them with a variety of strategies that emphasize respect for the land, medicines, language, culture, traditional skills, roles and responsibilities, and different teachings to help them in their lives. There are specific kinds of cultural knowledge that *Akwesasronon* want for their youth. The interviewees described the characteristics of youth education as being connected to the land, family-centered, and grounded in the *Akwesasronon* cultural framework. Forest stewardship can benefit from the understanding of the sub-code "Educate" because it provides directions for the way to provide education for Akwesasronon, specifically youth. Further, it has an ability engage with the cultural knowledge systems in a respectful way.

"Knowledge Providers" showed the people that were referenced in relationship to different cultural knowledge present in Akwesasne and was mentioned 114 times in the participant interviews (Figure 3). The knowledge held by providers is an essential component of promoting cultural integrity and continuity. These individuals are considered "experts" or holders of important cultural knowledge by *Akwesasronon*, even if they do not recognize themselves as "experts." Some of the "Knowledge Providers" mentioned were interview participants, such as Eddie Gray, Darrel

Thompson and Louise Herne-McDonald, as well as others that have passed away, such as Ray Fadden and Ernest Benedict. Further, an interesting aspect of "Knowledge Providers" is that they are represented in families too, such as parents, grandparents, aunts and uncles. "Knowledge Providers" are a part of the social fabric of Akwesasne and education occurs in these intimate spaces of people's lives that are drawn out in their reflection. Interview participant, Kathleen Herne, conveyed a story about picking berries with her family in the mountains, which was where she was taught about language, medicines, and culture. However, she said, "It wasn't like 'I'm going to teach this today, *Konien:ah'* (My Child)." Her statement speaks to the ways that knowledge transfer occurs in Akwesasne, which manifests through doing and building relationships in the forests. Forest stewardship needs to have a means of access to cultural knowledge as it relates to the forest through "Knowledge Providers," which are widely available in Akwesasne. Further, education can be made more effective when it is done on the land and family-centered, which brings together the necessary relationships with culture, language, and land.

"Practical Knowledge" refers to specific knowledge about forest resources, such as trees, medicines, basket-making, harvesting, and hunting and the sub-code was recorded 103 times in different participant interviews (Figure 3). Further, this knowledge demonstrated a respectful dimension to engaging the land and accessing forest resources. Interestingly, "Practical Knowledge" co-occurred 149 times with "Species" (Appendix Q) within the participant interviews, which speaks to the intimate connection between *Akwesasronon* and the land. This research was focused on forests, so the "Practical Knowledge" shared was connected to trees. For example, the black ash tree is important to the community and there is a lot of knowledge available about its different characteristics and usages. It is important as a medicine, but also as a source of identity and survival. Akwesasne is well known for the fancy

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baskets and is a heritage that people celebrate in their families, which grew out of the need for income to support themselves and their families. However, there were other trees that *Akwesasronon* shared a wealth of "Practical Knowledge" about, such as Maple, Oak, Birch, and Cedar. Furthermore, there was a lot of sharing about the harvesting of trees for firewood, which included times of the year for collection and the characteristics of different types of wood. Interview participants raised concern about overharvesting, which would not occur if harvesting occurred in a respectful manner and paid attention to the correct timing, such as collecting trees in the fall when they are resting. There is a relationship that needs to be respected and acknowledgment between the harvester and trees. The harvester needs to ask the tree for permission to harvest it and let the tree know how it will be used. This form of engagement gives the tree agency and the harvester a responsibility to be forthcoming with the tree about what it is going to be used for. This sets up a framework for a respectful relationship to occur. A forest contains an expanse of knowledge and utility for the community of Akwesasne and the community only needs to ask and acknowledge the forests for the resources they are provided. Forests stewardship could draw on this approach to engage with the forest, which will help in keeping a healthy forest and community through sharing "Practical Knowledge" that needs to be practiced on the land.

"Resurgence" is reflective of the current ability of *Akwesasronon* to engage their biocultural context and kinship networks without stigma and represents a sub-code of "Passing on Knowledge. The sub-code occurred 78 times through coding the participant interviews (Figure 3). Resurgence speaks to the resistance, resilience, and adaption of *Akwesasronon* to hold on to and carry their knowledge into the next generation, considering social pressures to let it go. This sub-code intersects with "Story," "Teachings," and "Ceremonies." As Elvera Sargent said, "Elders used to say

if you know how to make a basket, you will never go hungry." The people of Akwesasne drew strength and resistance from the land and their traditional practices, which were essential during difficult times in the past, present, and future. Additionally, the reclamation of cultural practices helps restore and strengthen familial and kinship relationships between *Akwesasronon* and the land. The hunting trips of Audrey Herne, interviewee, brought her family closer together to learn and engage the land. Further, "Resurgence" captures the ingenuity of cultural knowledge and practices that were able to be dynamic and adapt to changing circumstances. Eric Sunday, interviewee, utilized his understanding of the habitat needs of minnow populations in Akwesasne and basket-making to utilize the excess material to build a structure to promote a biodegradable habitat structure. This moment provided a direct connection between the water, fish, and forests. Further, the forest was able to help address an environmental need in the water for minnow populations. "Resurgence" intersected with youth as a means of linking cultural knowledge to the next generation. Thus, youth need to have access to cultural knowledge and the land, so they can be empowered and educated. The land is an essential part of this relationship because the resistance is embodied in the protection of it. Harriet shared a sad story about the cost of protecting forest because her friend lost his life protesting out west against extractive industries. It can be dangerous, but protesting and protecting the land is an essential part of speaking for those that do not have a voice and fulfills an essential part of *Akwesasronon* roles and responsibilities. Forest stewardship is another mechanism for "Resurgence" to work through and engage *Akwesasronon* with forests as they reclaim their cultural heritage.

The sub-code, "Teachings", occurred the least in "Passing on Knowledge" and only appeared 67 times across participant interviews (Figure 3). This sub-code connects with traditional stories, which have "Teachings" embedded in them.

However, it speaks more to the enactment of roles and responsibilities between people and the rest of creation. There are many "Teachings" that are about respectful interactions with the environment through acknowledgement and engagement. Further, they have diverse interpretations that can vary across contexts and time with an array of applications within a person's life or relationship with the natural world. A frequent topic that spoke to "Teachings" was the Tree of Peace, or white pine, which is an important aspect of the Peacemaker's journey and sharing of *Kaianerekowa*. The white pine serves as a metaphor for the people, governance system, Haudenosaunee Confederacy and the three foundational principles, which have applications to other relationships beyond governance. It is the diverse interpretation of these "Teachings" that makes them powerful tools for the empowerment of *Akwesasronon*. Additionally, they help *Akwesasronon* reflect on their actions, so they are respectful. Thus, forest stewardship can draw on "Teachings" that promote respect, reciprocity, connection, and acknowledgement with the land.

Source of Knowledge

"Source of Knowledge" was utilized as a thematic code to identify the different ways that knowledge is generated and gained in Akwesasne. "Source of Knowledge" was mentioned 407 times in the participants interviews (Figure 2), the second most mentioned thematic code. Additionally, the coding process associated with this thematic code had four established sub-codes prior to analysis, which included "Language," "Roles and Responsibilities," "Connectedness," and "Identity (Appendix D). However, "Roles and Responsibilities" was the only sub-code conserved throughout the analysis. The other sub-codes were recategorized into new sub-codes that were titled "Ceremony" and "Complex Connectivity," which more closely reflected the characteristics of the thematic code. They are the various ways that knowledge is generated in chorus with and reflected in relationships with the land.

The knowledge informs *Akwesasronon* actions and engagement with the land, as a means of learning and connecting. The community is connected to the land through "Ceremony" and enact relationships of reciprocity through "Roles and Responsibilities." "Complex Connectivity" explores the different manifestations of the relationships and the way they emerge within the community from the land. Forest stewardship can be informed by "Roles and Responsibilities," which are reaffirmed by connections with the land through "Complex Connectivity" and "Ceremony."
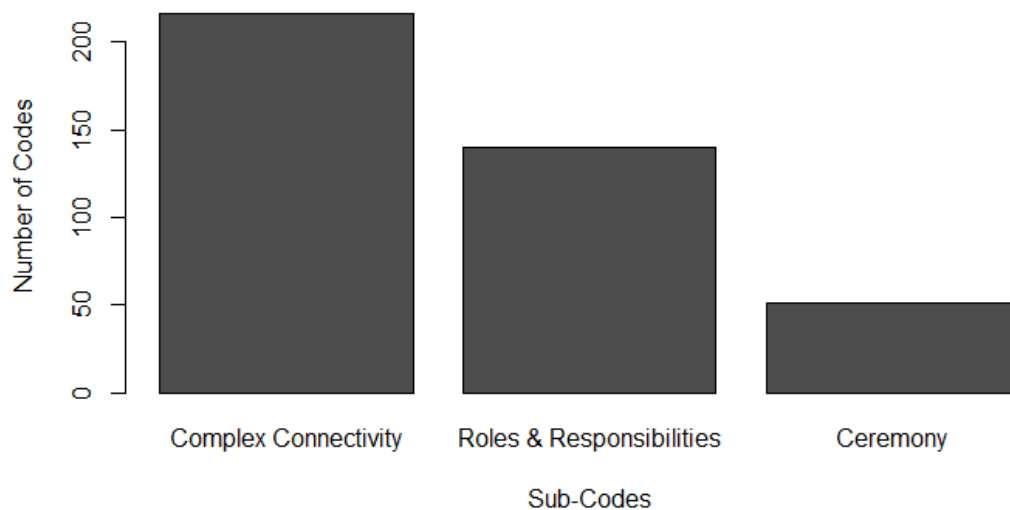
Figure 4: Sub-codes associated with Thematic code, Source of Knowledge, generated from 37 semi-structured individual interviews with Akwesasne community members conducted between 16 June 15 August 2017 with associated number of occurrence by interviewees (n), which are as follows: Complex Connectivity (n=216); Roles and Responsibilities (n=140); Ceremony (n=51)

The importance of "Ceremony" (n=51, Figure 4) cannot be understated because it is a means to acknowledge the community's relationship to different aspects of creation, even though it was least mentioned sub-code. "Ceremony" is a part of Haudenosaunee roles and responsibilities to the land, which are manifested through honoring and acknowledgment. *Akwesasronon* minds are brought into a space of gratitude for the gifts that the natural world provides through conducting ceremonies. Dean George, interviewee and faith keeper, spoke to how the cycle of ceremonies,

which are signaled by changes in the land. He said, "Well, you go to your garden. If you see them in flowering or some people have beans, they set the ceremony." He is responsible, among others, to be in contact with and pay attention to the land through gardening as well as other practices, so changes are noted, and ceremony times are set. There are ceremonies that are about enhancing connections with the land through fasting. *Oher:okon*, a coming of age ceremony, was discussed in strategies associated with the sub-code of "Educate." Through fasting, youth in *Oher:okon* are placed in direct contact with the natural world and it provides an opportunity for them to learn about their connections to the rest of creation. Additionally, it is a mode of knowledge generation within the *Akwesasrono*n biocultural context as the land serves as their teacher. However, fasting is not limited to the youth and is a process for all *Akwesasronon* to reconnect with the land and culture. Interviewees, Chelsea Sunday and Craig Arquette shared stories about the connection and empowerment that they experienced in their fasts. Another important "Ceremony" mentioned was the Naming Ceremony, which introduces *Akwesasronon* babies and their *Kanienkeha* names to the rest of creation. Thus, the rest of creation knows that *Akwesasronon* baby and have roles and responsibilities to fulfill to that child, and vice versa. These ceremonies are necessary for creating connections with the natural world. Forest stewardship is about connecting community with the forest, so it can draw on these connections generated through ceremonies.

"Roles and Responsibilities" (n=140, Figure 4) outline the reciprocal framework of commitment between people and the rest of creation in a complex web of relationships. They vary across genders, ages, clans and other aspects of creation. The *Ohenton Karihwatehkwen* provides the foundation and a reminder of the role and responsibilities of all of creation to each other through its recitation. Interviewee, Audrey Herne claims that it is supposed to be part of everyday practice. A daily

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practice of recitation has the potential to keep a constant connection with obligation to creation and admiration for the gifts that creation continues to provide. Another way of connecting with and acknowledging the land for use is through a tobacco offering. Offering tobacco opens up a time of reflection for individuals to consider the request that they are making of creation, which allows for a respectful relationship to be established with creation. Some *Akwesasronon* carry specific "Roles and Responsibilities," such as Clan Mothers. Interviewees, Louise Herne-McDonald and Harriet Boots are both bear clan mothers and carry the responsibility to name children during the Naming Ceremony. These names are held by the clans and passed through generations, which the clan mothers must make sure that two individuals do not share the same name. Names can only be passed when the person with name passes on, which a baby born can inherit and speaks to cycles of intergenerational knowledge present in this ceremony. Additionally, interviewee, Peggy Pyke-Thompson spoke to the people's responsibility to care for the environment and speak for those that do not have a voice. Forest stewardship has a place and is another aspect of "Roles and Responsibilities" that focuses on the fulfillment of *Akwesasronon* duty to protect the land and forests.

"Complex Connectivity" (n=216, Figure 4) is most concerned with the complex and interconnected relationships which are part of the "Source of Knowledge," but share connection to other thematic codes or sub-codes. The sub-code was the most coded (Figure 4) and showed connections to *Kanienkeha*, spirit, purpose, history, governance, practices, men and women, prophecies, and many others with overlap amongst them. The knowledge embedded in "Complex Connectivity" is about being in direct connection with the land, which emerge from the complex network of relationships. The relationships are multi-layered and support each other. For example, Basket-making is made up of complex networks of knowledge that feed into each

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other. The harvesting of the black ash tree requires adherence to proper protocol in "Roles and Responsibilities" for harvesting as well as "Practical Knowledge" about the correct tree to choose. *Kanienkeha* is a part of all these processes and allows for a deeper understanding of the basket-making process. It is out of this concept of interconnected relationships that Akwesasne received reparation for Natural Resource Damages Case and created the Akwesasne Cultural Restoration program. The only way that "Complex Connectivity" can be understood is through engaging in traditional practices on the land with *Kanienkeha* and the teachings intact. Forest stewardship can be strengthened in Akwesasne through an understanding and incorporation of "Complex Connectivity" into its approach on strategies implemented. It is a rigorous process but has the potential to provide a beneficial and transformative impact to Akwesasne.

Concerns

All interview participants conveyed "Concerns" about the environment (n=407, Figure 2). Initially, this thematic code only had the sub-code, "Changing Values," but later incorporated 6 other sub-codes which are "Loss," "Conflicts," "Barriers," "Teachings," and "Critique." It is these seven sub-codes together that provide insight into the "Concerns" of Akwesasronon connected with forests and represents their anxiety and hopes for the land and their future. These are the points that need to be addressed with the creation of a forest stewardship strategy so that *Akwesasronon* voices are heard and incorporated.
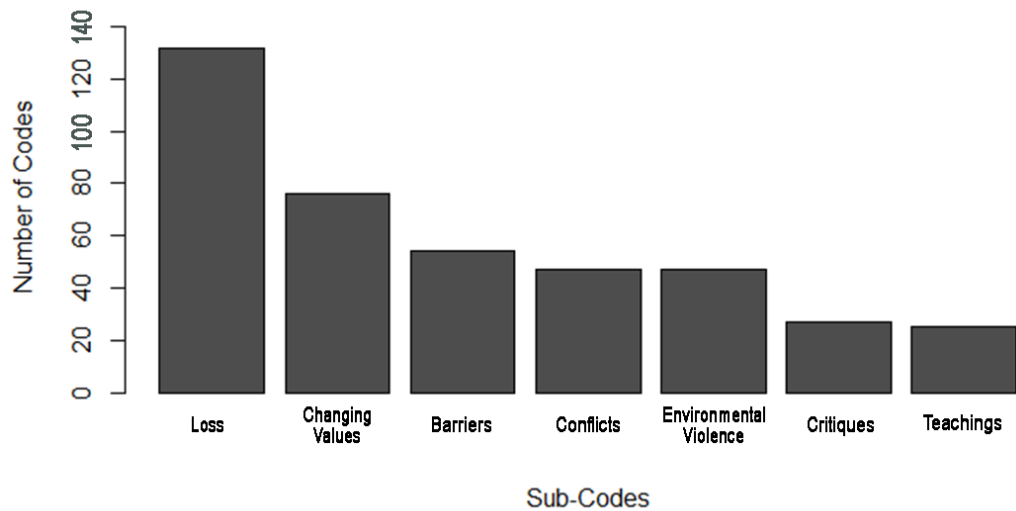
Figure 5: Sub-codes associated with Thematic code, Passing on Knowledge, generated from 37 semi-structured individual interviews with Akwesasne community members conducted between 16 June 15 August 2017 with associated number of occurrence by interviewees (n), which are as follows: Loss (n=132); Changing Values (n=76); Barriers (n=54); Conflicts (n=47); Environmental Violence (n=46); Critiques (n=27); Teachings (n=25)

"Loss" (n=132) was based in *Akwesasronon* fears that complex kindship networks would or could be disrupted and result in associated knowledge erosion, which reflect its high mention during interviews (Figure 5). The main aspect of "Loss" revolved around *Akwesasronon* disconnect with the land. This aspect of "Concerns" speaks to the need for Akwesasronon to be engaged with the land. *Akwesasronon* disconnect is present across the community, but peoples' minds need to be brought back into a place of acknowledgement and respect. "Concerns" need to be addressed so *Akwesasronon* fulfill their roles and responsibilities to the rest of creation. Interviewees noted that there is lack of education regarding cultural knowledge and connections to the land, which is the responsibility of *Akwesasronon* to educate the youth. Without education, disrespectful relationships can develop with the land (i.e. polluting, overharvesting). For example, Mary Arquette, interviewee, shared a story about Sally Benedicts medicine trail that was destroyed by a cross country team. They

did not know that Sally's trail was important and full of medicines, so their lack of education resulted in the destruction of important medicines. Another big source of anxiety for *Akwesasronon* is around climate change contributing to the extinction or reduction of culturally important species. There is an important Haudenosaunee prophecy that speaks to climate change, which will be expanded on the discussion of the sub-code "Teachings." Climate change is important to acknowledge due to "Complex Connectivity," which shows the complexity of relationships and knowledge systems in Akwesasne. The relationships and knowledge that could be changed forever due to human-caused sources contributing to climate change. The species and relationships disrupted by climate change may become a teaching about the ramifications of not fulfilling "Roles and Responsibilities" to the rest of creation. However, forest stewardship can aid in the development of proactive plans to engage the reality of "Loss" and the hope for the knowledge and relationships to buffered against their loss. Forest stewardship can take specific actions to gather knowledge from different knowledge holders and share appropriate knowledge throughout Akwesasne, so there are more people to carrying the teachings forward for future generations.

"Changing Values" (n=76, Figure 5) is connected to "Concerns," but focuses on the ways people have shifted their values and are no longer reflective of an *Akwesasronon* cultural framework. Although disconnect was an important part of the sub-code, "Loss," that intersects with "Changing Values." Some *Akwesasronon* have lost their connection with the land and are disrespecting the land through overharvesting and through different actions that negatively impact the land (i.e. littering). Further, these "Changing Values" were connected to changes in the familial structure and relationship with the clan system. *Akwesasronon* families are becoming more nuclearized due to single family homes, which disrupts the important

relationship between elders and youth. Further, individualism was seen by interviewees as a threat to the Haudenosaunee valuing of communalism, such as prioritizing individual needs over the community. The individualism discussed by interviewees appears to focus on selfishness, absence of mindfulness and overconsumption of resource promoted by mainstream society, which is exacerbated by the capitalism. Kathy Herne, interviewee, spoke to the influx of money from smuggling and the ways it contributed to drug abuse, which disrupted familial relationships. Additionally, she shared her perspective about the ways that excessive money created a generation of youth without a hard work ethic because they could have anything and everything they wanted. Smuggling and associated influx of money in Akwesasne is a complex issue that is beyond this capability of this research to adequately understand. However, the reality of smuggling appears to be a by-product of *Akwesasronon* inability to live off the land through traditional means, such as fishing or basket-making, because they do not generate enough income or cannot be sustainably practiced as the community has grown so large. Additionally, convenience was mentioned as part of "Changing Values" because engaging in traditional activities on the land is a labor-intensive task, which is exacerbated by the lack of a hard work ethic in the generations growing up with excessive money from smuggling. Eric Sunday and Audrey Herne, interviewees, spoke about the ease of going to Walmart for needed supplies rather than engaging in hard work and ingenuity to gather supplies through more traditional means. Forest Stewardship could help *Akwesasronon* in shifting the "Changing Values" towards activities and understanding that reconnect them with the land.

"Barriers" (n=54, Figure 5) are a serious consideration to be made within forest stewardship because it provides context for the various hurdles to gain access to the land. Time is a limited resource for *Akwesasronon* in today's social climate.

Akwesasronon are finding it difficult to make time to share stories with family or to say the *Ohenton Karihwatehkwen* in the morning. These moments are necessary for knowledge transfer to occur or to bring minds into alignment with the natural world. Thus, strategies need to be accessible to people with busy schedules. Another major "Barrier" noted was restrictions in access to different forests and lands for cultural practices to be carried out. Eric Sunday, interviewee, spoke about engagements with Conservation Officers on Barnhart Island. He noted that there are a lot of deer on Barnhart Island, but they cannot be accessed because of restrictions. His story helps convey the discomfort with an approach that utilizes laws and regulations to guide the actions of *Akwesasronon* in forest stewardship. However, the discomfort could be connected to the laws and regulations imposed by settler-states that affected the ability of *Akwesasronon* to engage in traditional activities. Regardless, laws and regulations are not a method that interviewees see as viable because it does not fit with Akwesasne. Instead, forest stewardship could draw on "Teachings" about "Roles and Responsibilities," which have the potential to be more widely accepted and effective. To expand the conversation on "Educate," there needs to be neutral spaces for people with varying levels of cultural knowledge and ideologies (i.e. Catholics) to feel comfortable attending events. It is through creatively addressing and engaging "Barriers" that a forest stewardship strategy can be successful in an *Akwesasronon* context.

  Akwesasronon do not only need to reclaim relationship with the land, but also with each other, themselves, and non-*Akwesasronon*. "Conflict" (n=47, Figure 5) helped provide clarity regarding the different social struggles experienced throughout Akwesasne's story, which were discussed in the political history. An important "Conflict" discussed by interviewees occurred in the 90s and left a large impact on Akwesasne and continues to fractionalize *Akwesasronon*. The 90s conflict was a

strong contributor to the creation of two longhouses, but not the only source. There are historical wounds that need to be healed, so the different knowledge holders from the two longhouses can bring their minds together through forest stewardship. The collaborative gathering had knowledge holders and leaders from both longhouses present, which speaks to the potential of forest stewardship to help in the mending of relationships between *Akwesasronon*. However, "Conflict" is not limited to those between *Akwesasronon* and extends to the internal struggles confronted, which are connected to imposed social pressures to reject or hide cultural heritage. Kathy Herne, interviewee, spoke about the internal "Conflict," which she sees as a byproduct of efforts to protect the youth. *Akwesasronon* want healthy and happy lives for their children, but social dynamics generated fear of limitations from cultural traditions and knowledge. This revolved around the mistreatment of *Akwesasronon* for being too "Indian." The "Conflict" was intensified by the power of Catholicism in Akwesasne and fear of Residential Schools. People were punished for speaking *Kanienkeha*, so the language was lost in many families. Thus, *Akwesasronon* "Conflict" with each other and personally needs to be addressed so that cultural knowledge and relationships can be reclaimed. Social dynamics have shifted in and around Akwesasne, which resulted in Catholicism's loss of power and influence. Further, Akwesasne has entered an era of cultural acceptance and revitalization where youth can celebrate their cultural identity and be strengthened by it. Additionally, "Conflict" is present with science in Akwesasne, which was noted by interviewees. The distrust of science is connected to a long history of disrespect and lack of willingness to understand the biocultural context and concerns of *Akwesasronon*. For example, *Akwesasronon* are strongly opposed to pesticides and genetically modified organisms, so their use in forest stewardship needs to be carefully negotiated through education and community engagement. Forest stewardship could serve as a means of mending

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relationships in Akwesasne between *Akwesasronon*, themselves, non-*Akwesasrono*n and science through understanding and negotiation. The healing of relationships will make the community's knowledge and cooperation accessible to forest stewardship and increase the potential for success.

"Environmental Violence" (n=46, Figure 5) is focused on damages to the land, which spread across Akwesasne and disrupted knowledge systems and kinship relationships. "Environmental Violence" primarily relates to pollution and development, which were shown to impact the land and people. The pollution in Akwesasne revolves around the research discussed within the environmental history that explores the impacts of environmental contaminants. The community used to be able to depend on the water and Joanne Swamp, interviewee, shared that they used to be able to drink the water from the river. This is no longer possible and there is fear generated throughout the community about being exposed through fish consumption or its presence in the air and land. However, the pollution is not only from non-*Akwesasronon* or industrial development in the territory. Interviewees acknowledge the sources of pollution and "Environmental Violence" coming from Akwesasronon. There is a need for Akwesasronon to hold themselves and each other accountable for their own contributions to "Environmental Violence." Additionally, there is a concern around development in Akwesasne by *Akwesasronon* that could disrupt relationships with the land, such as clear-cutting of forests for houses. There is a need for homes in Akwesasne, but housing development needs to be balanced with cultural needs of the community. Forest stewardship can aid in addressing environmental pollutants by through having areas conserving areas that are away from the industrial sector and protecting lands from development.

"Critique," (n=27, Figure 5) was most apparent during the semi-structured interview process when interviewees were asked to expand on definitions (Appendix

A) and discuss connection within the fuzzy cognitive map (Appendix B) of values and sub-values connected to forest stewardship. This part of the semi-structured interview process was meant to be a generative activity for participants, so they could add their knowledge to the definitions, connections, and make suggestions in ways that they were most comfortable either through the definitions list or visual representation of them. The cognitive map proved to be the most effective and drew the attention of participants. People pointed out that things like Elders, water, sun, and others were missing from the fuzzy cognitive map. A particularly strong and critical critique came from Stacy Huff, interviewee, who was concerned about the separation of culture from the forests because they are supposed to be one. She spent time focused on this point and invoked stories about her relationship with her granddaughter. Her critique was important, among others, in making the point about the holistic ideology of Haudenosaunee. Forest stewardship strategies need to be holistic in their manifestation so it is more inclusive of kinship relationships and culture is woven throughout, which cannot be treated as a separate issue.

"Teachings" (n=25, Figure 5) are distinct from those sub-coded in "Passing on Knowledge" because they are about *Akwesasronon* not knowing them or serve as warnings. There were concerns raised about *Akwesasronon* not knowing their "Roles and Responsibilities," which can have consequences for future generations access to cultural knowledge and kinship relationships. The acquisition of these "Teachings" by *Akwesasronon* has the potential to shift their engagement with the land through understanding their impacts on future generations and relationships with the land. The prophecies serve as warnings about events that may happen if "Roles and Responsibilities" are not fulfilled. Jonelle Beauvais, interviewee, mentioned a prophecy that was about trees dying from the top-down, which are an indication of the worlds end and could also be about climate change. However, the end of the world is

not about the "world ending", but it refers to a big change happening. The potential effect on *Akwesasronon* identity and culture are frightening. Additionally, *Akwesasronon* are already seeing the impact of climate change with interviewees commenting on the changes during winter (i.e. winters being shorter and having less snow), which may affect forest ecology and cause the changes species presence and abundance. Kenny Perkins, interviewee, acknowledged that the change is coming, but he was hopeful that the people will get through it. The teachings of the ancestors and continuation of the culture will help the people make it through difficult changes in the environment. Forest stewardship can aid in preparing the community for changes coming through supporting and promoting activities on the land to educate *Akwesasronon* about forests, with their associated foods and medicines, as well as engage in activities to make forest healthier and more resilient. Through engaging in these activities, forest stewardship could help *Akwesasronon* in fulfilling their "Roles and Responsibilities" to care for the land and reinforce relationships between people, each other and the land as well as associated knowledges. Additionally, forest stewardship should be attentive to the potential shift in species presence and abundance through proactive and adaptive strategies to protect their continued existence in Akwesasne and their associated knowledges.

Holistic Health

Forest stewardship needs have a dimension focused on health due to the complex connectivity between the people and lands. However, the conceptualization needs to be grounded in a holistic approach (i.e. mental, physical, emotional, and spiritual), which led to the creation of the thematic code "Holistic Health" (n=316, Figure 2). The thematic code was originally composed of 7 sub-codes, but "Spiritual" was excluded due to too few codes. The 6 sub-codes used were "Economic," "Health," "Basket-Making," "Livelihood," "Healing," and "Protection." These provide insight

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into the ways that a "Holistic Health" approach can benefit a forest stewardship strategy and *Akwesasronon* by drawing on their relationships with the land to be healthy and balanced.
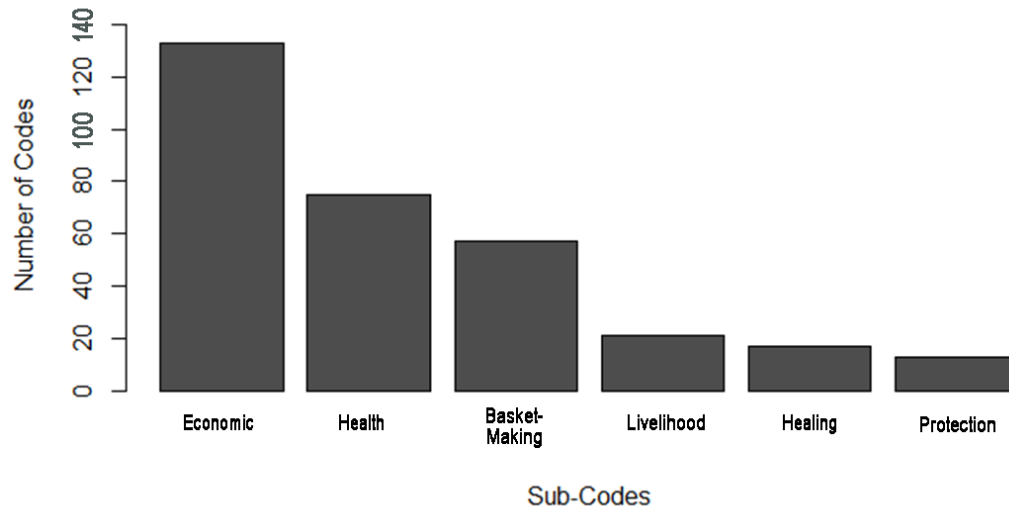
Figure 6: Sub-codes associated with Thematic code, Holistic Health, generated from 37 semi-structured individual interviews with Akwesasne community members conducted between 16 June 15 August 2017 with associated number of occurrence by interviewees (n), which are as follows: Economic (n=133); Health (n=75); Basket-Making (n=57); Livelihood (n=21); Healing (n=17); Protection (n=13)

The forest has "Roles and Responsibilities" to fulfill to *Akwesasronon*, which "Economic" (n=133, Figure 6) exposes. Forests were given the responsibility to provide the material and spiritual resources for survival and health of people. Food was a common aspect of "Economic." Maple, leeks, and berries were mentioned as important foods to the community that were provided by forests. Accessing provisions of the forests requires the enactment of practices of hunting and gathering. Additionally, some *Akwesasronon* still use woodstoves for heating their homes, which forests support through the provision of firewood. Elders noted that woodstoves were more prevalent when they were younger, so the need for firewood was more prevalent across Akwesasne. Interviewees suggested using standing dead trees for firewood rather than live trees. However, Mary Herne, interviewee and elder, pointed out that

they used both living as well as standing dead trees and both were necessary, so woodstove pipes do not burn, which could also happen from burning pine due to its high sap content. Furthermore, the forests are providers of oxygen, shade, shelter, medicines, income, and foods. Timber is utilized for building homes, longhouses, lacrosse sticks, rattles, cradle boards, and baskets. Forest stewardship could draw on the "Economic" dimensions of forests to draw *Akwesasronon* into the forest and learn the various ways they can utilize it in a sustainable way. The relationship between *Akwesasronon* and forests is reciprocal because the people have a responsibility to utilize the resources just as much as the forest has the responsibility to provide them.

A holistic conceptualization of health from the Indigenous perspective draws on the "Teachings" about the medicine wheel, which is composed of physical, emotional, spiritual and mental health. The holistic perspective of health was sub-coded under "Health" (n=75, Figure 6) and spoke to *Akwesasronon* health being embodied in their relationship with the land. *Akwesasronon* need to be in the forest in order to access the benefits for their health. This was explained by interviewee, Della Adams, in her approach to helping people balance their holistic "Health". The physical, emotional, spiritual, and mental dimension of holistic "Health" need to be balanced, as too much focus on one aspect can make a person unbalanced in others. Thus, a well-balanced person makes time for all dimensions of "Health." Otherwise, it could potentially result in imbalances and health problems, such as depression. Forests connect to this holistic conceptualization of "Health" through the provision of resources and space for maintaining "Health" throughout Akwesasne. Thus, forest stewardship can help create a healthier community through the provision of spaces for *Akwesasronon* to access medicines and keep themselves balanced mentally, physically, emotionally and spiritually.

"Basket-Making" (n=57, Figure 6) was important to sub-code within "Holistic Health" because it has and continues to be an important part of *Akwesasronon* identity and survival. Les Benedict, interviewee, spoke to the changing forms of baskets that reflected their utility, such as corn washing baskets, fish baskets, and fancy baskets. The forms of "Basket-Making" in Akwesasne have a dynamic dimension to meet utilitarian needs, such as corn baskets for processing white corn for cooking, as well as a means of cultural and artistic expression, such as fancy baskets. Akwesasronon basket-makers are well known for their fancy baskets which were an adaptive strategy to meet the income needs of families by selling and appealing to non-*Akwesasronon* desire for Native American products. A common motif in the interviews was remembering families that participated in the "Basket-Making" traditions. Rod Cook, interviewee, shared stories about his grandmother that made baskets until her arthritis would not allow her anymore. Tina Square, interviewee, shared a story about her great-grandmother, Mary Adams, and the wedding basket for the Pope and was the recipient of many awards. The basket referred to by Tina Square was gifted to John Paul II in 1980 to celebrate the beautification Kateri Tekakwitha (Thornburn, 2001) and is now the patron saint of the *Kanienkehaka.* The story of Mary Adams speaks to the importance of Catholicism in Akwesasne as well as the pride in familial relationships. Additionally, stories of basket-making traditions families are a celebration of resilience that *Akwesasronon* women embody as they provide for their family and garnering many awards and recognitions for the practice of their craft. "Basket-Making" is an important aspect of forest stewardship because the practice could be lost due to the impact of Emerald Ash Borer (EAB) on black ash trees. The loss of black ash trees could be very disrupting to *Akwesasronon* knowledge systems and kindship networks with and to the forests. It could produce similar cultural impact, loss of cultural knowledge and language that the fishing tradition experienced as direct

result of environmental contaminants and was discussed in the environmental history of Akwesasne. Forest stewardship can engage this reality and work to find alternative basket-making material, lessen the impact of EAB, or develop mechanisms for documenting "Basket-Making" knowledge related to black ash trees.

Livelihood" (n=21), "Healing" (n=17), and "Protection" (n=13) were discussed together because they occurred in very low frequencies when compared with the other sub-codes (Figure 6). These can be explained in their connection with each other and other aspects of "Holistic Health." "Livelihood" was an aspect that connects to the cultural practice of "Basket-Making," but includes additional practices of hunting and harvesting in forests. *Akwesasronon* relied on forest resources for their "Livelihood" during the potash era and working in the logging camps. Forests continue to be a source of "Livelihood" for basket-makers and woodworkers that make cradle boards, rattles, and lacrosse sticks. "Healing" is distinct from "Health" because it is focused on the moments that people directly engaged with the natural world and were healed. The forest is a space to engage in activities that help people to heal from different afflictions. Angello Johnson, interviewee, suggested that being in the forest is "Healing" for the mind. Other interviewees shared a similar perspective on being in the forest and it being "Healing" for them. It is through being present in the forest surrounded by the natural world that "Healing" occurs for Akwesasronon. Additionally, the forest provides "Protection" through the shelter for Akwesasronon, plants, animals and birds. Mary Arquette, interviewee, suggested that the forest is protected by black flies, horse flies, and mosquitoes. The black flies, horse flies, and mosquitoes have a responsibility to keep people out, so medicines and food can grow. The forest is a safe space for other plants and animals to be protected until it is time for them to fulfill their roles and responsibilities. "Livelihood," "Healing," and "Protection" are all present and provided by the forest. It is part of its roles and

responsibilities to maintain a space that the different parts of creation can access the provisions it provides. Forest stewardship can incorporate these elements to create space and opportunity for engagement and learning about the many provisions of forests and respect it. Further, it is through *Akwesasronon* being in contact, learning about, and utilizing the forest that they can fulfill their roles and responsibilities to it.

Stewardship

      "Stewardship" (n=280, Figure 2) was used to add depth and discussion around the ways that *Akwesasronon* envisioned forest stewardship strategies for the forest landscapes of Akwesasne. The analysis of the thematic code began with "Fulfillment of Roles and Responsibilities," "Connection to the Land," "Values." and "Scientific." However, "Scientific" was not found to be significantly present and recoded under "Fulfillment of Roles and Responsibilities." Additionally, "Awareness" emerged throughout the analysis and provided an interesting dimension to forest stewardship around community engagement. These sub-codes associated with "Stewardship" open up important perspectives and guidance for the kinds of forest stewardship strategies that the community sees as necessary and viable within Akwesasne's context specificity.

Figure 7: Sub-codes associated with Thematic code, Stewardship, generated from 37 semi-structured individual interviews with Akwesasne community members conducted between 16 June 15 August 2017 with associated number of occurrence by interviewees (n), which are as follows: Fulfillment of Roles and Responsibilities (n=125); Connection to Land (n=58); Values (n=51); Awareness (n=46)

Akwesasronon need points of access to cultural knowledge as it relates to forest stewardship, which was expressed through "Awareness" (n=46, Figure 7). "Awareness" provided insight into the various methods that *Akwesasronon*, current and new ideas, are potentially increasing community engagement and the distribution of cultural knowledge around forest stewardship. Workshops were a commonly mentioned strategy for engaging with the community. However, this is confronted with "Concerns" around time and accessibility. Thus, workshops need to be considerate of the demands on *Akwesasronon* time and availability due to work, family, or other responsibilities. Additionally, Akwesasne has a complex geographic layout as discussed in the political history, which leads to unique challenges for the location of workshops due to the international border and no public transportation. Workshops focused on forest stewardship need to be available in various locations across Akwesasne with differing times, such as after workhours or on the weekend. Approaching with these suggestions could help increase participation of

Akwesasronon. Additionally, interviewees spoke about prioritizing "Awareness" efforts to reach youth as well as approaches that addressed different scales of relationships, such as family and community. The community-centered approaches used tools like *Oher:okon*, radio, walking trails, tree and seed giveaways, as well as community newsletters or papers to create "Awareness" about forest stewardship. The youth were consistently emphasized by interviewees, which shows their importance within the community structure. The youth are a key resource for learning and carrying cultural knowledge to the next generation, which can be accomplished through going into schools or creating opportunities for them to learn about their relationship with forests. Additionally, youth can be reached through family-centered approaches. Interviewees, Eric Sunday and Audrey Herne noted that there needs to be more opportunities for the youth to engage with elders. The elders are a great source of cultural knowledge, but there needs to be a conscious effort in bringing elders and youth together. Forest stewardship can draw on these various strategies to increase "Awareness" that prioritizes engagement with youth and families.

"Values" (n=51, Figure 7) showed a strong connection to "Roles and Responsibilities" because *Akwesasronon* were given the responsibility to respect and acknowledge the forest for all it provides. Respect and acknowledgement of forests could affect individuals' actions so that they do not cause harm. Interviewees spoke to a respectful relationship as being common sense, but this presents an issue. Common sense appears to be some innate knowing how to go about a respectful interaction with the environment. However, the knowledge of respectful engagement with the forest is not just common sense and speaks to the knowledge sharing systems present in Akwesasne that are built upon relationships. There needs to be education occurring that helps embed relationships of respect toward the natural world in the community. There is a cultural foundation that supports this idea of it being "common sense," as it

is a part of the cultural framework of the community. However, not all Akwesasronon were raised in the culture. Victoria Ransom, interviewee, had to actively seek out knowledge on her own culture and this is not an uncommon reality faced by *Akwesasronon*, which was discussed in the political history. Forest stewardship can help facilitate education for *Akwesasronon* to understand their roles and responsibilities to the forest and land, so a respectful relationship with the land becomes "common sense."

      Akwesasnron need to be in to be in contact with creation in order to understand kinship and knowledge relationships. "Connection to Land" (n=58, Figure 7) explores the need to be in contact with the land, so relationship building can occur and is an essential part of communicating stewardship. Through being in "Connection to Land," *Akwesasronon* can experience the changes happening around them on the land and their relationship to these changes, which are reflected in their cultural context. Mary Arquette, interviewee, knows it is time to harvest maple sap when the great horned owl arrives, which can only occur through being out on the land and giving attention to the different beings present or not present. Further, relationships can be established with land through pounding logs to make splints for baskets or creating a memory like Rod Cook, interviewee, did when he made maple sap popsicles by breaking part of a maple branch. The relationship can only be established through experience. Further, kinship networks can be created, which Norma Sunday, interviewee, did through planting trees on her property when her children were born. She can see the trees grow as her children grow, which became a family tradition for her children to take yearly pictures with their trees. Thus, forest stewardship should seek to create opportunities of engagement and learning that allow *Akwesasronon* to be in "Connection to Land" for relationship and memories to be created, which are supported by the biocultural context.

"Roles and Responsibilities" were discussed as an important part of "Source of Knowledge" that outline the various reciprocal commitments existing between different aspects of creation and provide a framework of respectful engagement and connection. However, these reciprocal commitments are not discussed in a specific manner that has an action attached to them, which is a responsibility of *Akwesasronon* to interpret and enact. The "Fulfillment of Roles and Responsibilities" (n=125, Figure 7) is a means to explore the interpretations of *Akwesasronon* behind "Roles and Responsibilities" that can be enacted on the land as part of conservation activities. A common characteristic of "Fulfillment of Roles and Responsibilities" is caring for the land, which could include activities like removing invasive species, banking black ash trees, collaborating with outside agencies, restoration, and monitoring changes. Additionally, interviewees placed emphasis on the importance of following cultural protocols, such as asking permission, stating use, and offering tobacco, to make sure that the forest is acknowledged for its provisions. There is a respectful way to harvest wood, which includes only taking what is needed, making sure to do it at the right time of the year (i.e. Fall), and following cultural protocols of harvest and use. Forest stewardship can use the input and interpretation provided by *Akwesasronon* to develop activities that are context specific to their needs and will help them in "Fulfilling their Roles and Responsibilities."

Medicines

"Medicines" (n=152, Figure 2) are an essential part of *Akwesasronon* health that need to be engaged in forest stewardship because forests contain a plethora of plants with medicinal properties. Additionally, "Medicines" are valued knowledge within the community, which is reflected in the presence of traditional medicine programs within SRMT and MCA. *Akwesasronon* have significant relationships with and knowledge of "Medicines" that emerged in interviews from sharing about

gathering, preparation, and application to address different ailments. The original sub-codes associated with "Medicines" were "Being there" and "Practicality." However, these were expanded and renamed into six sub-codes, which are "Practical," "Collect," "Connection," "Spirit," "Value," and "Plurality." These sub-codes allowed for an exploration of the different ways that Akwesasronon engage, utilize, and value "Medicines." Forest stewardship acknowledgement and incorporation of this knowledge helps support *Akwesasronon* identity and health through helping support and promote healthy forest habitats with conservation activities.
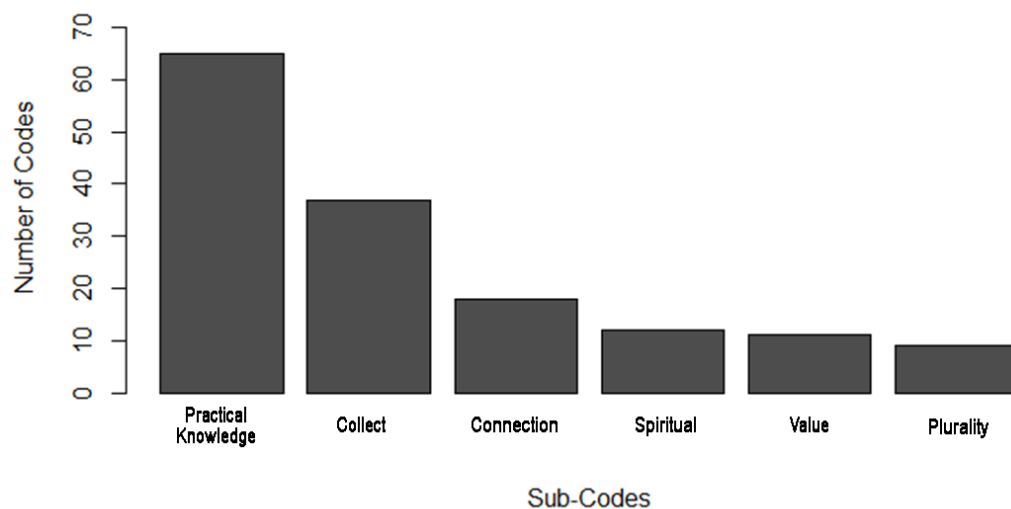
Figure 8: Sub-codes associated with Thematic code, Medicines, generated from 37 semi-structured individual interviews with Akwesasne community members conducted between 16 June 15 August 2017 with associated number of occurrence by interviewees (n), which are as follows: Practical Knowledge (n=65); Collecting (n=37); Connection (n=18); Spiritual (n=12); Value (n=11); Plurality (n=9)

"Practical" (n=65, Figure 8) speaks to the uses of "Medicines" and the expansive amounts of knowledge about the ailments that can be treated with the use of different trees and plants. Elm, black walnut, maple, witch hazel, and basswood were used for birthing, cancer, diuretics, purification, and mending skin, respectively. Further, there were multiple uses for different medicine like Elm, which Louise

Herne-McDonald, interviewee, used for birthing and Mary Herne, interviewee, used for cleansing the kidneys. "Medicines" have multiple uses and applications for physical ailments that affect *Akwesasronon*. "Medicines" have a multiplicity of application, which provides the system with resiliency. Furthermore, "Medicines" have applications that address issues beyond the physical, which was explored through "Spiritual" (n=12, Figure 8). "Spiritual" spoke to the different ways that these "Medicines" were used in healing or protection that go beyond the physical. Blackthorn, prickly ash, hickory, and tobacco were used for "Spiritual" purposes, such as protection and cleansing. However, it is important to acknowledge certain cultural activities are important as "Medicines" for healing, such as snow-snake[iii], singing, and lacrosse. There are various sources of "Medicines" available across the community that do not necessarily connect to something physical like a plant. Furthermore, "Plurality" (n=9, Figure 8) showed that certain "Medicines" had both "Spiritual" and "Practical" applications. For example, red willow is a medicine that is used for protection and cleansing the body of toxins as well as "Spiritual" protection and cleansing. There are diverse applications for "Medicines," which can be either "Practical", "Spiritual," or even both. There is a lot of medicinal knowledge in Akwesasne which has become less common and was acknowledged by Rod Cook, interviewee. Forest stewardship can aid in creating opportunities for *Akwesasronon* to learn their "Medicines" and access them in forests, which will aid helping the community be healthy and promote continuity of cultural knowledge.

Akwesasronon respect and love the community knowledge about "Medicines." "Value" (n=11, Figure 8) speaks to the ways that *Akwesasronon* understand and appreciate this valuable source of knowledge around "Medicines." The knowledge of "Medicines" is connected to the process of collecting, which was shown through "Collect" (n=37, Figure 8). "Collect" demonstrates the ways in which *Akwesasronon*

enact harvesting, which builds relationships of respect and appreciation. *Akwesasronon* adhere to their respectful relationship with "Medicines" through following proper protocol for harvesting and noting location, so they are not overharvested. Audrey Herne, interviewee, shared a story about a time that her husband went harvesting "Medicines" and he was unable to find them until he followed proper protocol through offering tobacco. This story is not uncommon in Akwesasne and it speaks to the agency of the "Medicines," which extends personhood as part of the relationship network. Medicines do not have to offer themselves for harvesting, if a respectful relationship is not present. Additionally, there are more specific protocols for harvesting medicines that contribute to maintaining a healthy population. For example, a person should not pick more than they need and should not pick the first plant that they encounter because that is the leader; It is the leader that the person offers tobacco and asks for permission to harvest one of their family members, which has the responsibility to fulfill their roles and responsibilities to *Akwesasronon*. The "Medicines" have roles and responsibilities to *Akwesasronon*, but it is through a process of acknowledgement and consent that a reciprocal relationship is reinforced. "Medicines" have a far reach throughout Akwesasne relationships and knowledges, which was explored through "Connection" (n=18, Figure 8). "Connection" demonstrated the ways that "Medicines" are linked to Akwesasne, *Akwesasronon, Kanienkeha*, being on the land, dreams, and stories. A personal story shared by Edward Gray, interviewee, spoke about his purpose, which was to become a medicine man for *Akwesasronon*. He spent many years working as an ironworker, but was drawn back to Akwesasne and is one of the most well-known and respected medicine people that works for MCA's Traditional Medicine Program. *Akwesasronon* understand the importance of "Medicines," which they "Value" and utilize the resources provided in the community to treat a plethora of ailments, physical and

spiritual. Forest stewardship can draw on the ways that respectful and meaningful

relationships are developed between *Akwesasronon* and "Medicines" and draw upon

community resources that are already established for insight and knowledge.

Low Frequency Thematic Codes: Diversity, Gender Roles, Spirit, and Suppression
of Knowledge

Akwesasne is home to a diverse set of perspectives and ecology, which have

connections to the political and environmental history. "Diversity" (n=58, Figure 2)

added clarity to the sources of conflict occurring between *Akwesasronon* and non-

Akwesasronon as well as each other. A commonly discussed conflict occurred

amongst *Akwesasronon* between those that identified as traditionalists (i.e. cultural

practitioners) and Catholics. As discussed in the political history, Catholicism was not

seen as a source of contention when the first 100 *Kanienkehaka* arrived in Akwesasne.

However, Catholicism would later be utilized as a tool to generate fear and shame

around *Akwesasronon* cultural practices, such as ceremony, *Kanienkeha*, medicines,

kinship networks, and knowledge systems. These cultural practices were equated with

being uncivilized or "bad," which led to the hiding of traditional knowledge and the

creation of barriers to accessing this knowledge. Anthony David, interviewee, noted

his experience with the conflict between Catholicism and accessing cultural practices

after his grandfather, a Catholic, reprimanded him for attending ceremony at the

longhouse. Unfortunately, this is not an uncommon experience in Akwesasne.

However, the social landscape of Akwesasne is changing and making space for both to

co-exist. Norma Sunday, interviewee, was an individual that found balance between

traditional practices and Catholicism. She found healing and comfort in the traditional

practices of *Akwesasronon* during a death feast for her brother. However, she still

attends church because it is familiar, and because she made a promise to her

grandmother to continue this tradition. The social shifts in Akwesasne are becoming

more visible throughout the community. Another conflict acknowledged was between *Akwesasronon* and non-*Akwesasronon* worldviews, which Peggy Pyke-Thompson, interviewee, noted. She shared that the *Akwesasronon* worldview is a holistic framework of interconnected relationships, which was not present in non-*Akwesasronon* worldviews. These sorts of sentiments are reflective of the lack of understanding and engagement that is prevalent in research on environmental violence. It took decades for reparations to be made to Akwesasne for environmental and cultural damages, and for their perspective to be heard. This reality speaks to the need for respectful education that works in both directions. *Akwesasronon* can turn to their traditional teachings to help facilitate healthy relationships of understanding, which the "Rabbit Story" does well. The "Rabbit Story" speaks to the importance of "Diversity" through the way children learned from a diverse village of rabbits (different sizes and colors) to quell conflict in their own village with songs and dances gifted by said rabbits. In addition, "Diversity" captured conversations about the health of the environment being directly connected to diversity. Eric Johnson says, "We have a real diverse forest, a lot of animals" and Audrey Sunday responded, "We are lucky because we have everything we need." These two individuals are hunters and trappers and have a strong connection to the land, so their conversation tells us that forests are healthy in Akwesasne. This is important information to know and emphasizes the importance of protecting forests and the need for *Akwesasronon* to utilize them. "Diversity" in perspective, as well as in ecology, is a part of making Akwesasne a healthy community. This is to say that forest stewardship can engage the diversity present in Akwesasne and promote "Teachings" of acceptance and understanding as well as promote activities that protect and promote a diversity present in forests.

Spirituality is an important aspect of *Akwesasronon* relationships and worldviews with the forest, which was partially addressed in "Medicines." However,

"Spirit" (n=55, Figure 2) expands the discussion to include other connections, such as personal relationships to culture, sacred spaces, and utility. The interviewees, Jonelle Beauvais and Craig Arquette, spoke to the spiritual connections that grew from their experiences with fasting. Fasting opened a different mode of communication between *Akwesasronon* and the land. In turn, "Spirit" opens up a specific dimension of *Akwesasronon* worldviews discussed in "Diversity." Kenny Perkins, interviewee, spoke to this aspect of *Akwesasronon* worldviews in research, stating that "You can't get a PhD in spirituality." The quote was concerned with academic institutions not meaningfully engaging the spiritual dimension of *Akwesasronon* worldviews, which could limit understandings. Dean George, interviewee, shared, "everything in nature has a spirit", which speaks to the personhood of all creation. There is a spiritual connection created to the land through being in the forest, which fasting or other cultural activities helps facilitate. Additionally, the "Spirit" serves as a conduit of sorts that allows *Akwesasronon* to connect with the rest of creation and helps facilitate a respectful and productive relationship with it. As such, forest stewardship can help facilitate the relationship between *Akwesasronon* and the forests through working to create accessible spaces for spiritual connection, such as fasting or ceremony.

"Roles and Responsibilities" and "Fulfillment of Roles and Responsibilities" have held a significant place within understanding relationships between *Akwesasronon* and forests. The relationship is gendered with various roles and responsibilities carried by men and women, which was explored through "Gender Roles" (n=33, Figure 2). The gendering of relationships with the forest could be perceived as limiting, but it is not conceived in this way by *Akwesasronon*. There is value in the reclamation of these gendered roles and responsibilities to aid in negotiating engagement with land and between *Akwesasronon*. Jonelle Beauvais, interviewee, placed emphasis on the roles and responsibilities of men in Akwesasne.

She was concerned that *Akwesasronon* men do not know their roles and responsibilities, which generated an imbalance in relationships within Akwesasne and the land. The forest is considered the men's space, which Mary Arquette, interviewee, supported and is apparent in the process of producing maple syrup. She saw the sugar shack, a place for processing maple sap, as a place for men to relax and connect with each other. The sugar shack is a place for men to develop relationships with each other and share their knowledge of men's roles and responsibilities. Further, the men's roles and responsibilities were emphasized in fire teachings as part of *Ohero:kon*. The way a man builds a fire shows if he is ready to help build a family because a prepared man will build a fire with smoke that goes straight up and not all over the place into peoples' faces. The imbalance of gendered roles and responsibilities has forced *Akwesasronon* women to fulfill both, which is a heavy responsibility to place on their shoulders. A balanced relationship between gendered roles and responsibilities would help in alleviating this stress. The existence of balanced gendered roles and responsibilities in Akwesasne is embedded into the community as men are responsible for death through providing the speech while women are responsible for bringing life into the world. An interesting aspect of the research engaged two-spirit[iv] people's roles and responsibilities, which are currently in the process of reclamation. However, Jonelle Beauvais, interviewee, mentioned that the presence of two-spirit people was an indicator of a healthy community, which she noted are becoming more common as acceptance spread across Akwesasne. Forest stewardship needs to consider the gendered relationships in Akwesasne between *Akwesasronon* and forests, and each other, which can be promoted through working collaboratively with *Akwesasronon* Knowledge Holders to develop educational activities. Furthermore, forests stewardship can be supportive and inclusive in promoting spaces for learning and expanding the gendered conversation in Akwesasne to be two-spirit inclusive.

Akwesasronon have confronted many different struggles that have distanced them from the land, each other, knowledge systems and kinships networks, which was discussed in the environmental and political history. "Suppression of Knowledge" (n=18, Figure 2) helped bring the interviewees' voices forward on the topic of suppression, which spoke to personal and external pressures. The themes that grew from the "Suppression of Knowledge" showed strong connection to topics, such as Catholicism, Ceremonies, Language, Barriers, Schools, Pollution and Colonization. These topics collectively exacerbated the distancing of Akwesasronon from the land and their knowledge. A major disrupter was pollution, as discussed in the environmental history, because it generated fear of exposure to environmental contaminants and limited *Akwesasronon* ability to engage in traditional practices on the land. Another inhibitor was Catholicism and Residential schools, which promoted a social environment of shame and stigma around cultural knowledge and relationships. The stigma forced ceremonies into hiding, which made them inaccessible to most *Akwesasronon*. Ceremonies were almost lost due to the stigma, but *Akwesasronon* worked diligently to reclaim them and they continue to be practiced in Akwesasne. The presence of ceremonies and celebration of culture in Akwesasne speaks to hope and resilience of *Akwesasronon* to hold onto their culture and not let it disappear. Additionally, Kathleen Herne, interviewee, noted that the destigmatization and celebration of *Akwesasronon* culture only occurred about 10 years ago. Forest stewardship can help facilitate the process of reclamation of cultural practices through creating spaces for engagement with the forest and helping with sharing of cultural knowledge. Furthermore, it serves as a tool for helping *Akwesasronon* heal from the past and building for the future generations to have access to the necessary resources for instilling pride in their cultural heritage.

Species

        Coding for "Species" was an approach utilized to understanding the importance of specific species within the kinship network and knowledge networks as a part of their complex connectivity. "Species" were mentioned 696 times throughout the participant interviews as well as 136 of unique taxa of species (Figure 9), which are detailed in Appendix X. It is from the different "Species" that relationships emerge and are connected to the *Akwesasronon* values system related to forest stewardship. The information about "Species" was explored through the "Number of Species" and 4 high frequency species, which are "Black Ash," "Sugar Maple," "Cedar," and "White Pine." Prioritizing these species for discussion is not an indication of their importance because *Akwesasronon* ideology does look at these relationships from a hierarchal perspective. However, forest stewardship strategies can engage and understand different species roles and responsibilities as well as relationship with *Akwesasronon*. This can inform management practices prioritizing different species, so they continue to be present within Akwesasne's landscape. Furthermore, forest stewardship strategies can be incorporated into educational material; thus reinforcing holistic, relational, and reciprocal relationships among *Akwesasronon*.
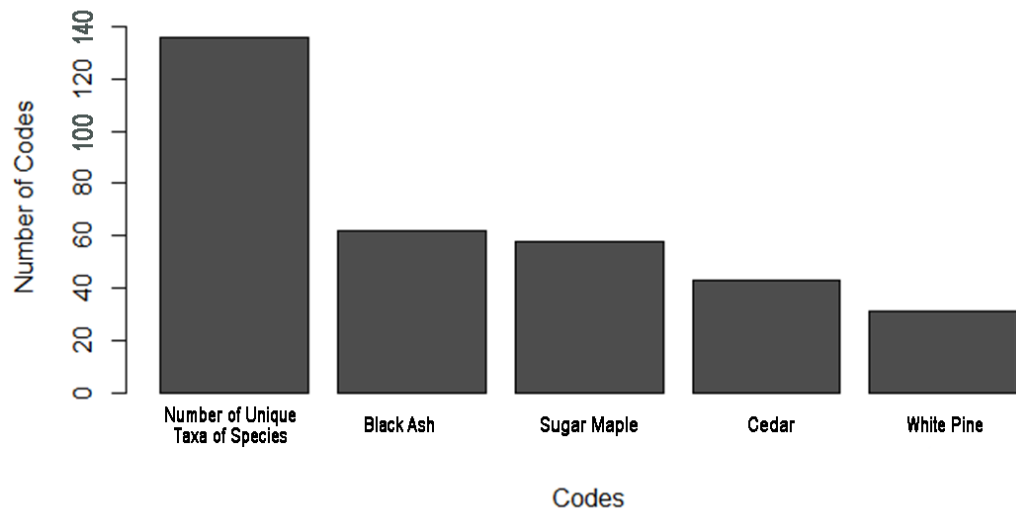
Figure 9: Sub-codes associated with code, Species, generated from 37 semi-structured individual interviews with Akwesasne community members conducted between 16 June 15 August 2017 with associated number of occurrence by interviewees (n), which are as follows: Number of Unique Taxa of Species (n=136); Black Ash (n=62); Sugar Maple (n=58); Cedar (n=43); White Pine (n=31)

Akwesasronon have an expansive knowledge of the various species that exist in Akwesasne. "Number of Species" (n=136, Figure 9) highlights this relationship, which contained discussion about fungi, insects, plants, medicines, trees, animals, and birds. These beings were not exclusive to the forest environment, which was reflected in references to garden plants, farm animals, and fish. The range of species present, in or around forests, is reflective of the complex connectivity of the *Akwesasronon* value system to forests, which resonate to other landscapes of relationships. The knowledge about these species is expansive and is reflective of *Akwesasronon* knowledge systems and kinship networks, which will be expanded upon on with the highest frequency species from the interviewees. Forest stewardship can engage these species to conceptualize a healthy *Akwesasronon* relationship with forests from a holistic approach that looks at the connection of the forest with other aspects of creation.

Akwesasne has a long history of basket-making, which utilizes splints made from the "Black Ash" (n=62, Figure 9). Baskets are an intimate part of the

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community's identity and their relationship with forests, which helped contribute to the families' livelihoods historically and contemporary. This was made apparent in the discussion of the thematic code "Holistic Health," which explored the *Akwesasronon* connections to basket-making. Interview participants shared stories about their personal connections to baskets, which was a means of income and sustaining families. Further, interviewees showed an understanding of "Black Ash" trees that helped them in evaluating which trees were best for split making, which is the process of separating layers of black ash used in basket-making. For example, you do not want a "Black Ash" tree that is growing in proximity to pine trees because the splints will be brittle. This knowledge emerged from the generations of basket makers in Akwesasne that passed this knowledge down. However, this relationship in the community is in danger, which is due to the presence of Emerald Ash Borer, which was mentioned 23 times during the participant interviews. The Emerald Ash Borer (EAB) burrows into "Black Ash" trees and through this process kills the tree and makes them unusable for making splints for baskets. Akwesasne is facing the reality that there will no longer be "Black Ash" trees available for making splints or to use as medicines. The loss of this species could create a cascading effect in Akwesasne for ceremonies, *kanienkeha*, medicines, and others that are not immediately apparent. There is a need for "Black Ash" to be directly addressed as part of a forest stewardship strategy with proactive and innovative approaches to negotiating a future without them.

Akwesasronon have reciprocal roles and responsibilities to other aspects of creation, which are outlined *Ohenton Karihwatehkwen*. Within the recitation of the *Ohenton Karihwatehkwen*, the "Maple" (n=58, Figure 9) is acknowledged as the leader of the *Okwire'shòn:'a*. Additionally, there is a traditional story about the creation of the relationship between the "Maple" and the Haudenosaunee people. This

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origin story was reiterated by a few participants, but it mostly revolved around a little boy that needed food and medicine for his sick mother. He was asking all the trees for help, but it was only the "Maple" that helped him through sharing its sap. Additionally, this story could be considered the beginning of the *Wahta* (Maple) Ceremony where the tree is honored when the sap stops running and is an important part of the yearly cycle of ceremonies. The "Maple" tree is the first medicine and food of the year and represents renewal and rebirth as spring is coming. There is concern about the "Maple" tree and its survival, which Mary Arquette, interviewee, mentioned in a prophecy from the *Kariwiio* about trees dying from top-down and the "Maple" trees were directly mentioned. This is a loss that could dramatically affect *Akwesasronon* and all Haudenosaunee. Forest stewardship could aid in developing strategies to protect the "Maple" tree from the impacts that are on the horizon and connected to climate change (Bishop et al., 2015) as well as dangers presented by the spread of invasive species, such as the Asian Longhorn Beetle (Dodds & Orwig, 2011).

The "Cedar" (n=43, Figure 9) tree holds significance as a medicine for cleansing the spirit and body, which speaks to its plurality as a "Medicine." It was mentioned to be high in vitamin C and used to treat scurvy. The "Cedar" tree has a traditional story that outlines its role and responsibility as a medicine. The story started with a bird with a broken wing looking for shelter that went from tree to tree asking for help, but it was only the Cedar tree that provided it shelter. The bird healed and went on its way, but when it returned, it was accompanied by the *Teharonhiawako*, who thanked the tree by giving it a medicine to carry for the people. This story embodies teachings about caring for one another because they could be carrying an important lesson or knowledge to share. Forest stewardship reflects this

teaching in Akwesasne because it is helping mend the relationships between people and forests and all the associated knowledge and resources.

The Haudenosaunee Confederacy was founded upon the principles of *Kaianerekowa*, which was discussed in the political history. As part of the *Kaianerekowa* story, the "White Pine" (n=31, Figure 9) was chosen to reflect Haudenosaunee governance system through a variety of layered meanings. Edward Gray, interviewee, spoke about the "White Pine" tree's roots, which were supposed to spread out to other Indigenous Nations, so they can come under the shade of the tree and be protect by the Haudenosaunee Confederacy. The Haudenosaunee Confederacy was meant to expand and invite other nations to take hold of the Peacemaker's message. Further, the "White Pine" was chosen as a representation of the original five nations of the Haudenosaunee Confederacy because it has needle bundles of five. The connections of the "White Pine" in representing the Haudenosaunee Confederacy's governance shows the way that Haudenosaunee knowledge is embedded in the land. Furthermore, forest stewardship helps support the governance of Haudenosaunee people through provisions to protect the White Pine within *Akwesasronon* forests, which serves as an educational tool that is directly connected to forests.

Network Analysis

The network analysis was meant to explore the concept of everything being connected within the holistic Haudenosaunee ideology as well as demonstrate the complex connectivity present between thematic codes and sub-codes. The thematic code and sub-codes showed co-occurrence throughout the participant interview which was used to inquire about the connections between codes (Appendix M – Y). The analysis showed co-occurrences between 27 different codes fulfilling the threshold of 10 interactions and 10 different codes that did not. The codes with interactions that met the threshold of 10 co-occurrences are outlined below:

- Passing on Knowledge: Knowledge Providers, Practical Knowledge, Story, Educate, and Teachings
- Source of Knowledge: Ceremony, Complex Connectivity, and Roles and Responsibilities
- Concerns: Barriers, Changing Values, Conflict, Environmental Violence, and Loss
- Holistic Health: Economic, Basket-Making, and Health
- Stewardship: Awareness, Connection to Land, Fulfillment of Roles and Responsibilities, and Values
- Medicines: Collect, Connection, and Practical
- Low Frequency Thematic Codes: Diversity, Gender Roles, and Spirit
- Species

The nodes with interactions that met the threshold of 10 co-occurrences are outlined below.
- Passing on Knowledge: Resurgence
- Concerns: Critique and Teachings
- Holistic Health: Healing, Livelihood, and Protection
- Medicines: Plurality, Spiritual and Value
- Low Frequency Thematic Codes: Suppression of Knowledge

The network analysis utilized the 27 codes that met the threshold of co-occurrence as nodes within the network analysis. The complexity of the network is apparent and shows the relationships present in the values system of Akwesasronon associated with forests (Figure 10). The expanse of the connection present in the network analysis is informative, but its complexity makes it difficult to analyze the connections. Thus, the nodes that showed the most moments of co-occurrence and connections to other nodes, which are "Passing on Knowing – Story," "Source of Knowledge – Complex Connectivity," and "Species," were more deeply explored in their connection to forest stewardship.

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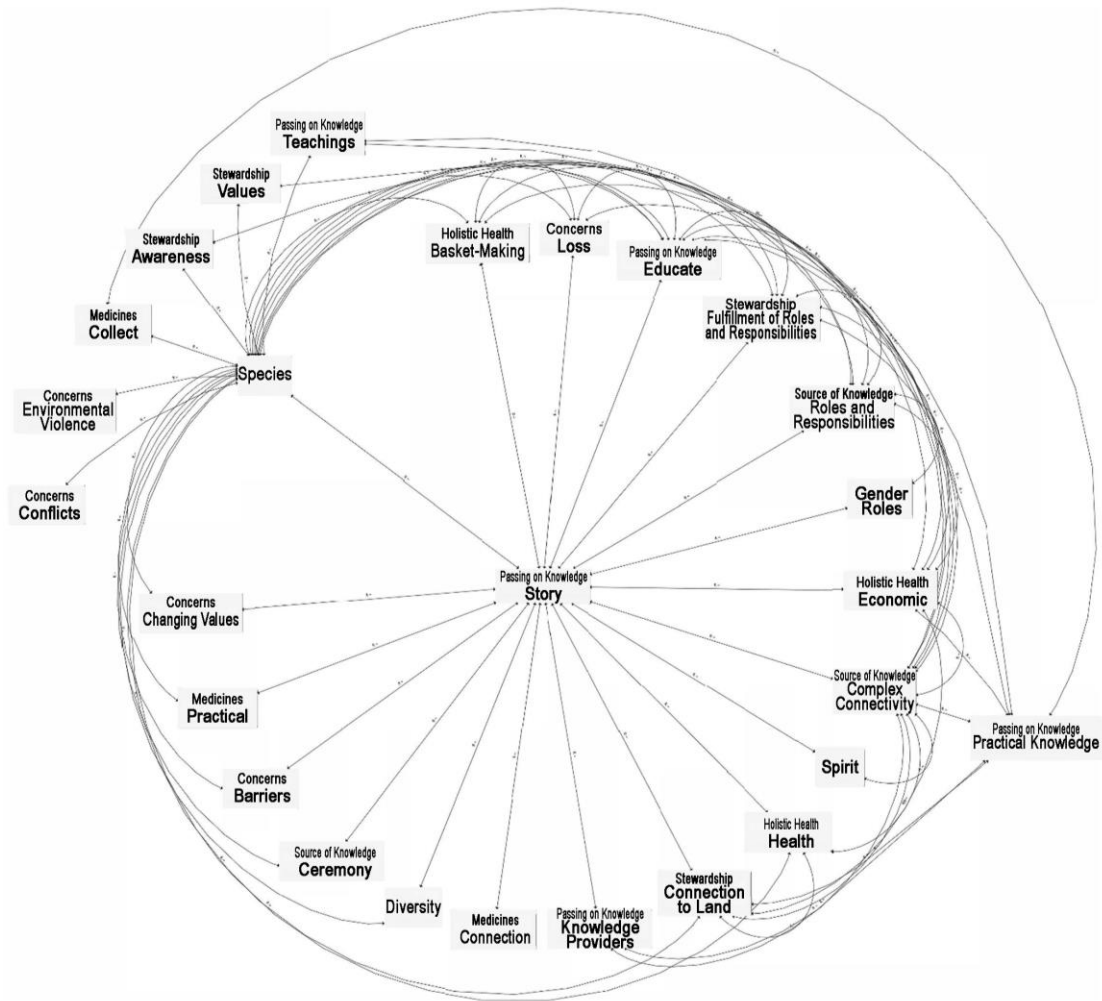
Figure 10: Network Analysis Results for all nodes generated from co-occurrence for codes generated from 37 semi-structured individual interviews with Akwesasne community members conducted between 16 June 15 August 2017

"Species" are an important part of kinship networks and knowledge systems of *Akwesasronon*. "Species" need to be present on the landscape so *Akwesasronon* can understand their relationship with and knowledge of them. The "Species" node showed the greatest number of interactions with nodes connected to "Species", which were "Passing on Knowledge – Story" (n=159) and "Passing on Knowledge – Practical Knowledge" (n=149, Figure 11). "Passing on Knowledge – Story" and "Passing on Knowledge – Practical Knowledge" nodes speak to the importance of storytelling and the depth of knowledge present in Akwesasne about the different species present in and around Akwesasne. *Akwesasronon* learn their connection and

relationship to different species through stories, which are reinforced through practical knowledge that is learned on the land. The interplay between the two reinforce the need for education to occur on the land, which is aided through story. Additionally, "Species" interconnection between knowledge systems, kinship networks, *Akwesasronon*, and the land are reinforced through the nodes for "Source of Knowledge – Complex Connectivity" (n=126), "Holistic Heath – Economic" (n=106), and "Stewardship – Fulfillment of Roles and Responsibilities" (n=93, Figure 11). These nodes convey the complex connectivity between different "Species" in Akwesasne's forest and *Akwesasronon* cultural practices, such as *Kanienkeha,* ceremony, and traditional activities. The presence of "Species" are the resources that make sure that ceremony and traditional activities continue, so their presence is necessary for *Akwesasronon* identity to remain intact. Forests provide the shelter and protection for "Species," which *Akwesasronon* need to utilize as part of fulfilling their roles and responsibilities to each other. This network of connections is informative to a forest stewardship strategy, so it can follow the connections across the value system that draw on the relationship stemming from different "Species," which can be the target of conservation activities.
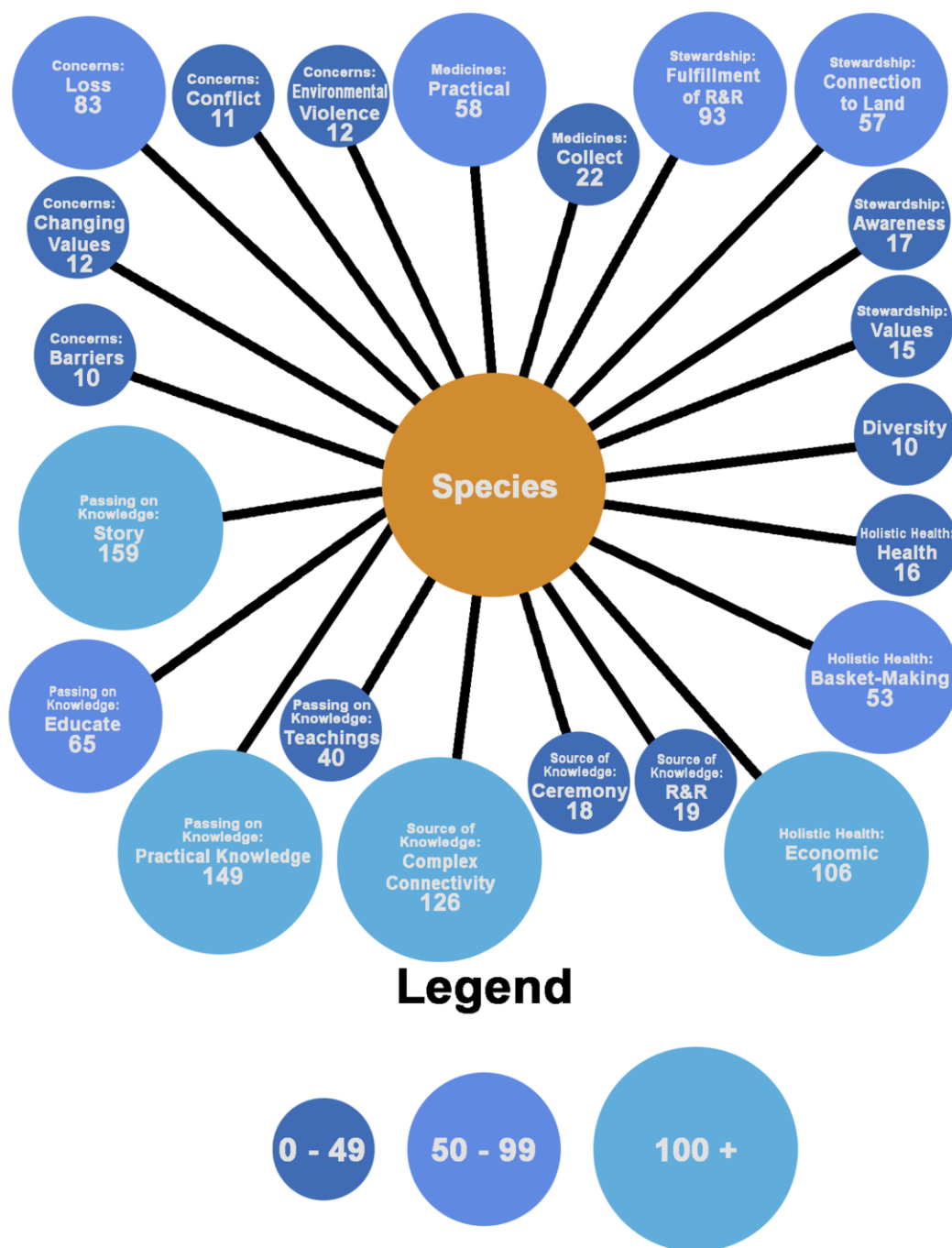
Figure 11: Network Analysis Results for "Species" node generated from co-occurrence for codes generated from 37 semi-structured individual interviews with Akwesasne community members conducted between 16 June 15 August 2017

Stories are an essential component of Indigenous knowledge systems, which are dynamic in meaning and the way knowledge is transferred across generations. The

importance of story was conveyed by the network analysis, which showed the node "Passing on Knowledge – Story" at the center (Figure 10). This continues to support the importance of storytelling in Akwesasne and shows the importance of storytelling as a mechanism for conveying *Akwesasronon* knowledge and kinships networks. The "Species" (n=159) node had the most interactions with "Passing on Knowledge – Story," which shows a strong connection between the act of storytelling and knowledge of the land. The act of storytelling cannot occur with a storyteller, which was made apparent though the connections to "Passing on Knowledge – Knowledge Providers" (n=56, Figure 12). There are *Akwesasronon* that are gifted storytellers, but the stories can come from any knowledge providers throughout a person life that share a lesson. These people are celebrated for their knowledge and fondly remember for their contributions to the knowledge present in Akwesasne. The stories shared have a complex connectivity, which was apparent in the connection to "Source of Knowledge – Complex Connectivity" (n=52, Figure 12). The connection speaks to the flow of knowledge that is embedded in stories and has multiple meanings and connections. *Akwesasronon* can accesses knowledge and understand their relationship to the forests through stories. Furthermore, the node can inform a forest stewardship strategy to create opportunities for storytelling and connect *Akwesasronon* with knowledge providers. Akwesasronon can learn and understand their complex connectivity with themselves, cultural knowledge and forest through the act of storytelling.
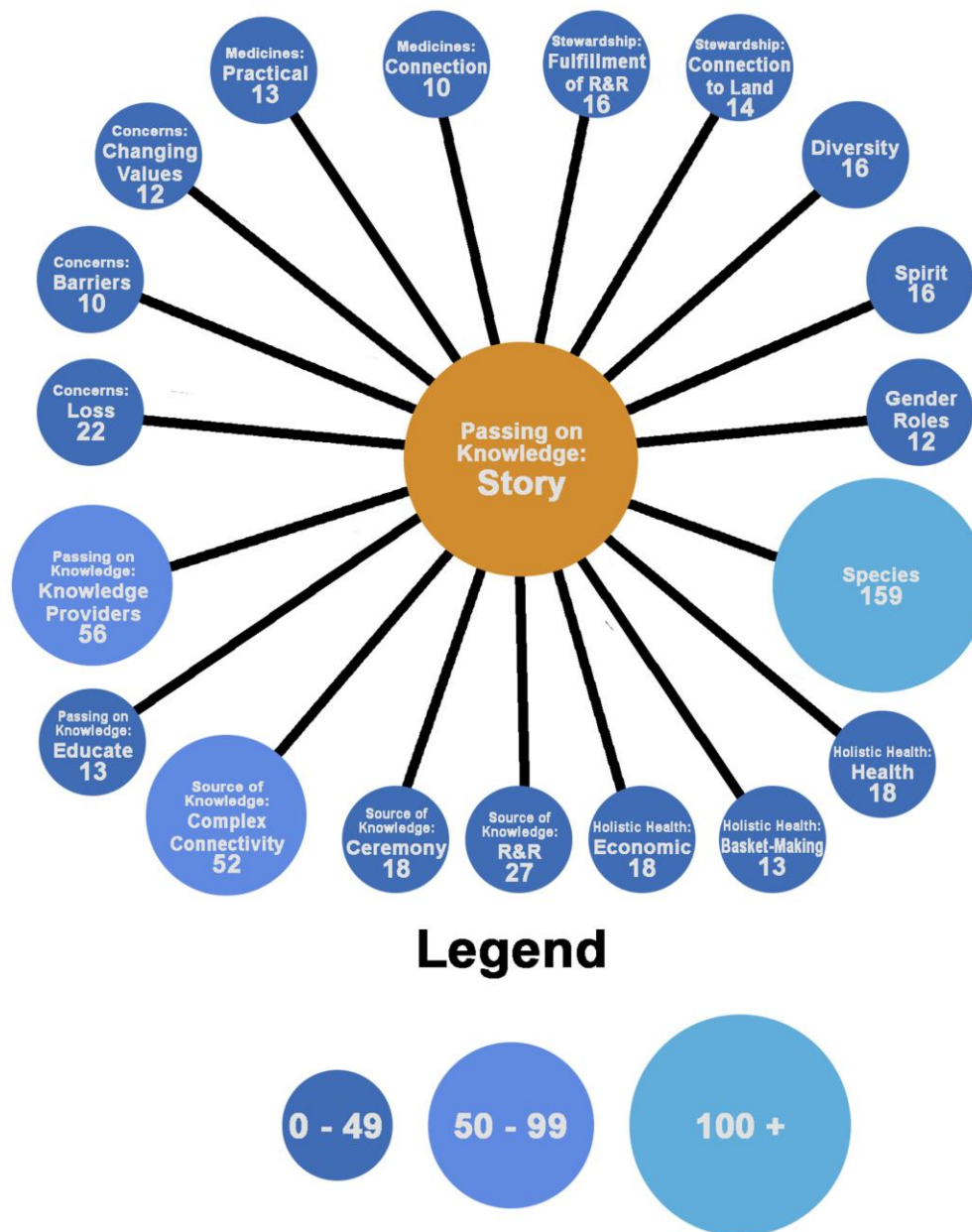
Figure 12: Network Analysis Results for "Passing on Knowledge-Story" node generated from co-occurrence for codes generated from 37 semi-structured individual interviews with Akwesasne community members conducted between 16 June 15 August 2017

The complex connectivity present in the knowledge system and kinship networks of *Akwesasronon* is consistently stressed to convey the importance of the all relationships with the land. Emphasizing "Passing on Knowledge – Complex Connectivity" helps convey the importance of complex connectivity, which is reinforced by the network analysis (Figure 10). "Species" and "Passing on Knowledge – Story" were already discussed in relationship to "Passing on Knowledge – Complex Connectivity." Thus, "Passing on Knowledge – Educate" (n=33, Figure 13) was explored, which speaks to the importance of education that engages the complex connectivity of *Akwesasronon* knowledge systems and kinship networks. The complex connectivity of education is multi-layered with diverse interpretations and various access points, such as stories, ceremonies, cultural practices, teachings, knowledge providers and others noted in network analysis (Figure 10). *Akwesasronon* can access this education through attending ceremony, listening to a story, or a walk through the forest, which can carry many different interconnected and applicable lessons for challenges a person encounters throughout their life. Additionally, bio-culturally grounded education is an approach that focuses on the weaving of interconnected relationships and knowledge that are found on the land and grounded culturally. "Concerns – Loss" (n=28, Figure 13) represent points of disruption that can result from the loss of relationships with the land. The loss of species from the land has a cascading effect across the whole value network and knowledge system of *Akwesasronon* in relationship with forests. Forest stewardship is a means to help protect this interconnected system of knowledge and relationship through conservation activities, which is paramount to the *Akwesasronon* cultural continuity.
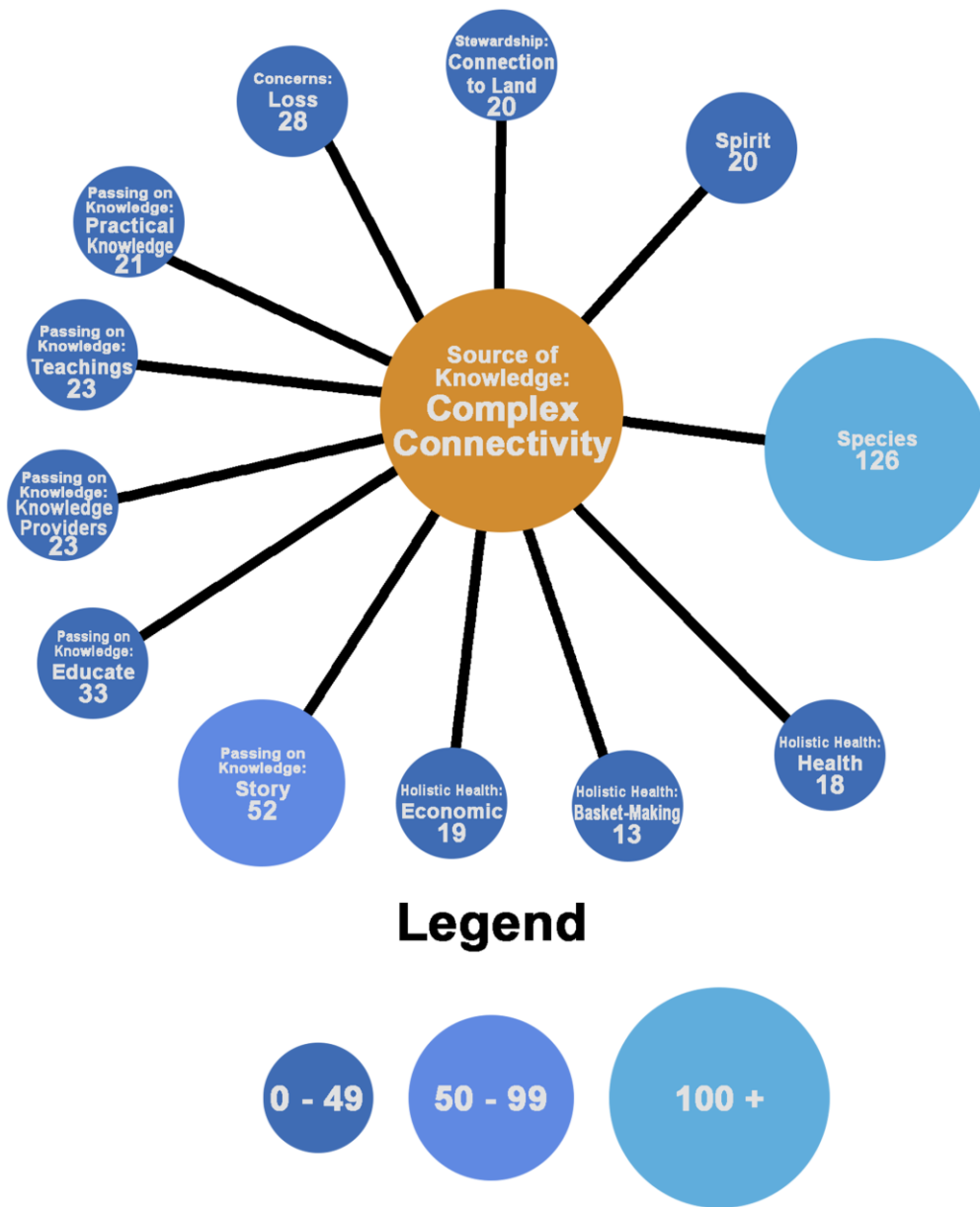
Figure 13: Network Analysis Results for "Source of Knowledge-Complex Connectivity" node generated from co-occurrence for codes generated from 37 semi-structured individual interviews with Akwesasne community members conducted between 16 June 15 August 2017

Discussion

  Akwesasronon have a complex and interconnected relationship with forests that is supported and reinforced by their biocultural context, which was threatened by environmental violence. These research results demonstrate that complex connectivity is still present in Akwesasne, despite the social pressures and environmental damages done. Relationships were disrupted and there is a lot of healing to be done, but there is hope for change and renewal. There are potential threats on the horizon, such as climate change, invasive species, development, as well as others, but the recommendation stemming from this research will help the community proactively plan through understanding the relationship between *Akwesasronon* and forests.

  Akwesasronon cultural knowledge needs to be learned in connection with the land, which can be degraded if disrupted through losses of biodiversity. Kassam (2009) demonstrates through his work with the Iñupiat community of Wainwright, Alaska, the importance of connection with the land, which emerged through the application of the human ecological lens - Diversity and Perception, Context, Relations and Phronesis – and showed that the community's knowledge and relationship is context-dependent. Akwesasne shares a similar context-dependent reality as the Iñupiat. Akwesasne, like some other Native American Communities, is not a transient community because their knowledge and relationships are embedded in the land (Tarbell & Arquette, 2000). This raises the concern around conserving the land, but in doing so it is also caring for the culture. Forest stewardship is a mechanism to aid in this process.

  Akwesasronon have worked diligently to have their voices heard and proposed various approaches to engage Akwesasronon worldviews (Arquette et al., 2002; David, 2005; Ransom & Ettenger, 2001). Their work was incredibly influential to this research that sought to center and prioritize *Akwesasronon* voices and concerns in

forest stewardship. The stories and teachings engaged in this research were and continue to be important in work throughout Akwesasne in the realm of Social Work, Health, Justice, and Economic Development. This speaks to the dynamic interpretation of these teachings and applications outside those previously conceived. Further, this work was inspired by the hard work of other Indigenous scholars whose work addresses decolonizing methodologies (Smith, 2013), Indigenous methodological approaches, (Kovach, 2010) and provides Indigenous research methods (Wilson, 2008). Their work fought for Indigenous worldviews and knowledge systems to be acknowledged and removed from the margins of research. The voices of Indigenous communities have valuable knowledge about the land that they reside upon and can be a powerful source of thought and information for conservation and forest stewardship.

Indigenous knowledge systems and kinship networks are threatened by climate change and other forms of environmental degradation from industries. This research highlights the interconnected nature of *Akwesasronon* cultural knowledge that could be disrupted through the loss of one part can have cascading effects across the rest of the system. However, there is hope and it has come in the form of a story from *Kanienkehaka* Bear Clan Elder, Tom Porter. He recounts a time when the Haudenosaunee forgot about their traditional teachings, but they were reclaimed by a fatherless boy that taught 12 other boys, born at the same time as him, all the songs, speeches, and ceremonies that were necessary for Haudenosaunee to fulfill their roles and responsibilities to the rest of creation (Porter, 2008). This story of reclamation of traditional teachings a story that is a part of Haudenosaunee history that is a reminder that there will always be hope for cultural reclamation. This is relevant to Akwesasne because there was a lot of knowledge lost due to environmental violence experienced in the community. However, these relationships and knowledge can be reclaimed through sharing across Akwesasne and continuing to build relationships with the land.

The connection to land cannot be understated because it is the source of knowledge and kinship networks in Indigenous Knowledge systems. It is on the land where the concept of phronesis (practical knowledge) becomes possible and Indigenous people learn to connect 'knowing how' in doing certain activities with the knowledge of 'knowing that' about teachings and roles and responsibilities (Kassam, 2009). *Akwesasronon* can engage in certain activities on the land, but there needs to be cultural knowledge involved to create a respectful relationship. Further, the cultural knowledge and kinship networks can be understood, but without the land it is just knowledge without an outlet of application. Forest stewardship can be made more successful by promoting phronesis of cultural activities and knowledge, so *Akwesasronon* can fulfill their roles and responsibilities and connect to the land through conservation.

Conclusion

The framing of this research drew on the context specificity of Akwesasne. The political and environmental history of this place is full of atrocious actions, intentional or otherwise, which affected *Akwesasronon* health, culture, and their relationships with each other and the land, the effects of which the community deals with to this day. However, the history also revealed stories of resistance to violence and achieving justice through the persistence of the community's efforts to be heard and celebrate their cultural heritage. Additionally, the biocultural context situated the framework for forest stewardship. Together, these pieces of Akwesasne's context specificity provide meaningful insight for the research process, analysis of results, and influence recommended forest stewardship strategies. The research process was supported by the partnership established between SRMT and Cornell University prior to project implementation in order to identify needs, which was further strengthened by the research, data collection and analysis, conducted by

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an *Akwesasronon* graduate student. Through this process, Akwesasne is respected, engaged, and empowered in the process of research and the resulting recommendations for forest stewardship strategies have a higher chance of success in the community.

Forest stewardship informed by *Akwesasronon* voices can serve as a powerful tool in Akwesasne to help the people connect with and fulfill their roles in and responsibilities to the rest of creation. The relationship between the community and the land is reciprocal, so creating a healthier environment means a healthier community and vice versa. *Akwesasronon* have a complex connectivity as a result of their long history of relationships with land, and this relationship is strengthened through the utilization of cultural practices. *Akwesasronon* need to be on the land in order to learn their connection within cultural knowledge systems and kinship networks, which were apparent from the results of the *Akwesasronon* interview analysis. The importance of paralleling cultural and ecological stewardship is apparent and is an essential part of the recommendations for forest stewardship in Akwesasne. *Akwesasronon* have roles and responsibilities to the land, as the land does to them, which are outlined in cultural teachings and will be part of the recommendation. The successful implementation of forest stewardship in Akwesasne can help make the land healthier for future generations to come, so they can access to their cultural knowledge, practices, and relationships with the land.

CONCLUSION

Akwesasne has a unique and complicated history that stems from its geographical location as well as political and ecological history. Situating Akwesasne's history was important to conceptualizing context specific biocultural forest stewardship strategies. These recommendations are the product of the insight provided by the conceptualization of "Indigenous Forest Stewardship," which was explored through literature that engaged Indigenous People. Additionally, these recommendations synthesize the input from *Akwesasronon* voices to represent the needs of the community. All the recommendations are fluid and adaptive, so they can be adjusted as the community deems necessary. These recommendations could be considered my idealized vision for Akwesasne and informed by my experiences of working and living within Akwesasne. I hope that they serve my community well as well as those generations that have yet to be born.

First, *Akwesasronon* need to identify accessible lands with diverse species and habitats that draw upon, support, promote, and reinforce the complex connectivity between forests and the biocultural context of Akwesasne. Identification of these lands can undergo a spatial analysis informed by the following parameters: accessibility, species, habitats, cost, and concerns. Accessibility of the lands should be sensitive of those with limited mobility, such as elders. The elders are necessary to convey important knowledge and relationships with the land. Additionally, the land identified should have different species, which align with cultural knowledge and stories, as well as the diverse habitats required to sustain and support healthy populations. The accessibility, species, and habitats need to be weighed with cost, as the Saint Regis Mohawk Tribe has limited funds to purchase lands. However, the costs should be mindful of the biocultural significance such as cultural knowledge and relationships with the land. These lands should be protected from development, such as housing.

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Land utilization should be promoted across the community by hunters, crafts people, food gatherers and medicine harvesters with attention to cultural protocols of use. Attention to cultural protocol of use through distribution of cultural teaching outlining proper harvesting and respectful engagement will help keep the land healthy and knowledge flowing through the community. Within the protected lands, there should be areas designated for ceremony (i.e. *Ohero:kon* or other ceremonies) as well as areas for sharing stories. The stories can be traditional stories or very personal. The parameters discussed above are important to identifying lands to be purchased by the Saint Regis Mohawk Tribe as well as proactive management and utilization of the lands by the other biocultural forest stewardship recommendations.

   Community Engagement needs to be prioritized within forest stewardship because the health of community and forests are connected and need to be supported, promoted, and reinforced. The avenues of engagement should center storytelling regarding forest stewardship, which can occur in areas protected from development and are accessible to people with limited mobility. Additionally, forest stewardship should seek to create a network of storytellers, which is already present and sharing stories. However, there are *Akwesasronon* that have knowledge and stories about forests and are not the primary, identifiable knowledge providers in Akwesasne. The network of storytellers with different knowledge about forests can be added to as more *Akwesasronon* knowledge providers are identified and drawn upon for community engagement opportunities as well as properly compensated for their time. Additionally, the collection of storytellers may share similar stories, but the stories could be told with a different meaning and open up new dynamic interpretations for listeners. Forest stewardship should seek to develop a comprehensive and biocultural grounded awareness campaign that shares teachings about the concepts of roles and responsibilities to the land. However, the information shared on public platforms must

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be considerate of the distinction between knowledges reserved for *Akwesasronon* and those sharable to individuals outside of Akwesasne. The distinction needs to be negotiated with a collection of *Akwesasronon* knowledge providers. The awareness campaigns can share teachings and stories about roles and responsibilities broadly on platforms like the radio, newspaper, online outlets and others that community sees as necessary. The awareness campaign can also share the introductory knowledge around roles and responsibilities, which can be given more specificity in storytelling circles and workshops. Additionally, as many workshops as possible should occur on the land with storytellers present and land-based activity practitioners, and there should be efforts to promote mentorship on the land in families throughout the community. The families can also work with local environmental agencies to develop personal management plans for their own lands. This creates opportunities for management and distributing cultural knowledge and relationship outside land purchased through the Land Claim. The distribution of knowledge across the community will help strengthen and protect cultural knowledge and relationships for future generations. I see this approach as both a community and family-centered approach to engaging the land through forest stewardship.

Collaboration was at the heart of this forest stewardship research project, which is an important aspect of negotiating relationships with non-Indigenous People. For an equal collaboration to occur, there needs to be a sharing of cultural values that seeks to convey cultural competency via training for all non-*Akwesasronon* researchers. Additionally, I believe that cultural awareness trainings should go in both directions so *Akwesasronon* people understand researchers, their background, and research approaches as well as researchers appreciate the language of community and biocultural knowledge. A successful collaboration can work together to develop a framework of engaging research that assesses holistic health of Akwesasne, which is

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inclusive of biocultural health. For these relationships and collaborations to be long-lived, they can take insight from the teachings about polishing the *Kaswetha* (Two-Row Wampum), which is about acknowledging the autonomy between the two parties. The act of polishing the *Kaswentha* will aid in the reinforcement of the relationship so the relationship remains strong and both parties are continuously reminded of their responsibilities to each other. Additionally, there should be efforts placed on long-term collaborations because short, transactional relationships are not sustainable nor wanted. I believe collaboration can be successful in forest stewardship strategies if hierarchal power relationship between Akwesasronon and non-Akwesasronon are discussed and peacefully negotiated. Furthermore, I believe successful collaborations through forest stewardship are about an extending of familial relationships with researchers and collaborator as they become a recognizable part of the community.

The development of biocultural curriculum for *Akwesasronon* must be integrate *Kanienkeha* into all aspects of development and end-product. *Kanienkeha* will aid in the help in communicating, promoting and reinforcing the knowledge shared and created as part of the forest stewardship strategies. Additionally, specific teachings and stories that should be drawn upon are: *Tsi Kiotonhwentsiatáhsawen, Kaianerekowa, Ohenton Karihwatehkwen, Tahatikonhsetónkie, Tsi Ní:ioht Tsi Wa'akwa'tá:raien,* and species-specific stories (i.e. sugar maple, cedar, and others) as well as personal stories by cultural practitioners. These stories are not an exhaustive list of all the teachings and stories necessary to build a biocultural curriculum and more need to be added as *Akwesasronon* knowledge providers come forward to share. The teachings and stories utilized should by aligned with learning opportunities on the land about proper protocol for respectful harvesting of trees and medicines with identification and relationships emphasized. Additionally, bringing together *Akwesasronon* cultural knowledge providers and scientists to utilize traditional

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knowledge in chorus with complex scientific concepts would be beneficial to *Akwesasronon* youth and inspire them to explore the sciences through education and potentially a career. I believe this collaboration could potentially help break down some barriers of miscommunication between *Akwesasronon* and non-Akwesasronon. Curriculums developed can promote holistic concepts of health that are attainable through personable engagement with the land. Teachings on gendered roles and responsibilities should be inclusive of two-spirit people and be open to allow youth to self-determine their engagement with gender. This will be a tool to empower these youth while also affirming the gender, which may not fit within a dichotomous framework. An aspect of the curriculum development should incorporate the political and environmental history of Akwesasne, which situates forest stewardship. Additionally, sharing the political and environmental history of Akwesasne will be beneficial and empowering to *Akwesasronon* because our history is not taught in schools. The history presented in this thesis is a start, but there are more stories about Akwesasne to be uncovered that will add more depth to historical narrative. Additionally, understanding our history will help *Akwesasronon* understand their relationship with the land in connection with the systems that sought to remove us from our biocultural context as well as be empowered by the resistance and resilience embodied by our people to speak up and be heard. I think understanding our political and environmental history will inspire *Akwesasronon* to seek out and reclaim their cultural knowledge and relationships with land. Furthermore, the development of the curriculum as part of the biocultural forest stewardship strategy has the potential to help *Akwesasronon* reclaim relationships with the land as well as help them fulfill their roles and responsibilities to the land.

The Akwesasronon interviewed in this research presented many concerns that need to be addressed in the biocultural forest stewardship strategies. First and

foremost is addressing species that are or may become threatened or endangered in Akwesasne. If it is not possible to protect the species, effort should be made to develop mechanisms to protect the cultural knowledge that is affected by the loss of a particular species. For example, there needs to be a comprehensive strategy developed to address EAB and Black Ash trees. EAB is present in Akwesasne, which will dramatically impact the Black Ash trees, making them useless for making baskets and detrimentally affecting the biomass as well as ecology of forested lands in Akwesasne. Thus, the knowledge must be recorded and saved, preferably with online availability to *Akwesasronon*, so future generations can access it. There should be effort put into identifying other species of trees that work as an alternative for basket making material. Additionally, drawing on the historical trade of other Indigenous Communities with the Haudenosaunee, collaborations can be developed between the different communities located at different latitudes to share knowledge and different species that are affected by changing ecological landscapes due to climate change. Indigenous Communities have always shared with each other knowledge, stories, teachings, ceremonies, songs, as well as human labor, so we can work together to help protect our knowledges and relationships with the land for future generations. The enactment of these collaborations is hopeful that the land will heal, and the different Indigenous Communities can call their knowledge and relationships home someday in the future. Additionally, these collaborations can be strengthened by working with non-Indigenous Scientists to utilize their expertise and help support efforts of protection of different species. Another important species of concern is the Sugar Maple, which is potentially threatened by climate change and invasive species. The knowledge surrounding the Sugar Maple should have the same approach utilized for Black Ash, such as recording and saving knowledge as well as collaboration with other Indigenous Communities and non-Indigenous Scientists. Additionally, the

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biocultural forest stewardship strategies should work with landowners in developing strategies to allow access for medicine collectors, hunters, crafts-people, and food gatherers. To help protect their lands from degradation, a training for all land-based activities can be developed to educate land-use practitioners of proper protocol and avenues of gaining permission from landowners. I believe that the biocultural forest stewardship is essential in aiding in the protection of species on the land, which helps support and reinforce cultural knowledge and relationships with the land. The effective enactment of the biocultural forest stewardship strategies will help in making sure that future generations have access to their cultural knowledge and relationships with the land.

The biocultural forest stewardship will not be possible without a necessary funding and human resources. I worked many years in Akwesasne for different programs that struggled to fund themselves as well as new projects. The programs were forced into an unhealthy relationship with grants, which they depended upon for salaries for employees as well as obtaining the necessary resources to enact new projects. However, my work experiences and research helped me understand that there are resources and funding available in Akwesasne, which can be accessed through inter-governmental and inter-departmental collaborations. The biocultural forest stewardship strategies recognize that the health of the community and land are connected. Thus, collaborations across departments and governments can help fill in the lack of funding and human resources to enact important strategies for the community's empowerment through biocultural forest stewardship. Additionally, the governments present in Akwesasne should work together to assert the sovereignty and unity of Akwesasne, so grants and human resources are not limited by the imposed border, and work to get funding established for the project in perpetuity. Grants are helpful and necessary for the creation of new project, but they should not be the only

source of support for programs. The biocultural forest stewardship strategies can be achieved by lobbying and drawing the collaborative energies across Akwesasne, which can help create a healthier community and land for future generations.

Akwesasne is an incredibly resilient community that has worked diligently to reclaim cultural practices, knowledges, and relationships with the land despite the purposeful action made to strip them by settler-states. I feel like the biocultural forest stewardship strategies for Akwesasne are building on this history of cultural reclamation and adding a dimension to environmental management. The biocultural context conveys the importance of land, which is family and a part of us. The enacting of forest stewardship strategies will aid *Akwesasronon* in the fulfillment of their roles and responsibilities to the rest of creation. I feel like the network analysis will be beneficial to Akwesasne as it provides a visual representation of relationships across values and could help in understanding the complexity of implementing forest stewardship strategies as well as justification for the need for inter-departmental and governmental collaborations. Furthermore, these recommendations are tool for *Akwesasronon* to mend relationships with each other, land, and cultural knowledge, so a healthier and united Akwesasne is created for the future generations to draw upon and lead healthy lives with their cultural knowledges and relationship intact.

APPENDIX A: VALUE AND SUB-VALUE, WITH DEFINITIONS, IDENTIFIED

AT THE COLLABORATIVE GATHERING (6/3/17)

1) Culture: Areas or places valued because they are necessary to the continuation of traditions and knowledge within Akwesasne.
   a. Indicators: A phenological occurrence that signals cycle of ceremonies and associated activities.
   b. Basket Making: There is a long history and tradition of this activity in Akwesasne. It is important economically, as well as culturally. The knowledge around it is specific to the forest and is threatened by the emerald ash borer.
   c. Teachings: There are many different teachings that will be explored throughout this project that are valuable, which are outlined below. These will be explored in detail as they relate to forests.
      i. Ohenton Karihwatehkwen (Thanksgiving Address): It is a speech that is given before any important event that acknowledges all of creation for fulfilling their roles and responsibilities.
      ii. Original Instructions: Humans are responsible to be thankful and offer tobacco.
      iii. Kaianerekowa (Great Law): It is the message brought by the Peacemaker to the bring peace and unity to the different Nations of the Haudenosaunee Confederacy and has three foundational principles: Peace, Power and Good Mind.
      iv. Kariwiio (Code of Handsome Lake): It is was a teaching received by Handsome Lake to be given to the Haudenosaunee Nations to regulate behavior, as they were being affected dramatically and negatively by Mind-Changers (drugs and alcohol).
   d. Language: The language is verb-based and connected to the land. It is very important to Akwesasronon and needs to be promoted and preserved in connection to Forest Stewardship.
   e. Names: This is intimately connected to language. Names are at the center of a Haudenosaunee role and responsibility and identity. It is the how creation recognizes them.
   f. Lessons: There are a lot of skills to be learned in the forest. Hands-on learning can help individual learn, because they can see the results of their hard work, such as cutting, splitting, and stacking wood to then prepare a fire. There is guidance embedded in these processes that are connected to the culture.

2) Connection to the land: Areas or places valued because they provide an access point for connecting with and maintaining a relationship with the land, which is a part of Haudenosaunee Roles and Responsibilities.
   a. Experience: This helps shape people's relationship with the forest and the rest of the world. The forest shares lessons about reciprocity. It can help open a person's mind up to the original instructions and being present in a simple and quite space for reflection to obtain peace and serenity. People have an emotional connection to the forest, as they are saddened by to see a deplorable forest. Spirit talking happens in the forest. It is a healing space, as trees can pull the sickness from individuals and the concentrated oxygen in forests help with healing. Men, and their wellness, is connected to the forest, which currently is lacking. Further, it is a great place for mentorship and learning to occur.
   b. Roles and Responsibilities: As outlined in the Ohenten Kariwahtekwen and in teachings, the Haudenosaunee recognize themselves as stewards of the land. In the original instruction, Haudenosaunee are given the responsibility to care for Mother Earth. Also, the relationship between the forest and Haudenosaunee need to be respectful and seriously approached with a good mind.
   c. History: The way people relate to the land and the stories it holds.
3) Learning: Areas or places valued because they present opportunities to learn about culture, history and the environment.
   a. Ononhkwaon:we (Traditional Medicine): This is a treasured and valuable Haudenosuanee resources, which is emphasized by Akwesasronon elders. They want to maintain this knowledge for future generations, while maintaining its integrity.
   b. Practical Knowledge: This is knowledge held by an individual that has usage in certain activities, such as the properties of different wood used for a fire to boil maple sap.
   c. Role Models: These are individuals that teach through either sharing stories or through example with their actions. They make the learning process much easier.
4) Spirit: Areas or places valued because they have a cultural significance connected to the continuity of ceremonies or connected to stories.
   a. Sacred Space: It is an area set aside for ceremony, learning, healing, and possibly other uses.
   b. Ohero:kon: This is a coming of age ceremony that helps the youth connect with the natural world as they make the transition into adults. They receive twenty weeks of culturally grounded education that culminates in a one to four day fast depending on years in ceremony.
5) Recreation: Areas or places valued because they provide places for outdoor recreation activities and experiences.

  a. Youth: It gets the youth on the land to connect through playing and/or learning.
6) Biological: Areas or places valued because they are home to different species that roles and responsibilities, such as medicines, plants, trees, and wildlife.
  a. Tree Species:
    i. Butternut: TBD
    ii. Maple: It is the leader of all trees, referenced in the Ohenton Karihwatehkwen. It produces sap, which is connected to the first ceremony of the New Year, Wahta.
    iii. Slippery Elm: It is a rare species of tree in Akwesasne. It is valued medicine used in the community. Thus, it must be protected.
    iv. Black Ash: This is a species of very high concern because it is a part of Akwesasnronon identity and history as basket makers. They are threated by the arrival of the Emerald Ash Borer, an invasive species approaching the area.
    v. Black Walnut: This is a highly valued medicine; the shells are used and the insides buried. The tree has a mutual relationship with squirrel.
    vi. White Pine: It is called the Tree of Peace and represents different aspects of the Kaianerekowa (Great Law). It has a wealth of symbols representing teachings and concepts. Also, it is valued as a medicine.
    vii. Apples Trees: It is a food source.
  b. Other Species:
    i. Squirrels: They are an important part of the forest cycle. They burry and forget nuts, so new trees come up. They are a teacher that can show Akwesasronon how to be good stewards.
    ii. Birds (General): TBD
    iii. Bees: TBD
    iv. Deer: TBD
7) Life Sustaining: Areas or places valued because they provide food, shelter, and energy for the community and other beings.
  a. Food: The forest provides sustenance to the community and other being, such as fruits (apples in the fall), nuts, and berries (in the summer).
  b. Shelter: It is a place for community, people, animals, and medicines, to find refuge. Trees fulfill their roles and responsibilities in various ways, such as laying down to help someone. They have value in their death, energy, and canopy, protection. Also, it provides an escape from the heat during the summer.

     c. Fuel: Wood is used in fire during the winter and ceremony. Fire carries important lessons.

     d. Services: A trees, Tree of Life, is at the center of the Creation Story. Also, they help hold the land together with their roots and produce oxygen.

8) Wellness: Places or areas valued because they provide a space for aiding in the holistic well-being of Haudenosaunee.

     a. Health: In Akwesasne, it is understood from a holistic place, which it draws upon the four components the medicine wheel - mental, emotional, physical and spiritual. These need to be in balance for a person's to be health and have a good mind. Imbalance causes sickness.

**AKWESASRONON
FOREST
STEWARDSHIP**

LANGUAGE   INDICATORS

NAMES   BASKET MAKING

LESSONS   TEACHINGS

EXPERIENCE

HISTORY   CULTURE

CONNECTION
to
LAND   WELLNESS — HEALTH

ROLES
&
RESPONSIBILTIES   SERVICES

LEARNING   LIFE
SUSTAINING

Forests

ONONKWAO:WE
Traditional Medicine   FOOD   FUEL

PRACTICAL
KNOWLEDGE   SHELTER

ROLE
MODELS   SPIRIT   BIOLOGICAL

OHERO:KON   SACRED
SPACE   RECREATION   TREE
SPECIES   OTHER
SPECIES

YOUTH   **All of them are important!**
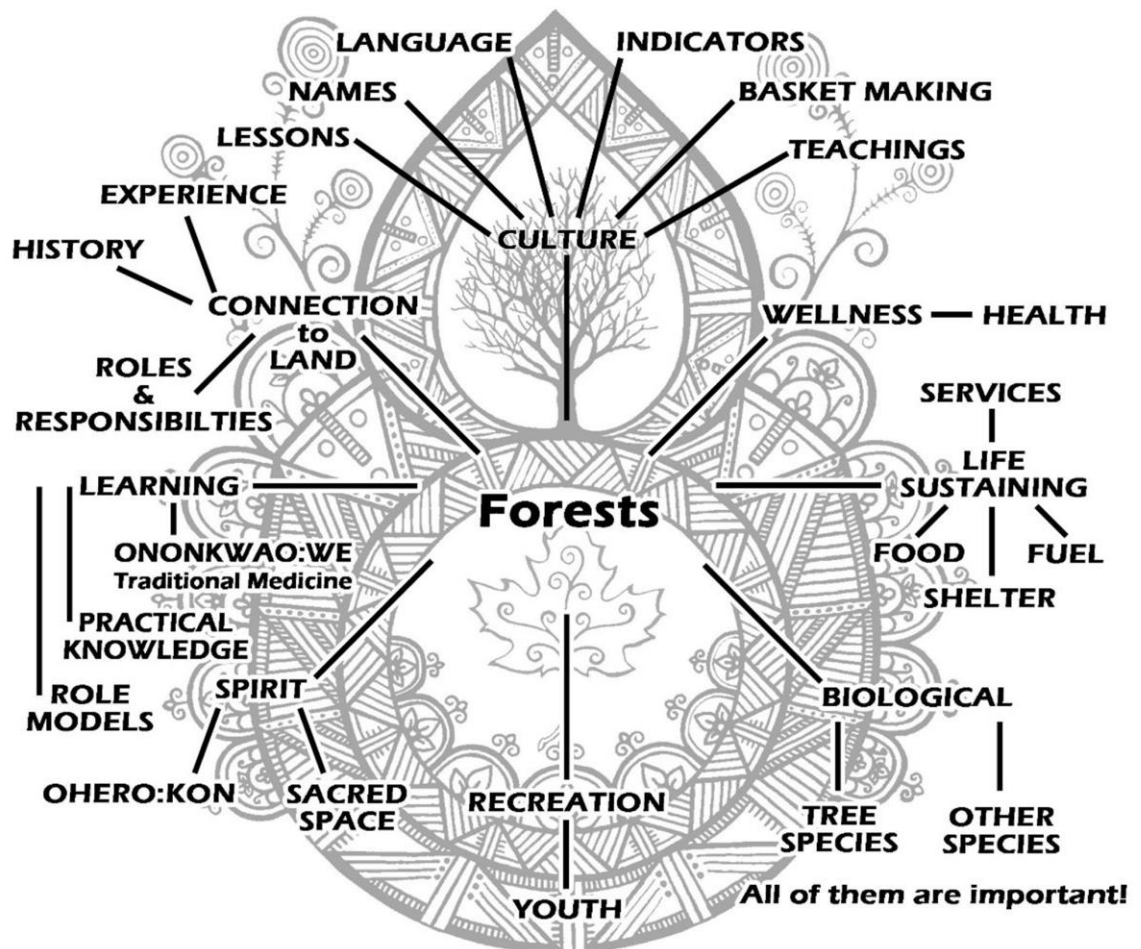
**The participants requested that
medicines remain generalized.
It is a means of protecting the
knowledge.**

Code (high lighter)	Sub Codes (tabs)
Culture	Indicators
	Basket Making
	Teachings
	Language
	Names
	Lessons
Connection to Land	Experience
	Roles and Responsibilties
	History
Learning	Traditional Medicines
	Practical Knowledge
	Role Models
Spirit	Sacred Space
	Ohero:kon
Recreation	Youth
Biological	Trees Species
	Other Species
Life Sustaining	Food
	Shelter
	Fuel
	Services
Wellness	Health
Others	
Issues	
Important Quotes	tabs will be used as they relate to the above subcategory

Code (high lighter)	Sub Codes (tabs)
Suppression of Knowledge	Schooling
	Supression of Stewardship Values
Source of Knowledge	Lanugage
	Dreams
	Roles and Responsibilities
	Intergenerational Knowledge
	Connectedness (Connection to Land)
	Identity
Stewardship	Scientific
	Values
	Fulfillment of Roles and Responsibilities
	Connection to Land
Spirit	
Medicine	Being there
	Practicality
Diversity	Species (All Beings)
	Values
	Perspective/Outlook
Holistic Health	Economic
	Spiritual
	Basket Making
	Livelihood
	Healing
	Health
	Protection (+ and -)
Species	
Concerns	Changing Values**
Passing on Knowledge	
Gender Roles	Shifting
Important Quotes	Memos will be used to connect them with appropriate categories and sub-categories

APPENDIX E: RECRUITMENT SCRIPT FOR COLLABORATIVE GATHERING

IN AKWESASNE

To be conducted by phone:

Hello [insert name]! This is [researcher's name] calling. I am a researcher working with St. Regis Mohawk Tribe's Environment Division and Cornell University. How are you?

We are conducting a research project focused on forest stewardship strategies for Akwesasne's lands. I am calling to invite you to a Collaborative Gathering at [name of community center] on [day of week] at [time]. We are talking with Elders and other knowledgeable people about the forested lands in and around Akwesasne, including weather, plants, and animals. We are inviting 30 to 45 people, all from Akwesasne, to attend. Do you have a moment for me to explain the Collaborative Gathering? [If no, jump to last paragraph.]

We are working with the Akwesasne community members to develop culturally and biologically informed forest stewardship strategies. These strategies will be grounded in the core values of Akwesasne. The project will: (1) Provide a collection of culturally grounded forest stewardship strategies, with specific recommendations to reduce vulnerability, and build adaptive capacity by addressing wide ranging issues of forest use; and (2) Create curriculum material on sustainable forest stewardship for use in high school and undergraduate environmental science education.

Would you be interested in attending our focus group on [day of week]? I am hoping you are available because we would really appreciate your participation. Our discussion will last about 120 minutes. We will be providing lunch right after we finish the discussion.

If positive response: Wonderful! I look forward to seeing you on [day], at [time], in the [location]. Let me give you my phone number in case you have any questions or if something comes up. It's [phone number]. Thank you! Talk to you soon, [name]!

If negative response: That's OK, I understand! Just so that you know, I will be here working on this project for the next several months. In addition to the Collaborative Gathering, I will be conducting Individual Interviews, so if that would work better for you, maybe we can find another time to meet one-on-one.

APPENDIX F: WRITTENT INFORMED CONSENT FOR COLLABORATIVE

GATHERING IN AKWESASNE

We are requesting you to participate in a research study entitled "Stewardship Strategies for Existing and Newly Settled Native American Land in the Northern Forest". We will describe this study to you and answer any of your questions. This study is led by Dr. Karim-Aly Kassam of the Department of Natural Resources and the American Indian and Indigenous Studies Program at Cornell University in partnership with the St. Regis Mohawk Tribe's Environment Division. This study has been reviewed and approved by the Institutional Review Boards at Cornell University.

What the study is about: This study will work with the Akwesasne community members to develop culturally and biologically informed forest stewardship strategies. These strategies will be grounded in the core values of the community. The project will: (1) Provide a collection of culturally grounded forest stewardship strategies, with specific recommendations to reduce vulnerability, and build adaptive capacity by addressing wide ranging issues of forest use; and (2) Create curriculum material on sustainable forest stewardship for use in high school and undergraduate environmental science education. This co-generated knowledge of Akwesasne may be shared with other Native Communities to aid in their efforts to preserve their important cultural and environmental resources.

What we will ask you to do: Our collaborative discussion will last approximately 120 minutes. We will begin by identifying important values connecting forest environments and surrounding areas. These will inform the topics of breakouts discussion groups. Participants will have the freedom to join the group of their choice. The breakout groups will present their ideas to the larger.

Taking part is voluntary: Your involvement in this study is voluntary. You have a right to refuse to participate before we begin, or discontinue at any time, with no penalty to you, and no effect on your relationship with any of the individuals or organizations involved.

Risks and discomforts: We do not anticipate any risks or discomforts from participating in this research.

Benefits: There is no payment or other direct benefit for taking part in this study. We hope this research will directly benefit the community, by generating effective forest stewardship strategies that may be useful to Akwesasne's forested lands. We will share all the findings from this study with you as well as with Akwesasne's community members and leaders.

Confidentiality: Any information you share with us may be shared with the general public. If you give us your permission, we would like to use your name, in order to acknowledge your contributions to our research, both in our presentations and our

publications. Otherwise, if you prefer to maintain confidentiality, we will ensure that neither your name nor any other identifying information is included in any presentation or publication resulting from this research.

☐   I choose to maintain my confidentiality. I do not give my permission to have my name or any other identifying information associated with the information I provide during this Collaborative Gathering.

☐   I consent to my name being used in association with the information I provide during this Collaborative Gathering, including presentations and publications resulting from this research:

Signature: _____ Date: _____

Audio Recording (only if consenting to the use of name above): With your permission, we would like to record our Collaborative Gathering using a digital audio recorder. The audio recording and a transcription of our Collaborative Gathering's discussion will be archived at the Tribal Historic Preservation Office. The recording and transcript of our Collaborative Gathering will be accessible to the public. We will not record the Collaborative Gathering unless all participants give their permission to do so. If anyone does not wish to have the Collaborative Gathering recorded, the research team will document the discussion by taking notes.

☐   I do not wish to have this Collaborative Gathering recorded.

☐   I agree to have this Collaborative Gathering recorded and I give permission for the recording and transcript to be archived at the Tribal Historic Preservation Office, where it will be made available to the general public.

Signature: _____ Date: _____

Photograph (only if consenting to the use of name above): With your permission, we would like to take your photograph with a digital camera. This photographed would be included in a publication to acknowledge your contributions to the research. You may still participate in this study if you prefer not to be photographed.

☐   I do not wish to be photographed.

☐   I agree to be photographed and I give permission for the photograph to be included in publications resulting from this research.

Signature: _____ Date: _____

If you have questions: If you have any questions at this moment, please ask them now.

If you have any questions or concerns in the future, I am providing you with an information sheet, which contains contact information for the lead investigator, other project partners, and an anonymous ethics hotline to report your concerns.

Statement of Consent: I have read the above information, and have received answers to any questions I asked. I consent to take part in the study.

Signature: _____ Date: _____

Name (printed): _____

Signature of person obtaining consent: _____

Date: _____

Printed name of person obtaining consent: _____

This consent form will be kept by the researcher for five years beyond the end of the study.

APPENDIX G: COLLABORATIVE GATHERING GUIDE FOR AKWESANE

Number of participants: 30 to 45
Inclusion criteria: Participants must be 18 years old and residents of Akwesasne or from surrounding area.
Duration of focus group: approximately 120 minutes
Location: Community Centers in Akwesasne
Room arrangement: All participants will sit at tables that will face forward towards the front for presentations. This will change when the individual breakout groups occur.
Materials: Color markers, flip chart paper, digital audio recorder

1.   Opening Address (5 minutes): A person will show appreciation for participation from the community and recite the opening address.
2.   Introductions (15 minutes): Provide a brief introduction to the research project and introduce the research team (field research manager and community researcher). Provide a brief overview of the agenda for the Collaborative Gathering.
3.   Written informed consent (10 minutes): Distribute copies of the 'Written Consent for Collaborative Gathering' and 'Contact Information Sheet' to everyone present. Read the form aloud, stopping to answer any questions. Collect signed written informed consent forms from each participant.
4.   Audio recording: If everyone in the group has signed the section giving permission to record the Collaborative Gathering with a digital audio recording device, turn it on to record and place it at the center of the room; additional recording devices will be used in individual group breakout sessions.
5.   Generating Values and Symbols for Human Ecological Mapping (20 minutes)
   • Explanation: Explain how the first activity will be to develop a set of values associated with forested lands to be addressed in the project. Ask for two people with clear handwriting to serve as scribes and record information. The group will identify the community values to discuss in the breakout groups.
      o Examples: Kassam (2001); Robinson and Kassam (1998) worked with indigenous communities to develop symbols that were representative of their relationship with their environment, which will be used later to conduct Human Ecology Mapping.
      o Alessia et al. (2008) utilized the following examples: Aesthetic; Biological; Cultural; Economic; Future; Historic; Intrinsic; Learning; Life Sustaining; Recreation; Spiritual; Subsistence; Therapeutic; Wilderness. The information will be georeferenced and analyzed to place different weights of value throughout the landscape.
6.   Breakout Groups Discuss (20 minutes)
   • Explanation: Explain how the second activity will be to explore and discuss the values and symbols identified in the previous activity in smaller intimate groups. The large group will be separated into 6 breakout groups. Ask one person with clear handwriting to serve as scribes and record information. A variety of different values and symbols will be assigned.

- Points of reference: Ask the breakout groups to think about what the values and symbols means to them and the community as it relates to forested lands.

7.   Discussion of breakout group's ideas with the larger group for additional comments (40 minutes)

- Ask a member from each of the groups to present their breakout groups thoughts. Next, allow the larger group to contribute their thoughts to the individual breakout groups thoughts, which an assigned person with clear handwriting will record.

8.   Additional sources of information (5 minutes): Explain to the group that you will be conducting Individual Interviews with Elders and other knowledgeable community members. Ask if they would like to recommend anyone who would be able to provide additional information about the topics discussed.

9.   Closing Address (5 minutes): Thank the group for attending the Collaborative and invite them to lunch. Remind them to contact you should they have any questions, suggestions, or concerns about the research. Finally, the closing address will be recited.

Citations:
Alessa, L., Klinskey, A., and Brown, G. 2008. Social-ecological hotspots mapping: a spatial approach to identifying coupled social-ecological space. Landscape and urban planning 85(1), 27-39.
Kassam, Karim-Aly and the Wainright Traditional Council. 2001. Passing on the Knowledge: Mapping Human Ecology in Wainright, Alaska. Calgary: Arctic Institute of North America.
Robinson, Michael and Karim-Aly Kassam. 1998. Sami Potatoes: Living with Reindeer and Perestroika. Calgary: Bayeux Arts

APPENDIX H: RECRUITMENT SCRIPT FOR INDIVIDUAL INTERVIEW IN

AKWESASNE

To be conducted by phone:

Hello [insert name]! This is [researcher's name] calling. I am a researcher working with St. Regis Mohawk Tribe's Environment Division and Cornell University. How are you?

We are conducting a research project focused on forest stewardship strategies for Akwesasne's lands. We are talking with Elders and other knowledgeable people about the forested lands in and around Akwesasne, including weather, plants, and animals. I am calling to see if I might come interview you. Do you have a moment for me to explain our study?

We are working with the Akwesasne community members to develop culturally and biologically informed forest stewardship strategies. These strategies will be grounded in the core values of Akwesasne. The project will: (1) Provide a collection of culturally grounded forest stewardship strategies, with specific recommendations to reduce vulnerability, and build adaptive capacity by addressing wide ranging issues of forest use; and (2) Create curriculum material on sustainable forest stewardship for use in high school and undergraduate environmental science education. We [spoke to, if person allows us to use their name] on this topic at [location] on [date], and they recommended that I speak to you.

These interviews last about 90 minutes. We ask questions about thoughts and suggestions about Collaborative Gathering, community activities, the weather, plants, animals, and forest lands. If at any point you decide you'd rather not participate, we can always stop the interview without any problem. May I come to interview you?

> If positive: Wonderful! Are you available on [day] at [time]? Excellent, let me give you my phone number in case you have any questions or if something comes up. It's [phone number]. Thank you! I look forward to seeing you on [day], at [time].

> If negative response: That's OK, I understand! It was my pleasure to speak with you. If you change your mind, I will be here for the next several months. You can reach me on my cell phone at [phone number]. Thank you for your time and have a wonderful day!

APPENDIX I: WRITTENT INFORMED CONSENT FOR INDIVIDUAL

INTERVIEWS IN AKWESASNE

We are requesting you to participate in a research study entitled "Stewardship Strategies for Existing and Newly Settled Native American Land in the Northern Forest". We will describe this study to you and answer any of your questions. This study is led by Dr. Karim-Aly Kassam of the Department of Natural Resources and the American Indian and Indigenous Studies Program at Cornell University in partnership with the St. Regis Mohawk Tribe's Environment Division. This study has been reviewed and approved by the Institutional Review Boards at Cornell University.

What the study is about: This study will work with the Akwesasne community members to develop culturally and biologically informed forest stewardship strategies. These strategies will be grounded in the core values of the community. The project will: (1) Provide a collection of culturally grounded forest stewardship strategies, with specific recommendations to reduce vulnerability, and build adaptive capacity by addressing wide ranging issues of forest use; and (2) Create curriculum material on sustainable forest stewardship for use in high school and undergraduate environmental science education. This co-generated knowledge of Akwesasne may be shared with other Native Communities to aid in their efforts to preserve their important cultural and environmental resources.

What we will ask you to do: A semi-structured interview will be used to discuss the symbols and values established in the Collaborative Gathering; learn about stories and teachings associated with forested lands; connect values, symbols and stories on (laminated) map; share thoughts of forest stewardship. The interview will last approximately 45-90 minutes.

Taking part is voluntary: Your involvement in this study is voluntary. You have a right to refuse to participate before we begin, or discontinue at any time, with no penalty to you, and no effect on your relationship with any of the individuals or organizations involved.

Risks and discomforts: We do not anticipate any risks or discomforts from participating in this research.

Benefits: There is no payment or other direct benefit for taking part in this study. We hope this research will directly benefit the community, by generating effective forest stewardship strategies that may be useful to Akwesasne's forested lands. We will share all the findings from this study with you as well as with Akwesasne's community members and leaders.

Confidentiality: Any information you share with us may be shared with the general public. If you give us your permission, we would like to use your name, in order to acknowledge your contributions to our research, both in our presentations and our

publications. Otherwise, if you prefer to maintain confidentiality, we will ensure that neither your name nor any other identifying information is included in any presentation or publication resulting from this research.

☐   I choose to maintain my confidentiality. I do not give my permission to have my name or any other identifying information associated with the information I provide during this Individual Interview.

☐   I consent to my name being used in association with the information I provide during this Individual Interview, including presentations and publications resulting from this research:

Signature: _____ Date: _____

Audio Recording (only if consenting to the use of name above): With your permission, we would like to record our Individual Interview using a digital audio recorder. The audio recording and a transcription of our Individual Interview's discussion will be at the Tribal Historic Preservation Office. The recording and transcript of our Individual Interview will be accessible to the public. We will not record the Individual Interview unless you give permission. If anyone does not wish to have the Individual Interview recorded, the research team will document the discussion by taking notes.

☐   I do not wish to have this Individual Interview recorded.

☐   I agree to have this Individual Interview recorded and I give permission for the recording and transcript to be archived at the Tribal Historic Preservation Office, where it will be made available to the general public.

Signature: _____ Date: _____

Photograph (only if consenting to the use of name above): With your permission, we would like to take your photograph with a digital camera. This photographed would be included in a publication to acknowledge your contributions to the research. You may still participate in this study if you prefer not to be photographed.

☐   I do not wish to be photographed.

☐   I agree to be photographed and I give permission for the photograph to be included in publications resulting from this research.

Signature: _____ Date: _____

If you have questions: If you have any questions at this moment, please ask them now.

If you have any questions or concerns in the future, I am providing you with an information sheet, which contains contact information for the lead investigator, other project partners, and an anonymous ethics hotline to report your concerns.

Statement of Consent: I have read the above information, and have received answers to any questions I asked. I consent to take part in the study.

Signature: _____ Date: _____

Name (printed): _____

Signature of person obtaining consent: _____

Date: _____

Printed name of person obtaining consent: _____

This consent form will be kept by the researcher for five years beyond the end of the study.

APPENDIX J: INDIVIDUAL INTERVIEW GUIDE

Inclusion criteria: Participants must be 18 years old and residents of Akwesasne.
Duration of interview: approximately 45-90 minutes
Location: In the participant's home or at a place of comfort or convenience, which will be noted.

1.   Introductions (5 minutes): Introduce the research team and provide a brief overview of the research.
2.   Written informed consent (10 minutes): Provide a copy of the form 'Written Consent for Individual Interview' and 'Contact Information Sheet' to the participant. Read the form together aloud, stopping to answer any questions. Collect the signed written informed consent form.
3.   Audio recording: If the participant has signed the section giving permission to record the session with a digital audio recording device, turn it on to begin recording.
4.   Semi-structured interview (70 minutes): For a semi-structured interview, the order of themes and topics is flexible based on the participant's responses. The following list includes sample questions organized by themes and responses. The questions selected for each interview will focus on those themes and topics to which the participant is most responsive (i.e. sensitivity to diversity of knowledge). Additionally, the spatial and temporal distribution of values and symbols will be identified on a laminated map.

Thoughts and Suggestions of Collaborative Gathering
- Do you agree with the values associated with the forested lands and their definitions that were identified in the Collaborative Gathering?
  - Provide a list of values and describe them.
- Do you have any suggestions for improving these values and their descriptions?

Human Ecological Mapping
- Could you identify areas that cultural activities occur?
- Could you align the symbols with the map?
- Do you have any stories about these locations?
- Have you noticed changes?

SES Mapping
- Could you identify important forest locations based on these values?

Forest Stewardship
- How would you recommend we care for the forests?
- Are there any special rules and regulations for behavior regarding forest use?
- How do we remind the community of their responsibilities?
- Do you know of any traditional stories about the forests?

5.   Additional sources of information (5 minutes): Explain to the participant that you are conducting in Individual Interviews with Elders and other knowledgeable community members throughout Akwesasne. Based on their interview, ask if they

would like to recommend anyone who would be able to provide additional information about the topics you have discussed.

APPENDIX K: CONTACT INFORMATION SHEET

Principle Investigator
Karim-Aly S. Kassam, PhD
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Project Partner
Ken Jock
Director
Environment Division
St. Regis Mohawk Tribe
449 Frogtown Road
Akwesasne, NY 13655
Telephone: (518) 358-5937
Email: ken.jock@srmt-nsn.gov
If you have any questions or concerns regarding your rights as a subject in this study, we encourage to contact Mr. Ken Jock or Dr. Karim-Aly Kassam.

You may also contact the Cornell University Institutional Review Board (IRB) at 607-255-5138 or access their website at http://www.irb.cornell.edu.

You may also report your concerns or complaints anonymously through Ethicspoint (www.ethicspoint.com) or by calling toll free at 1-866-293-3077. Ethicspoint is an independent organization that serves as a link between Cornell University

Inclusion criteria: Participants must be 18 years old and residents of Akwesasne.
Duration of interview: approximately 45-90 minutes
Location: In the participant's home or at a place of comfort or convenience, which will
be noted.

1.   Introductions (5 minutes): Introduce the research team and provide a brief
overview of the research.
2.   Written informed consent (10 minutes): Provide a copy of the form 'Written
Consent for Individual Interview' and 'Contact Information Sheet' to the participant.
Read the form together aloud, stopping to answer any questions. Collect the signed
written informed consent form.
3.   Audio recording: If the participant has signed the section giving permission to
record the session with a digital audio recording device, turn it on to begin recording.
4.   Semi-structured interview (70 minutes): For a semi-structured interview, the
order of themes and topics is flexible based on the participant's responses. The
following list includes sample questions organized by themes and responses. The
questions selected for each interview will focus on those themes and topics to which
the participant is most responsive (i.e. sensitivity to diversity of knowledge).

Thoughts and Suggestions on Collaborative Gathering Analysis
   • The values sequestered from the Collaborative Gathering, along with the
     cognitive map, will be reviewed with the interviewee. The following questions
     will be asked.
        o Do you have values or sub-values to add to those identified at the
           Collaborative Gathering? If so, what is important about the forests to
           Akwesasne and the people?
   • Would you explain these values in a different way or do you have any stories
     or examples to share for these values or sub-values?
   • Can you draw connections between sub-values and explain them?
Forest Stewardship
   • How would you recommend we care for the forests with these values identified
     in mind?
   • Are there any special rules and regulations for behavior regarding forest use?
   • How do we remind the community of their responsibilities?
   • Do you know of any traditional stories about the forests?
Context Specific Questions:
   • The interviewee may be asked questions specific to the person's background or
     knowledge regarding a particular relation to the community or culture.

5.   Additional sources of information (5 minutes): Explain to the participant that
you are conducting in Individual Interviews with Elders and other knowledgeable

community members throughout Akwesasne. Based on their interview, ask if they would like to recommend anyone who would be able to provide additional information about the topics you have discussed.

APPENDIX M: CO-OCCURRENCE TABLE FOR CODES (CONCERNS-BARRIERS – CONCERNS-CRITIQUE)

Codes	Concerns - Barriers	Concerns - Changing Values	Concerns - Conflict	Concerns - Critique
Concerns - Barriers	0	0	0	0
Concerns - Changing Values	0	0	1	0
Concerns - Conflict	0	1	0	0
Concerns - Critique	0	0	0	0
Concerns - Environmental Violence	1	0	0	0
Concerns - Loss	0	3	0	0
Concerns - Teachings	0	0	0	0
Diversity	3	3	1	0
Gender Roles	0	4	1	1
Medicines - Collect	0	1	1	2
Medicines - Connection	0	1	0	0
Medicines - Plurality	0	0	0	0
Medicines - Practical Knowledge	1	0	0	1
Medicines - Spiritual	0	2	1	0
Medicines - Value	0	1	1	0
Passing on Knowledge - Knowledge Providers	1	0	0	0
Passing on Knowledge - Practical Knowledge	0	4	1	1
Passing on Knowledge - Resurgence	0	1	3	0
Passing on Knowledge - Story	10	12	8	2
Passing on Knowledge - Educate	6	9	0	4
Passing on Knowledge - Teachings	1	3	2	0
Source of Knowledge - Ceremony	1	0	0	1
Source of Knowledge - Complex Connectivity	3	5	2	6
Source of Knowledge - Roles and Responsibilities	3	5	1	2
Species	10	12	11	5
Spirit	0	0	2	0
Stewardship - Awareness	1	0	0	1
Stewardship - Connection to Land	1	4	1	0
Stewardship - Fulfillment of Roles and Responsibilities	4	3	3	1
Stewardship - Values	1	5	3	0
Supression of Knowledge	1	0	1	0
Holistic Health - Basket-making	0	0	1	0
Holistic Health - Economic	1	5	5	1
Holistic Health - Healing	0	0	0	0
Holistic Health - Health	0	3	0	2
Holistic Health - Livelihood	0	2	0	0
Holistic Health - Protection	0	0	0	0

APPENDIX N: CO-OCCURRENCE TABLE FOR CODES (CONCERNS-ENVIRONMENTAL VIOLENCE – DIVERSITY)

Codes	Concerns - Environmental Violence	Concerns - Loss	Concerns - Teachings	Diversity
Concerns - Barriers	1	0	0	3
Concerns - Changing Values	0	3	0	3
Concerns - Conflict	0	0	0	1
Concerns - Critique	0	0	0	0
Concerns - Environmental Violence	0	2	0	1
Concerns - Loss	2	0	1	1
Concerns - Teachings	0	1	0	0
Diversity	1	1	0	0
Gender Roles	0	2	1	0
Medicines - Collect	2	2	0	1
Medicines - Connection	0	1	0	1
Medicines - Plurality	0	0	0	0
Medicines - Practical Knowledge	0	0	0	0
Medicines - Spiritual	0	0	0	0
Medicines - Value	1	2	0	0
Passing on Knowledge - Knowledge Providers	0	3	1	1
Passing on Knowledge - Practical Knowledge	1	5	1	3
Passing on Knowledge - Resurgence	0	2	0	1
Passing on Knowledge - Story	3	22	5	16
Passing on Knowledge - Educate	3	11	2	4
Passing on Knowledge - Teachings	2	9	5	2
Source of Knowledge - Ceremony	0	3	1	2
Source of Knowledge - Complex Connectivity	4	28	4	6
Source of Knowledge - Roles and Responsibilities	5	6	4	6
Species	12	83	8	10
Spirit	1	2	1	4
Stewardship - Awareness	2	5	1	2
Stewardship - Connection to Land	3	5	0	0
Stewardship - Fulfillment of Roles and Responsibilities	9	8	0	5
Stewardship - Values	1	4	1	2
Supression of Knowledge	1	3	0	1
Holistic Health - Basket-making	1	11	0	5
Holistic Health - Economic	3	8	0	2
Holistic Health - Healing	0	0	0	0
Holistic Health - Health	1	6	3	3
Holistic Health - Livelihood	0	2	0	0
Holistic Health - Protection	0	1	0	0

APPENDIX O: CO-OCCURRENCE TABLE FOR CODES (GENDER ROLES –

MEDICINES-PLURALITY)

Codes	Gender Roles	Medicines - Collect	Medicines - Connection	Medicines - Plurality
Concerns - Barriers	0	0	0	0
Concerns - Changing Values	4	1	1	0
Concerns - Conflict	1	1	0	0
Concerns - Critique	1	2	0	0
Concerns - Environmental Violence	0	2	0	0
Concerns - Loss	2	2	1	0
Concerns - Teachings	1	0	0	0
Diversity	0	1	1	0
Gender Roles	0	0	1	0
Medicines - Collect	0	0	0	0
Medicines - Connection	1	0	0	0
Medicines - Plurality	0	0	0	0
Medicines - Practical Knowledge	1	3	0	0
Medicines - Spiritual	0	1	0	0
Medicines - Value	0	0	0	0
Passing on Knowledge - Knowledge Providers	0	1	1	0
Passing on Knowledge - Practical Knowledge	0	12	0	1
Passing on Knowledge - Resurgence	0	0	0	0
Passing on Knowledge - Story	12	8	10	1
Passing on Knowledge - Educate	7	7	1	1
Passing on Knowledge - Teachings	3	2	0	0
Source of Knowledge - Ceremony	1	0	0	0
Source of Knowledge - Complex Connectivity	6	4	9	0
Source of Knowledge - Roles and Responsibilities	11	4	2	0
Species	1	22	5	5
Spirit	1	1	1	1
Stewardship - Awareness	1	0	0	0
Stewardship - Connection to Land	7	0	2	0
Stewardship - Fulfillment of Roles and Responsibilities	1	4	0	0
Stewardship - Values	1	2	0	0
Supression of Knowledge	0	1	0	0
Holistic Health - Basket-making	2	1	1	0
Holistic Health - Economic	3	4	0	2
Holistic Health - Healing	0	0	1	0
Holistic Health - Health	4	1	0	0
Holistic Health - Livelihood	1	0	1	0
Holistic Health - Protection	0	0	0	0

Codes	Medicines - Practical Knowledge	Medicines - Spiritual	Medicines - Value
Concerns - Barriers	1	0	0
Concerns - Changing Values	0	2	1
Concerns - Conflict	0	1	1
Concerns - Critique	1	0	0
Concerns - Environmental Violence	0	0	1
Concerns - Loss	0	0	2
Concerns - Teachings	0	0	0
Diversity	0	0	0
Gender Roles	1	0	0
Medicines - Collect	3	1	0
Medicines - Connection	0	0	0
Medicines - Plurality	0	0	0
Medicines - Practical Knowledge	0	0	0
Medicines - Spiritual	0	0	0
Medicines - Value	0	0	0
Passing on Knowledge - Knowledge Providers	5	0	1
Passing on Knowledge - Practical Knowledge	9	0	1
Passing on Knowledge - Resurgence	0	0	1
Passing on Knowledge - Story	13	3	1
Passing on Knowledge - Educate	7	0	3
Passing on Knowledge - Teachings	3	0	2
Source of Knowledge - Ceremony	2	1	0
Source of Knowledge - Complex Connectivity	6	1	1
Source of Knowledge - Roles and Responsibilities	2	2	5
Species	58	5	1
Spirit	1	0	1
Stewardship - Awareness	1	0	0
Stewardship - Connection to Land	2	0	0
Stewardship - Fulfillment of Roles and Responsibilities	2	0	1
Stewardship - Values	2	1	0
Supression of Knowledge	0	0	1
Holistic Health - Basket-making	0	0	0
Holistic Health - Economic	8	1	0
Holistic Health - Healing	1	0	0
Holistic Health - Health	5	0	0
Holistic Health - Livelihood	0	0	0
Holistic Health - Protection	0	1	0

APPENDIX Q: CO-OCCURRENCE TABLE FOR CODES (PASSING ON

KNOWLEDGE-KNOWLEDGE PROVIDERS – PASSING ON KNOWLEDGE –

PRACTICAL KNOWLEDGE)

Codes	Passing on Knowledge - Knowledge Providers	Passing on Knowledge - Practical Knowledge
Concerns - Barriers	1	0
Concerns - Changing Values	0	4
Concerns - Conflict	0	1
Concerns - Critique	0	1
Concerns - Environmental Violence	0	1
Concerns - Loss	3	5
Concerns - Teachings	1	1
Diversity	1	3
Gender Roles	0	0
Medicines - Collect	1	12
Medicines - Connection	1	0
Medicines - Plurality	0	1
Medicines - Practical Knowledge	5	9
Medicines - Spiritual	0	0
Medicines - Value	1	1
Passing on Knowledge - Knowledge Providers	0	13
Passing on Knowledge - Practical Knowledge	13	0
Passing on Knowledge - Resurgence	6	1
Passing on Knowledge - Story	56	4
Passing on Knowledge - Educate	9	3
Passing on Knowledge - Teachings	3	3
Source of Knowledge - Ceremony	0	0
Source of Knowledge - Complex Connectivity	23	21
Source of Knowledge - Roles and Responsibilities	5	1
Species	0	149
Spirit	3	2
Stewardship - Awareness	2	0
Stewardship - Connection to Land	5	12
Stewardship - Fulfillment of Roles and Responsibilities	3	16
Stewardship - Values	1	3
Supression of Knowledge	0	2
Holistic Health - Basket-making	8	9
Holistic Health - Economic	7	26
Holistic Health - Healing	0	0
Holistic Health - Health	3	0
Holistic Health - Livelihood	0	0
Holistic Health - Protection	0	0

Codes	Passing on Knowledge - Resurgence	Passing on Knowledge - Story
Concerns - Barriers	0	10
Concerns - Changing Values	1	12
Concerns - Conflict	3	8
Concerns - Critique	0	2
Concerns - Environmental Violence	0	3
Concerns - Loss	2	22
Concerns - Teachings	0	5
Diversity	1	16
Gender Roles	0	12
Medicines - Collect	0	8
Medicines - Connection	0	10
Medicines - Plurality	0	1
Medicines - Practical Knowledge	0	13
Medicines - Spiritual	0	3
Medicines - Value	1	1
Passing on Knowledge - Knowledge Providers	6	56
Passing on Knowledge - Practical Knowledge	1	4
Passing on Knowledge - Resurgence	0	2
Passing on Knowledge - Story	2	0
Passing on Knowledge - Educate	1	13
Passing on Knowledge - Teachings	1	5
Source of Knowledge - Ceremony	1	18
Source of Knowledge - Complex Connectivity	7	52
Source of Knowledge - Roles and Responsibilities	8	27
Species	5	159
Spirit	1	16
Stewardship - Awareness	4	3
Stewardship - Connection to Land	0	14
Stewardship - Fulfillment of Roles and Responsibilities	5	16
Stewardship - Values	0	7
Supression of Knowledge	3	4
Holistic Health - Basket-making	5	13
Holistic Health - Economic	3	18
Holistic Health - Healing	1	8
Holistic Health - Health	3	18
Holistic Health - Livelihood	1	1
Holistic Health - Protection	0	4

Codes	Passing on Knowledge - Educate	Passing on Knowledge - Teachings
Concerns - Barriers	6	1
Concerns - Changing Values	9	3
Concerns - Conflict	0	2
Concerns - Critique	4	0
Concerns - Environmental Violence	3	2
Concerns - Loss	11	9
Concerns - Teachings	2	5
Diversity	4	2
Gender Roles	7	3
Medicines - Collect	7	2
Medicines - Connection	1	0
Medicines - Plurality	1	0
Medicines - Practical Knowledge	7	3
Medicines - Spiritual	0	0
Medicines - Value	3	2
Passing on Knowledge - Knowledge Providers	9	3
Passing on Knowledge - Practical Knowledge	3	3
Passing on Knowledge - Resurgence	1	1
Passing on Knowledge - Story	13	5
Passing on Knowledge - Educate	0	3
Passing on Knowledge - Teachings	3	0
Source of Knowledge - Ceremony	3	2
Source of Knowledge - Complex Connectivity	33	23
Source of Knowledge - Roles and Responsibilities	26	19
Species	65	40
Spirit	3	9
Stewardship - Awareness	21	2
Stewardship - Connection to Land	9	8
Stewardship - Fulfillment of Roles and Responsibilities	14	7
Stewardship - Values	11	3
Supression of Knowledge	1	0
Holistic Health - Basket-making	8	0
Holistic Health - Economic	12	7
Holistic Health - Healing	0	0
Holistic Health - Health	6	5
Holistic Health - Livelihood	1	0
Holistic Health - Protection	0	1

APPENDIX T: CO-OCCURRENCE TABLE FOR CODES (SOURCE OF
KNOWLEDGE-CEREMONY – SOURCE OF KNOWLEDGE-COMPLEX
CONNECTIVITY)

Codes	Source of Knowledge - Ceremony	Source of Knowledge - Complex Connectivity
Concerns - Barriers	1	3
Concerns - Changing Values	0	5
Concerns - Conflict	0	2
Concerns - Critique	1	6
Concerns - Environmental Violence	0	4
Concerns - Loss	3	28
Concerns - Teachings	1	4
Diversity	2	6
Gender Roles	1	6
Medicines - Collect	0	4
Medicines - Connection	0	9
Medicines - Plurality	0	0
Medicines - Practical Knowledge	2	6
Medicines - Spiritual	1	1
Medicines - Value	0	1
Passing on Knowledge - Knowledge Providers	0	23
Passing on Knowledge - Practical Knowledge	0	21
Passing on Knowledge - Resurgence	1	7
Passing on Knowledge - Story	18	52
Passing on Knowledge - Educate	3	33
Passing on Knowledge - Teachings	2	23
Source of Knowledge - Ceremony	0	1
Source of Knowledge - Complex Connectivity	1	0
Source of Knowledge - Roles and Responsibilities	2	3
Species	18	126
Spirit	7	20
Stewardship - Awareness	1	3
Stewardship - Connection to Land	1	20
Stewardship - Fulfillment of Roles and Responsibilities	1	9
Stewardship - Values	3	3
Supression of Knowledge	0	4
Holistic Health - Basket-making	1	13
Holistic Health - Economic	3	19
Holistic Health - Healing	0	5
Holistic Health - Health	2	18
Holistic Health - Livelihood	0	5
Holistic Health - Protection	2	1

Codes	Source of Knowledge - Roles and Responsibilities	Species	Spirit	Stewardship - Awareness
Concerns - Barriers	3	10	0	1
Concerns - Changing Values	5	12	0	0
Concerns - Conflict	1	11	2	0
Concerns - Critique	2	5	0	1
Concerns - Environmental Violence	5	12	1	2
Concerns - Loss	6	83	2	5
Concerns - Teachings	4	8	1	1
Diversity	6	10	4	2
Gender Roles	11	1	1	1
Medicines - Collect	4	22	1	0
Medicines - Connection	2	5	1	0
Medicines - Plurality	0	5	1	0
Medicines - Practical Knowledge	2	58	1	1
Medicines - Spiritual	2	5	0	0
Medicines - Value	5	1	1	0
Passing on Knowledge - Knowledge Providers	5	0	3	2
Passing on Knowledge - Practical Knowledge	1	149	2	0
Passing on Knowledge - Resurgence	8	5	1	4
Passing on Knowledge - Story	27	159	16	3
Passing on Knowledge - Educate	26	65	3	21
Passing on Knowledge - Teachings	19	40	9	2
Source of Knowledge - Ceremony	2	18	7	1
Source of Knowledge - Complex Connectivity	3	126	20	3
Source of Knowledge - Roles and Responsibilities	0	19	8	4
Species	19	0	8	17
Spirit	8	8	0	1
Stewardship - Awareness	4	17	1	0
Stewardship - Connection to Land	4	57	2	0
Stewardship - Fulfillment of Roles and Responsibilities	13	93	5	2
Stewardship - Values	7	15	2	2
Supression of Knowledge	0	3	0	0
Holistic Health - Basket-making	6	53	1	2
Holistic Health - Economic	10	106	2	4
Holistic Health - Healing	1	7	5	0
Holistic Health - Health	9	16	8	1
Holistic Health - Livelihood	1	8	0	1
Holistic Health - Protection	0	5	1	0

APPENDIX V: CO-OCCURRENCE TABLE FOR CODES (STEWARDSHIP-
CONNECTION TO LAND – STEWARDSHIP-FULFILLMENT OF ROLES AND
RESPONSIBILITIES)

Codes	Stewardship - Connection to Land	Stewardship - Fulfillment of Roles and Responsibilities
Concerns - Barriers	1	4
Concerns - Changing Values	4	3
Concerns - Conflict	1	3
Concerns - Critique	0	1
Concerns - Environmental Violence	3	9
Concerns - Loss	5	8
Concerns - Teachings	0	0
Diversity	0	5
Gender Roles	7	1
Medicines - Collect	0	4
Medicines - Connection	2	0
Medicines - Plurality	0	0
Medicines - Practical Knowledge	2	2
Medicines - Spiritual	0	0
Medicines - Value	0	1
Passing on Knowledge - Knowledge Providers	5	3
Passing on Knowledge - Practical Knowledge	12	16
Passing on Knowledge - Resurgence	0	5
Passing on Knowledge - Story	14	16
Passing on Knowledge - Educate	9	14
Passing on Knowledge - Teachings	8	7
Source of Knowledge - Ceremony	1	1
Source of Knowledge - Complex Connectivity	20	9
Source of Knowledge - Roles and Responsibilities	4	13
Species	57	93
Spirit	2	5
Stewardship - Awareness	0	2
Stewardship - Connection to Land	0	2
Stewardship - Fulfillment of Roles and Responsibilities	2	0
Stewardship - Values	0	1
Supression of Knowledge	0	0
Holistic Health - Basket-making	0	13
Holistic Health - Economic	10	11
Holistic Health - Healing	0	2
Holistic Health - Health	10	2
Holistic Health - Livelihood	0	1
Holistic Health - Protection	0	1

APPENDIX W: CO-OCCURRENCE TABLE FOR CODES (STEWARDSHIP-

VALUES – HOLISTIC HEALTH-BAKSET-MAKING)

Codes	Stewardship - Values	Supression of Knowledge	Holistic Health - Basket-making
Concerns - Barriers	1	1	0
Concerns - Changing Values	5	0	0
Concerns - Conflict	3	1	1
Concerns - Critique	0	0	0
Concerns - Environmental Violence	1	1	1
Concerns - Loss	4	3	11
Concerns - Teachings	1	0	0
Diversity	2	1	5
Gender Roles	1	0	2
Medicines - Collect	2	1	1
Medicines - Connection	0	0	1
Medicines - Plurality	0	0	0
Medicines - Practical Knowledge	2	0	0
Medicines - Spiritual	1	0	0
Medicines - Value	0	1	0
Passing on Knowledge - Knowledge Providers	1	0	8
Passing on Knowledge - Practical Knowledge	3	2	9
Passing on Knowledge - Resurgence	0	3	5
Passing on Knowledge - Story	7	4	13
Passing on Knowledge - Educate	11	1	8
Passing on Knowledge - Teachings	3	0	0
Source of Knowledge - Ceremony	3	0	1
Source of Knowledge - Complex Connectivity	3	4	13
Source of Knowledge - Roles and Responsibilities	7	0	6
Species	15	3	53
Spirit	2	0	1
Stewardship - Awareness	2	0	2
Stewardship - Connection to Land	0	0	0
Stewardship - Fulfillment of Roles and Responsibilities	1	0	13
Stewardship - Values	0	0	1
Supression of Knowledge	0	0	1
Holistic Health - Basket-making	1	1	0
Holistic Health - Economic	3	0	2
Holistic Health - Healing	1	0	0
Holistic Health - Health	3	0	0
Holistic Health - Livelihood	0	0	0
Holistic Health - Protection	0	0	0

APPENDIX X: CO-OCCURRENCE TABLE FOR CODES (HOLISTIC HEALTH-ECONOMIC – HOLISTIC HEALTH - HEALTH)

Codes	Holistic Health - Economic	Holistic Health - Healing	Holistic Health - Health
Concerns - Barriers	1	0	0
Concerns - Changing Values	5	0	3
Concerns - Conflict	5	0	0
Concerns - Critique	1	0	2
Concerns - Environmental Violence	3	0	1
Concerns - Loss	8	0	6
Concerns - Teachings	0	0	3
Diversity	2	0	3
Gender Roles	3	0	4
Medicines - Collect	4	0	1
Medicines - Connection	0	1	0
Medicines - Plurality	2	0	0
Medicines - Practical Knowledge	8	1	5
Medicines - Spiritual	1	0	0
Medicines - Value	0	0	0
Passing on Knowledge - Knowledge Providers	7	0	3
Passing on Knowledge - Practical Knowledge	26	0	0
Passing on Knowledge - Resurgence	3	1	3
Passing on Knowledge - Story	18	8	18
Passing on Knowledge - Educate	12	0	6
Passing on Knowledge - Teachings	7	0	5
Source of Knowledge - Ceremony	3	0	2
Source of Knowledge - Complex Connectivity	19	5	18
Source of Knowledge - Roles and Responsibilities	10	1	9
Species	106	7	16
Spirit	2	5	8
Stewardship - Awareness	4	0	1
Stewardship - Connection to Land	10	0	10
Stewardship - Fulfillment of Roles and Responsibilities	11	2	2
Stewardship - Values	3	1	3
Supression of Knowledge	0	0	0
Holistic Health - Basket-making	2	0	0
Holistic Health - Economic	0	1	1
Holistic Health - Healing	1	0	1
Holistic Health - Health	1	1	0
Holistic Health - Livelihood	0	0	0
Holistic Health - Protection	0	0	0

APPENDIX Y: CO-OCCURRENCE TABLE FOR CODES (HOLISTIC HEALTH-
LIVELIHOOD – HOLISTIC HEALTH-PROTECTION)

Codes	Holistic Health - Livelihood	Holistic Health - Protection
Concerns - Barriers	0	0
Concerns - Changing Values	2	0
Concerns - Conflict	0	0
Concerns - Critique	0	0
Concerns - Environmental Violence	0	0
Concerns - Loss	2	1
Concerns - Teachings	0	0
Diversity	0	0
Gender Roles	1	0
Medicines - Collect	0	0
Medicines - Connection	1	0
Medicines - Plurality	0	0
Medicines - Practical Knowledge	0	0
Medicines - Spiritual	0	1
Medicines - Value	0	0
Passing on Knowledge - Knowledge Providers	0	0
Passing on Knowledge - Practical Knowledge	0	0
Passing on Knowledge - Resurgence	1	0
Passing on Knowledge - Story	1	4
Passing on Knowledge - Educate	1	0
Passing on Knowledge - Teachings	0	1
Source of Knowledge - Ceremony	0	2
Source of Knowledge - Complex Connectivity	5	1
Source of Knowledge - Roles and Responsibilities	1	0
Species	8	5
Spirit	0	1
Stewardship - Awareness	1	0
Stewardship - Connection to Land	0	0
Stewardship - Fulfillment of Roles and Responsibilities	1	1
Stewardship - Values	0	0
Supression of Knowledge	0	0
Holistic Health - Basket-making	0	0
Holistic Health - Economic	0	0
Holistic Health - Healing	0	0
Holistic Health - Health	0	0
Holistic Health - Livelihood	0	0
Holistic Health - Protection	0	0

APPENDIX X: LIST OF SPECIES FROM UNIQUE TAXA REFERNCED

THROUGHOUT INDIVIDUAL INTERVIEWS

Species	Count	Species	Count	Species	Count	Species	Count
Alfalfa	1	Cedar	43	Hawthorn	3	Spruce	2
Apple Trees	10	Cherry Trees	1	Hazelnut Tree	2	Spruce Grouse	2
Asian Longhorn Beetle	1	Chestnut	6	Hemlock	2	Squash	3
Balsam Fir	1	Chickadees	3	Hermit Thrush	3	Squirrels	11
Bark Beetle	1	Chickens	2	Hickory	14	Strawberries	13
Basswood	3	Chipmunks	3	Hippatica	1	Sturgeon	3
Bats	1	Chokecherry	1	Hornet	2	Sugar Maple	58
Beans	5	Corn	13	Horse Flies	1	Sumac	2
Bears	5	Cottonwood	1	Ironwood	1	Sunflowers	1
Beavers	9	Cows	4	Leeks	6	Sweet Flag	3
Beech	5	Coyote	1	Lilacs	1	Sweet Grass	21
Bees	11	Cucumber	2	Minnows	1	Tamaracks	1
Birch	9	Cormorant	1	Moose	3	Tobacco	5
Black Ash	62	Deer	21	Mosquitoes	4	Tomatoes	1
Black Flies	3	Deer Flies	1	Mushrooms	17	Trillium	6
Black Red	1	Dog Flower	3	Muskrats	9	Turkey	2
Black Walnut	9	Douglas Fir	3	Oak	10	Turtle Socks	3
Blackberries	5	Dragonflies	1	Pear Tree	2	Turtles	3
Blackcaps	1	Ducks	4	Perch	1	White Ash	8
Blood Flower	1	Eagles	3	Pheasants	1	White Pine	31
Blue Ruces	1	Echinacea Purpurea	1	Pigs	1	Wild Boar	1
Blue Cranes	1	Elder Wood	1	Pitcher Plant	1	Wild Garlic	1
Blue Spruce	1	Elm	11	Plantain	1	Wild Ginger	5
Blueberries	4	Emerald Ash Borer	23	Plum Tree	1	Willow	3
Bobcats	3	Fishers	2	Poplar	9	Witch Hazel	2
Box Elder	1	Foxes	3	Porcupine	9	Wolverines	1
Brambles	3	Gar	1	Prickly Ash	2	Wolves	4
Brown Ash	1	Garlic Muster	2	Pumpkins	1	Worms	3
Buckthorn	1	Geese	4	Purple Loosestrife	1		
Bullfrogs	1	Ginseng	2	Rabbits	6		
Bullheads	1	Golden Thread	6	Raspberries	6		
Burdock	2	Goldenrod	1	Red Twig Dogwood	13		
Burtternut	1	Grapes	1	Rough Grouse	2		
Butterflies	2	Green Ash	4	Sage	1		
Butternut	3	Grey Horned Owl	1	Snakeroot	6		
Carrots	1	Hawk	1	Spiders	1		

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[i] The White Roots of Peace are associated with message of the *Kaianerekowa*, which was about the roots (i.e. message of peace) spreading out around the world. However, this reference is about an organization that was committed to sharing the message of peace to other nations and creating cultural awareness about the Haudenosaunee.

[ii] I attended a two-spirit educational event following my undergraduate degree in 2014. Philip White-Cree gave a present where discussed the history of two-spirit identity with Indigenous Communities. During the presentation, he presented a conceptualization of *Tahatikonhsetónkie* that situates a person relationship at the center of relationships through the teaching. Through this conceptualization, a person can touch both ends of the *Tahatikonhsetónkie* through a grandparent and grandchildren.

[iii] Snow-snake is a traditional game that occurs during the winter within Haudenosaunee communities. The snow-snake are a carved piece of polished wood that is thrown into a trough made of snow. Snow-snake is considered a medicine and has a traditional story attached to it.

[iv] "Two-Spirit is a third gender found in some Native American cultures, often involving birth-assigned men or women taking on the identities and roles and responsibilities of the opposite. A sacred and historical identity, Two-Spirit can include but is by no means limited to LGBTQ identities." Link: https://www.dictionary.com/e/gender-sexuality/two-spirit/