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Confronting Colonial Standard Making Practices: Environmental Governance and Invasive Species Management at Walpole Island First Nation

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A thesis submitted in partial fulfillment of the requirements for the Master of Arts degree in Anthropology

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**CONFRONTING COLONIAL STANDARD MAKING PRACTICES:
ENVIRONMENTAL GOVERNANCE AND INVASIVE SPECIES MANAGEMENT
AT WALPOLE ISLAND FIRST NATION**

(Monograph)

by

Kristy Nicholson

Graduate Program in Anthropology and Specialization in Environment and
Sustainability

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Arts

The School of Graduate and Postdoctoral Studies
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Abstract

Hegemonic standard making practices in Ontario environmental governance can disregard the interests of First Nations by limiting funding and scope for community environmental management (Dalton, 2009). Invasive species management at Walpole Island First Nation has sought to control aggressive plant species that have infiltrated culturally and economically important ecosystems. Ontario government agencies, Ministry of Environment (MOE), and Ministry of Natural Resources (MNR), offer funding through sources such as the Great Lakes Guardian Community Fund (GLGCF) for community management projects with the intent to encourage collaboration. However, predetermined 'acceptable' project designs can override community defined-goals. This was evident during the funding process for an invasive species management project undertaken by the Walpole Island Heritage Centre during the 2013 summer field season targeting invasive white sweet clover and Phragmites. I address colonial processes in Ontario invasive species management and advocate for an equitable platform for environmental discussion, decision-making and co-governance (Dalton, 2009).

Keywords

Walpole Island First Nation; Environmental Management; Invasive Species; Standard Making; Governance.

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Introduction

Thesis Overview

My thesis research has sought to analyze and demonstrate the ways in which First Nation community-led environmental management initiatives and community determined environmental goals can be hindered by colonial and hegemonic forces such as ‘standard making’ that control access to funding opportunities and limit project scope. These practices not only hamper First Nation led environmental management, they also perpetuate environmental degradation by failing to support sustainable solutions, such as the problem of invasive species, in exceptionally vulnerable areas. First Nations are particularly at risk to the effects of these colonial practices; environmental degradation has especially complex and devastating results for communities that have a social, cultural, and economic relationship with the land. I advocate for continued efforts to identify colonial processes in invasive species management in order to reconcile issues and inequalities in collaborative initiatives between First Nations and dominant forms of governance. I refer to ‘dominant forms of governance’ in my writing primarily to describe the Ontario provincial government and associated agencies such as the Ministry of Natural Resources (MNR) and Ministry of Environment (MOE). Furthermore, I argue that First Nation self-determination and a more equitable model for co-governance are essential for the achievement of effective environmental management strategies such as invasive species monitoring and removal initiatives. Community designed and led initiatives are imperative to First Nation’s abilities to cope with environmental degradation; hence there is a need to expand the definition for acceptable project designs and meaningfully incorporate marginalized forms of knowledge, as these are both critical steps towards co-governance. I hope to contribute to the wider discourse from Walpole Island First Nation (WIFN), as well as their partners and colleagues, on the decolonization of environmental management processes, which have discriminated against and relegated First Nation ways of knowing to the periphery in favour of dominant forms of knowledge, by which I refer to by the umbrella term as ‘western

scientific knowledge'. It is important to acknowledge that the perspectives and arguments brought forward in this thesis are not an attempt to disregard a number of positive collaborations between government agencies, First Nations, or scientific knowledge and indigenous knowledge. There remains, however, a number of challenges and hurdles that are important to discuss, as the perspectives of First Nations in these cases can be neglected due to the privileged vantage point held by practitioners of western science and Euro-centric governance. In order to achieve mutually beneficial models of co-governance in cases and fields such as invasive species management, these issues are critical to address.

My research focused on an invasive species management project conducted by the Walpole Island Heritage Centre over the course of the 2013 summer fieldwork season at WIFN. The focus of this thesis grew out of interactions I had while documenting this project with the Heritage Centre staff and Walpole Island community members, who expressed particular concerns with the environmental and social impacts of invasive plant species. I began to consider the ways the Ontario government's environmental management framework predetermines acceptable project designs, reducing opportunities for input and shared control for First Nation communities involved in invasive species management. I examined the limitations imposed by 'standard making practices' on this invasive species monitoring and removal project, focusing particularly on how agencies such as the MOE and MNR create and fix standards for project design, scope, and outcomes that tend to exclude community determined aims and community designed initiatives. I advocate for co-governance in this field, and a recognition for the ways in which dominant frameworks for invasive species management fail to provide an equitable platform for discussion and participation in environmental management.

Invasive Species: A Physical Product of Colonialism and Evidence of Environmental Racism

The term 'invasive species' refers to both floral and faunal non-native species that have been brought to North America largely due to human activities, especially those related to European colonization. Many of these species become integrated and function within native ecosystems, however, a number of invasive plant and animal species have

had devastating consequences for habitats across North America. Certain species are able to outcompete native flora and fauna for a variety of reasons including a lack of natural predators to control their populations (Dukes and Mooney, 2004). The focus of this project was two invasive plant species: *Phragmites australis* (hereby referred to as Phragmites) and *Melilotus albus* (hereby referred to as white sweet clover). Phragmites is native to Europe and Asia. It arrived in North America in the early nineteenth century around coastal ports in eastern United States and spread rapidly throughout the twentieth century (Ontario Ministry of Natural Resources [MNR], 2011). Phragmites grows in dense stands, forming monocultures that crowd out native vegetation, decreasing plant and animal biodiversity, and spreads through wind, water, animal and human disturbance (MNR, 2011). White sweet clover is also native to Europe and Asia. The earliest record of it was from 1664 when it began being cultivated as a forage crop and soil builder in North America (Anderson, 2013). It develops a healthy root system for its first season, then flowers, sets seed and dies in its second season (Anderson, 2013). It is most likely to be along roadsides, abandoned fields, and unflooded, open, natural communities such as prairies, where they create monocultures crowding out native plants (Anderson, 2013). It also spreads via water and wind as well as disturbance (Anderson, 2013).

Throughout my thesis, particularly in Chapters 2, 3 and 4, I will discuss how invasive species are a product of colonialism and the ways in which invasive species management can be characterized by colonial relationships between dominant forms of governance and First Nation communities. It is quite evident that colonial ventures such as shipping and development projects facilitated the introduction and spread of invasive species throughout North America. Invasive species are a physical product of colonialism and while this is discussed in a historical context, the infiltration of invasive species is not meaningfully acknowledged in the dominant discourse as a colonial process that continues to this day. While the role of these operations in the spread of invasive species is noted in government discourse such as in reports put out by the MNR, there has been insufficient discussion on how the introduction of invasive species has disproportionately affected First Nation communities by impacting important life ways. In general, government investigations into invasive plant species' social impacts has been limited to mainstream 'recreation and tourism' as well as 'aesthetic beauty' (Pejchar and Mooney,

2009: 502). “Other cultural services” are summarized using vague terms such as religion, spirituality, or tradition, though “these culturally important elements of ecosystems remain poorly studied, complex, and difficult to quantify” (Pejchar and Mooney, 2009: 502). Grappling with the complex, social ramifications of invasive species infiltration has often not been made a priority in the western scientific research that informs dominant environmental governance. As a result, these problems are not meaningfully addressed in hegemonic environmental discourse. Instead, government agencies target human actions by suggesting the ‘quarantining’ of or limitations for human activity in areas of concern rather than acknowledge colonial processes that both spread and hindered the ability to control invasive species. This colonial context has been perpetuated by the current state of decision-making procedures that attempt to manage invasive species, but exclude and fail to meaningfully incorporate First Nations’ input. While efforts to build capacity for communities through funding opportunities do exist, predefined ‘standards’ dictate where and to whom funding is allocated, as well as what type of management strategies are acceptable. These standards can hinder the ability of First Nation communities to put into practice their own strategies for coping with invasive plant species and mitigating their particular social, cultural and economic effects. Thus we must consider ways environmental decision-making processes can be decolonized in order to uphold First Nation rights to self-determination and autonomy over issues such as invasive species management that affect their resources and well-being.

Invasive Species at Bkejwanong

Bkejwanong, the traditional name for Walpole Island, meaning in Anishinaabemowin “the place where the waters divide”, is home to some of the most biologically diverse ecosystems in Canada. Many rare plant and animal species considered species at risk, are locally abundant on the islands, but are rare or non-existent throughout many parts of Canada (Nin-da-Waab-Jig et al., 2006). The six islands of WIFN are located in Southwestern Ontario on Lake St.Clair and the St. Clair River just west of Wallaceburg. Traditional land management, stewardship practices and considerable efforts put forth by the community and the Walpole Island Heritage Centre, which also goes by the name Nin-da-Waab-Jig, meaning “those who seek to find”, have

maintained the integrity of the environment and diversity of species for many years. Community members at Walpole Island are interested and engaged in practices that preserve and keep intact important ecosystems that sustain traditional life-ways. Many are involved in seasonal hunting, fishing, trapping and gathering since these activities are relied upon for their sustenance and traditional significance (McNab, 1999).

The Heritage Centre was founded in 1989, and evolved out of a Research Group established by the Walpole Island Land Claims Office in 1981 in order to conduct research on the environment and culture, and promote First Nation management and governance (VanWynsberghe, 1997). Monitoring and eradicating invasive plant species has been one of the main concerns of the Heritage Centre for much of its history. The two plant species at the heart of this project have been ongoing causes for anxiety in the community. Concerns for WIFN with invasive species include: reduced habitat for significant plant and animal species, loss of culturally important plants such as medicinal plants, as well as a loss of animal species critical to cultural and economic hunting, fishing and trapping practices. Income from the lease of a hunt club, hunting permits and jobs for local hunters as guides for outsiders, has also been hit very hard over the last twenty or more years. Dry, dead stock in dense Phragmites stands makes larger and more intense fires a greater threat (MNR, 2011). This risk is increased with practices of traditional burning that have been very important to the maintenance of healthy ecosystems on the island. Another concern is that changing and unhealthy ecosystems will not sustain the same amount of diversity that has enriched both the environment and culture at WIFN (Jacobs, 1992). These multifaceted, social contexts for concern with invasive plant species are often trivialized and remain unexplored in the dominant discourse. There is a lot of anxiety about how to cope with this change: whether it must be accepted since younger generations have not known the island without invasive plant species or whether to take extreme and costly measures to eradicate them so as to maintain the integrity of the environment that has traditionally been ecologically, culturally and economically important. Hence, community driven, First Nation solutions are critical to both the environment at WIFN and control over land against predetermined strategies from hegemonic forms of environmental governance.

Ontario Ministry of Environment and the Great Lakes Guardian Community Fund

The Great Lakes Guardian Community Fund (GLGCF) is a funding source set up by the MOE that is part of their “Ontario Great Lakes Strategy”, making government grants available for local projects run by not-for-profit organizations, First Nations, and Metis communities that “help protect and restore the Great Lakes” (Great Lakes Guardian Community Fund [GLGCF], 2014). The Ontario Great Lakes Strategy (OGLS) was developed as a means of “empowering action by all partners on the Great Lakes” in order to restore Great Lakes coastal area, conserve biodiversity and cope with invasive species (Ontario Ministry of the Environment [MOE], 2012). As stated in the OGLS document, the strategy was developed from engagement with “a wide variety of Great Lakes experts, First Nations and Metis communities and Great Lakes stakeholders on the feedback received since the release of Ontario’s Draft Great Lakes Strategy in June 2012”(MOE, 2012). The strategy has sought to develop a variety of solutions to a number of factors contributing to environmental degradation in the Great Lakes region (MOE, 2012). The document states that the “strategy is a living document. It belongs to all Ontarians, and Ontarians will have opportunities to participate in action” (MOE, 2012:1). The OGLS’s stated aims for achieving their goals for Great Lakes environmental restoration include: engaging and empowering communities, protecting water for human and ecological health, improving wetlands, beaches and coastal areas, protecting habitats and species, enhancing understanding and adaptation, and ensuring environmentally sustainable economic opportunities and innovation (MOE, 2012: 30). These aims involve the creation of opportunities for community participation in restoration, protection of natural habitats and biodiversity, advancement of science in fields that examine emerging stressors and the incorporation of these methods into management, and promotion of environmentally sustainable use of natural resources (MOE, 2012:30). Despite these intentions, not all Ontarians necessarily have an equal opportunity to participate due to a number of barriers that prevent certain community determined project designs from receiving funding, prioritize certain forms of knowledge, and limit project duration. Successful GLGCF candidates focused on restoration and management initiatives in the Great Lakes region (including Lake Erie, Lake Huron, Lake Ontario, Lake Superior, the

Ottawa river, and all connecting channels and watersheds) will receive up to \$25,000 in funding (GLGCF, 2014). In order to qualify, projects must accomplish and support broadly stated, predetermined goals. These goals include the enhancement of water quality for human and ecological health, improvement of wetlands, beaches and coastal areas, and protection of habitats and species (GLGCF, 2014). Under the stated rules of the GLGCF, recurring projects (projects intended to take place over the course of more than one field season) are not eligible for more than one season's worth of funding. Past applicants who were successful in acquiring funding, may only reapply for new initiatives (GLGCF, 2014). This stated rule is not conducive to community-defined goals for managing invasive plant species. The control and eradication of invasive plant species require long-term solutions, which can be sustained and repeated annually.

WIFN Invasive Species Management and Removal Project 2013 Overview

Over the course of the 2013 summer field season at WIFN, I worked with the Heritage Centre and helped to document one of their invasive species management projects for their records. Aims of this particular project were to continue ongoing initiatives to monitor and remove the targeted aggressive invasive plant species, white sweet clover, and monitor the distribution of Phragmites in important prairie ecosystems. The Heritage Centre applied for funding for this project from the GLGCF. Their original objectives, as proposed in the grant application, were to map and remove white sweet clover, garlic mustard, purple loosetrife, and Phragmites by engaging community members interested in enrolling in a bounty program. The grant money could be put towards compensating individuals per bag of invasive plant species they collected. Sites would include both prairie and marsh ecosystems of particular concern. The subsequent revisions to this application by the GLGCF indicated that they found the scope of this project to be too wide for a 'grassroots' initiative. The project's original objectives and design became dramatically curtailed.

Ultimately, the project focused on four main prairie sites: Sand pits, North and South Altman Prairie, and Triangle Prairie. Other sites that are severely affected and were of interest to the project in its original design were: Chematogen Channel, Squirrel

Island, Snye Prairie, Swan Lake, and Goose Lake. Our focus shifted to prairie sites rather than some of the waterways and marshes because of the limitations imposed by the GLGCF's revisions in scope, timeframe, and number of fieldworkers for the project. Prairies, although they are not as severely affected currently, became the focus in hopes that this information could help prevent further invasion since prairies are incredibly culturally and ecologically important habitats at WIFN. Less than 10% of tallgrass prairies in North America persist from pre-European settlement times, however, WIFN contains some of the "largest and most ecologically intact tallgrass prairies remaining in Canada" (Stover et al., 2012: 61) due to stewardship practices that have maintained them throughout WIFN's history.



Figure 1: Study Site: Sand Pits (9), North Altman Prairie (7), South Altman Prairie (4), Triangle Prairie (5), Potawatomi Prairie (6). Other site in original project design: Chematogen Channel (10), Squirrel Island (Blank), Snye Prairie (8), Swan Lake (2), Goose Lake (1/3).

During the 'white sweet clover phase' of the project I helped with the field crew team of four, and we spent this time recording GPS coordinates of large patches for future white sweet clover distribution mapping data. We removed white sweet clover before they had the opportunity to set seed by hand pulling the plant and roots from the ground or cutting the stems of plants that were too large to remove by hand. The purpose

of the 'Phragmites phase' of the project was to evaluate the current distribution and condition of Phragmites in important prairie ecosystems at WIFN. It was the original hope of the Heritage Centre to have this as a removal project; however, the GLCGF was not willing to fund a project of this nature and in order to contribute to Phragmites research, the project had to be changed to focus on mapping. The goal then became to provide a baseline for future monitoring of Phragmites and its impacts on native biodiversity in order to identify and prioritize areas for future Phragmites control and prairie restoration.

Overview of Hegemonic Standard Making Processes and Theory

'Standard making' is a process by which some forms of knowledge and paradigms are marginalized in favor of dominant forms of knowledge and models that have become the "standard" (Graham and Darnell, et al. 2011-2015). Broadly speaking, western scientific models have become standardized and hold a privileged vantage point in Ontario environmental management, while traditional ecological knowledge (TEK) and First Nation community forms of environmental governance, are marginalized. As a result there is unequal access to discussions and participation in environmental governance due to the preference for outside expert knowledge. This process can be limiting since dominant standards dictate the granting and acquisition of government funding, project scope and funding duration. According to James Scott, the hegemonic state has the tendency to simplify environmental management strategies for the sake of administrative uniformity by excluding local knowledge and social contexts of different landscapes to avoid abstract and complex realities (Scott, 1999). This colonial and hegemonic simplification process can be exemplified by the Ontario MNR's Best Management Practices (BMP) in invasive species management. While MNR claims a 'partnership approach' is used when developing 'best management strategies', this does not necessarily mean equal opportunity for input. Communities can offer insight, but these contributions may or may not be incorporated meaningfully into subsequent dominant forms of discourse such as the Ontario Invasive Species Strategic Plan (OISSP), as will be further discussed. According to James Ferguson and Akhil Gupta (2002), the state is imagined as being above "on the ground" or "grassroot" society, and

thus is in a position to control, regulate and dictate planning and standards in a ‘top down’ approach (Ferguson and Gupta, 2002). These images create a sense of scale, which is very pervasive in environmental governance in terms of participation and funding.

Disparities and inequalities between different knowledge systems are central to the ways in which hegemonic decision making processes exclude the input and participation of First Nations in environmental governance. Western scientific knowledge has often been used and made central in dominant discourses on environmental management and has become heavily politicized through the centralization of environmental governance. “Truth making” is a power exercised by dominant society in order to maintain the authority of certain discourse and knowledge systems over others (Foucault, 1976). Indigenous knowledge systems have been traditionally excluded or approached with caution in the dominant discourse, particularly when values of indigenous knowledge are not in line with the views of mainstream society. TEK is a term I will use to broadly describe Aboriginal knowledge systems including local, experiential, indigenous knowledge and more. TEK is a body of knowledge that has grown out of the experiences of many generations of people living in close contact with the landscape and environment (Witt, and Hookimaw-Wit, 2013). These experiences that make up TEK are “more than another accumulation of knowledge; [TEK] is a way of relation to creation and all its beings and forces. It is more than knowledge of a relationship; it is the relationship itself” (McGregor, 2000: 444). TEK is carried out and is intrinsically tied to everyday life, thought, belief and practice among First Nation communities. It is an essential way of life that is passed down across generations of people and is constantly adapting with every succeeding generation (Witt, and Hookimaw-Witt, 2013). Two fundamental concepts are themes seen in many cases of TEK (Pierotti and Wildcat, 2000). The first demonstrates that all things are connected in a web of life or ecological community (Pierotti and Wildcat, 2000). The second holds that all things are related: a concept that historically has been foreign in western scientific thought where humans are prioritized and viewed as separate from the rest of the ecological community (Pierotti and Wildcat, 2000). TEK links cultural worldviews to social institutions for the local groups that possess it (Lertzman and Vredenburg, 2005). Any culture or language loss is detrimental to TEK since they are fundamentally tied to

systems of meaning such as perspectives on the environment (Lertzman and Vredenburg, 2005). Sustainability is a core tenet in TEK that is embodied in thought and practice, instilling First Nation people with a sense of responsibility to regard the land as a gift given to them to use and look after, not to control (Witt, and Hookimaw-Witt, 2013). TEK is therefore a relationship that remains important in First Nation cultures both among individuals and within communities. In collaboration with Attawapiskat First Nation, Norbert Witt and Jackie Hookimaw-Witt formed the following definition of TEK:

Traditional Ecological Knowledge is the totality of life of the people, which consists of knowledge (or laws of nature) as it was observed and accumulated and as it is still applied in order to keep the balance in the relationship to the environment. The application of traditional knowledge is directed towards sustainability of life as a whole and it is defined within the concept of self-determination. TEK is a way of life of the people (Witt, and Hookimaw-Wit, 2013: 366).

Models for meaningful co-governance are critical for achieving environmental goals that benefit both non-Indigenous and Indigenous communities. As I will demonstrate, current models for environmental decision-making in Ontario often maintain exclusionary practices that systematically limit or omit input and participation from First Nation communities. In order to reconcile these practices, we must consider how western scientific knowledge is socially constructed and granted privilege over Indigenous knowledge systems. Challenges faced by collaborative initiatives between dominant agencies and First Nations have sought to resolve these differences in unproductive ways that attempt to find common ground without recognizing the equality of knowledge that might conflict with mainstream views and understandings. A platform for discussion and decision-making that recognizes First Nations as equal partners in environmental governance would involve the decentralization of processes such as policy making, and serious contemplations on the flaws of current, superficial forms of consultation that are often inadequate in addressing the complexities behind the problem of invasive species management in Ontario.

Methodology

The main methodology employed throughout the course of my fieldwork was participant observation. Relations with community members and Heritage Centre staff were built through my regular presence volunteering at the Heritage Centre, as well as partaking in community events. I spent a lot of time over the course of my work at Walpole Island in the summer of 2013 involved in fieldwork for the invasive species management project. I volunteered and helped with other Heritage Centre initiatives aside from invasive species research; primarily tasks related to or in preparation for Walpole Island's "Rekindle Tecumseh's Vision" events.¹ Throughout my time in the field, doing work around the Heritage Centre, interacting with the staff and field-crew members, as well as talking to landholders while requesting permission to conduct fieldwork on their land, I had a number of casual interactions and informal conversations that allowed me to learn valuable perspectives on the issue of invasive species. Furthermore, the field-crew held an open meeting and discussion at the Walpole Island Sports Complex and Community Centre on August 15th 2013, where feedback on our project, as well as concerns about issues surrounding white sweet clover and Phragmites, were shared by attendees from the community. Hence, indigenous methodologies such as the 'conversational method' were employed since these methods are best suited to gathering and understanding local knowledge (Kovach, 2010). These methods are "congruent with Indigenous paradigms" (Kovach, 2010: 40) and espouse culturally important traditions such as sharing stories and "orality as a means of transmitting knowledge" (Kovach, 2010: 42). Lastly, I conducted a semi-structured interview on August 28th, 2013 with Francine Macdonald, a senior invasive species biologist with the MNR, who offered her insights on management, funding opportunities for communities, and MNR governance in invasive species management.

¹ Rekindle Tecumseh's Vision was a 7 day event that took place in September 2013, run by the Southern First Nations Secretariat, honoring the legacy of Tecumseh and Indigenous peoples who fought in the War of 1812. The event started at Bkejwanong on September 29th and closed in Nmaachihna (Delaware Nation) on October 5th, the Bicentennial of Chief Tecumseh's death in the Battle of the Thames (Moraviantown).

I conducted my research based on the principles of Participatory Action Research (PAR), a term that refers to studies that aim to serve the practical concerns of the community by forming collaborative research questions and designs (Bend et al., 2011). Members of the community and the Walpole Island Heritage Centre define key research objectives and methodologies to ensure research that involves outsiders will directly benefit the community. Researchers must go beyond the standard ethical requirements by “arguing on behalf of community rights” (Wallwork, 2003: 9). These shared interests are critical to consider in project design since it is the right of a community to “not be intruded upon by outsiders in a pursuit of interests at variance with those of the community” (Wallwork 2003: 11). Top-down approaches are inappropriate when working with First Nations as research is imposed in this way without considering its local affects or addressing community defined needs, desires, and aspirations. In Walpole Island Heritage Centre’s Memorandum of Understanding (MOU) with Western University, established in June of 2009, both parties agreed to support a partnership and engage in research that respects the rights, standards, and practices of one another (Walpole Island First Nation and The University of Western Ontario [WIFN and UWO], 2009). All research goals and methods must be consented to and in line with the ethical research standards of WIFN (WIFN and UWO, 2009). This process is meant to help “promote a more equitable approach to information acquisition, sharing and dissemination and to develop a sense of collaboration for the research process (WIFN and UWO, 2009: 3). In order to fulfill the requirements of the MOU, I became involved in a project that had been determined by the Heritage Centre and sought to deal with a pressing issue important to WIFN. My research goals and directions were left open-ended, and evolved over the course of the project as desired by Heritage Centre staff, and through valuable insights from community members.

Chapter 1

1 Bkejwanong: A History of Environmental Governance and Reconciliation Research

In this chapter, I will begin to frame the context of my research and the conditions that led to the summer of 2013 invasive species monitoring and removal project and my thesis research at WIFN. I will give some background and history on WIFN, the Heritage Centre, and the long legacy of environmental management in which the community has engaged. These initiatives became important to the Walpole Island community as the threat of the uncontrolled, proliferating growth of industry, urbanization, agriculture, and a number of other factors perpetuating environmental degradation in the St. Clair River region, created a serious need to take action (VanWynsberghe, 1997). Adverse effects on ecosystem as well as human health such as chemical contamination, pollution from surrounding industries, loss of plant and animal wildlife and biodiversity due to unsustainable practices in surrounding areas, has prompted the community to find means to monitor the level of degradation. WIFN has engaged in research that aided in lobbying the federal, provincial, and municipal governments as well as corporations to take responsibility and aid in mitigating the harmful outcomes of environmental degradation. The Heritage Centre has formed partnerships with government and academic institutions, and has conducted a number of successful projects with these partners while taking measures to ensure that research projects conducted in collaboration with outsiders have direct benefits to the Walpole Island community. Finally, I will discuss the importance of “Reconciliation Research” (Dalton, 2010), what it aims to do, and how it seeks to provide a framework for more ethical, and effective collaborative research. I will discuss the significance of this framework to my research and the need to build on these concepts in future work and discussions on co-governance.

1.1 Linking Indigenous Perspectives, Leadership and Self Determination with Environmental Management Goals at WIFN

A Brief History of the People and Land at WIFN

WIFN, unceded First Nations territory located in Southwestern Ontario, just west of Wallaceberg, is a land traditionally composed of three nations: Ojibway, Odawa, and Potawatomi (VanWynsberghe, 2000). The three nations form a historical compact known as the Three Fires Confederacy, united by a shared Anishnaabe heritage (VanWynsberghe, 2000). The land is home to many rare species and ecosystems rich in biodiversity that have been maintained by traditional customs and practices for thousands of years (Jacobs and Sands, 2012). According to the Walpole Island Heritage Centre, “our traditional Native philosophies, values and practices of interacting respectfully with the natural world and not separating ourselves from it, has directly contributed to the continued existence of natural areas and many wildlife species, both common and rare, found on the Walpole Island First Nation.” (Nin-da-Waab-Jig, 2006: 13). WIFN has one of the largest coastal wetlands in the Great Lakes basin and is situated within the St. Clair River, a major waterway and shipping channel in the Lake Huron-Erie Corridor (Jacobs and Sands, 2012). Walpole Island is located downstream from a major manufacturing and petrochemical complex known as Sarnia’s “Chemical Valley” (Jacobs and Sands, 2012). Furthermore, a significant portion of the surrounding landscape has been converted into large-scale agricultural operations alongside 4800 hectares of farmland on the island leased out by Tahgahoning Enterprise (Jacobs and Sands, 2012). Many community members have detailed experiential knowledge of environmental change and the cumulative effects on ecosystem and human health of hazardous toxic material being released into the water from surrounding industries and agricultural operations (VanWynsberghe, 2000). Since the latter half of the twentieth century, the community has struggled to maintain cultural identity and autonomy as a result of growing urbanization and industrialization in the surrounding area and major urban centres such as Detroit, Sarnia and Windsor (VanWynsberghe, 2000). The area of the St. Clair River surrounding Walpole Island is a major shipping route, with the busiest and highest boat

traffic in the Great Lakes seaway (VanWynsberghe, 1997). Boat accidents and spills have had direct and dire consequences for the island's environment for decades (VanWynsberghe, 1997). Several petroleum refineries, electric thermal generating stations, wastewater treatment plants, and other chemical manufacturers that line the St. Clair River have produced toxic discharge often polluting the river, which has had noticeable, adverse effects on both environmental and human health at Walpole Island (VanWynsberghe, 1997).

An intimate knowledge of habitats in intergenerational experience and oral histories serves in the management and care of the land by Walpole Island community members (Jacobs and Sands, 2012). TEK and Anishnaabe cultural values have been strongly linked to notions of sustainability, resource management and stewardship practices at WIFN (McGregor, 2006). The concept of "Minobimaatisiwin", meaning 'way of the good life', suggests that a lifeway based on practicing TEK will continue to sustain Anishnaabe nations (McGregor, 2006). Discourse at Walpole Island often connects sustainability with native rights, human needs and stewardship practices and links strong First Nation governance with a healthy, sustainable environment (VanWynsberghe, 2000). It is the belief among many Anishnaabe, along with other First Nation cultures, that Minobimaatisiwin comes with the duty of preserving and caring for the land and must be lived in order to learn and practice TEK (McGregor, 2006). It is upheld and encouraged in the environmental philosophy of WIFN and the Walpole Island Heritage Centre:

To preserve, enhance and maintain a mutual respect and to continue our beneficial dependency upon the environment, we shall endeavor to coexist with Mother Nature and protect this relationship. We, the Walpole First Nation people, pledge to use these resources to the mutual benefit of all people. We shall therefore, ensure proper respect for all resources. As our elders have done, we shall maintain laws that preserve our wildlife, lands and resources. (Nin Da Waab Jig Heritage Centre, 2006:14).

These philosophies are critical to everyday life at WIFN, both in traditional practices that continue to sustain community members, and in standpoints on matters that concern the community and form goals the Heritage Centre has sought to address in environmental research and management.

Traditional Practices, Autonomy and Self-Determination

Hunting, trapping, and fishing practices remain integral to the way of life at WIFN and have been upheld by the community as rights that are “not for sale and are non-negotiable” (McNab, 1999: 147). These practices have been sustained in order to promote First Nation health and wellbeing as well as maintain autonomy from mainstream society. As stated by the Heritage Centre:

The self-sufficiency and self-determination of the Indian people before European Contact are being recovered in modern times. The people have learned to live in a new physical environment and in a new human context without losing their identity. (Wishart, 1996: 2).

While it is a popular belief among outsiders that southern First Nations no longer live off the land, seasonal rounds of hunting, trapping, fishing, and gathering have been traditionally important subsistence practices and economies integral to ways of life at WIFN that many community members maintain (McNab, 1999). They have persisted despite European efforts to claim the land on which Anishnaabe people have made a living (Wishart, 1996). Community members who continue to engage in subsistence activities demonstrate an intimate and contextual knowledge of ecosystem health in areas traditionally associated with these practices (Stephens, 2009). Their form of expertise is a result of empirical observations and lived experiences detecting cumulative changes in WIFN ecosystems and wildlife (Stephens, 2009). Expertise includes experiential narratives of the effects of pollutants on marshes and the fish and bird populations that rely on these habitats. Changes in animal populations, as well as the impact of their decline on hunting at WIFN have often been noted by community members. In a past research initiative at Walpole Island, one community consultant described these changes to duck populations:

One thing that I remember when I was young there were huge numbers of ducks. You would just look up and see them flying right over St. Anne's Island. There were so many that it looked like a big black cloud. You'd hear their wings it was almost like hearing thunder. Oh, those hunters had no problem getting any. It was those rare times when the guides could actually guarantee the hunters their ducks. And we caught lots. My relatives, my uncles would shoot 20 or 30 in one shot. It was incredible. I'd got hunting too, in the park and out there in the Middlegrounds, there'd be tons of them. They'd call them rafts, rafts of ducks....In those days, there was plenty of wildlife. People could live right there off the land....It was a different way of life. I've seen a lot of changes in my own lifetime. (Stephens, 2009: 124).

Community members have conveyed anxiety in the decline of traditional economies and practices of subsistence due to environmental degradation and have stated the value in finding ways for these practices to persist not only for commercial and economic reasons, but to ensure the maintenance of the invaluable expertise and knowledge that comes with having people working on the land and monitoring its wellbeing.

Hunting and fishing have been important economic ventures that draw outsiders, employ local experts, and provide a source of income to the community. WIFN has taken measures to ensure the commercial success gleaned from this form of tourism does not disrupt the integrity of the environment. In 1875, the Band leased marshland to the St. Clair Flats Shooting club, but recognized that outside tourists posed a threat to the livelihood of hunters at WIFN (Wishart, 1996). To avoid such threats, a clause in the lease agreement stated that the Shooting Company must not "hunt, fish or trap any animals or cut any hay or wood upon the said lands..., and that there shall be reserved to the Walpole Indians the exclusive right to trap muskrat and take fish over the described territory" (McNab, 1999: 174). WIFN avoided relinquishing natural resource rights and ensured that poachers would be kept in check under WIFN's defined system of land use while community members would continue to hunt and fish within these marshes (Wishart, 1996). Not only did this demand that WIFN benefit the most from this lease agreement, it served as a historical example and set the standard for how WIFN would

maintain autonomy and Aboriginal rights over resources and control conservational practices (Wishart, 1996). WIFN went on to establish their own licensing regime in order to ensure the practice of conservational procedures defined by their own terms, and prevent the provincial government from enforcing their own measures “without any knowledge of the hunter or the hunted or the fishers or the fish” (McNab, 1999: 179). Today, the federal government upholds WIFN’s hunting bylaws and regulations in their jurisdiction as equal to policy such as the Migratory Birds Convention Act, which had previously attempted to infringe on the activities of hunters at Walpole Island and impose outside standards and limitations on animal harvesting. An intensification in surrounding industrial and agricultural development in the latter half of the twentieth century, as well as a number of legal clashes, caused WIFN to take a drastic, historically significant action: the expulsion of the Indian Agent in 1965 (McNab, 1999). Among these clashes was a major dispute involving 2500 acres of marshland² at WIFN that the Department of Indian Affairs attempted to lease to the James Cooper Estate of the Town of Wallaceberg in 1941, which intended to convert it for the purposes of intensive agriculture (Wishart, 1996). These negotiations took place without the knowledge or consent of WIFN (McNab, 1999). In another case in 1954, WIFN was forced to enter into a treaty to surrender lands underwater in the St. Clair River³ to the Crown during the construction of the St. Lawrence Seaway, though this treaty was made on the condition that WIFN would regain Aboriginal title to the land once it was no longer needed by the Crown (McNab, 1999). Increased river shipping traffic and the dumping of toxic wastes on Seaway Island caused concern for WIFN over the relinquishing of this area, and there was a desire to reclaim Seaway Island (McNab, 1999). In order to resolve these disputes, and safeguard WIFN self-determination, Chief Burton Jacobs ensured the expulsion of the Indian

² In 1924, the Department of Indian Affairs attempted to relocate Caldwell Band members from Point Pelee to St. Anne’s Island (one of the islands within the Walpole Island Reserve). This land had previously been ‘conditionally surrendered’, or leased to a shooting club for duck hunting, and following negotiations with the club, the land was made available to the Caldwell Band who did not want to relocate (Wishart, 1996). As a result the government then felt they could lease the land to the James Cooper Estate in 1941 (Wishart, 1996).

³ These lands were the land under water of the Southeast Bend Cut-off Channel (McNab, 1999:181).

Agent, Fred Hall, and his replacement with a member of the community, Edsel Dodge (McNab, 1999) demonstrating that WIFN would not tolerate practices that were not in the best interest of the community (Wishart, 1996). Subsequently, with this action, “Walpole Island was better able to manage its resources according to the beliefs and practices of its residents” (Wishart, 1996: 20). Farming became an important venture on the island with the increased size, capacity and production on the band-owned farm, Tahgahoning (Wishart, 1996). However, the ability of WIFN to control their natural resources and sustain hunting, fishing, trapping, and gathering activities had unmistakable value to the community, as it is known that harvesting wild foods offers better return than agriculture, as will be further discussed (Wishart, 1996).

WIFN Self-Determination and Environmental Management on First Nation Terms

The eviction of the Indian Agent was a critical event that set the standard for how WIFN would cope with the impositions of dominant forms of governance, ensuring negotiations met their terms and goals (Jacobs, 1992). This action opened “the door to the modern self-government era”, and is an event that continues to resonate as a major step in the island’s history for autonomy and self-determination (Jacobs, 1992:1). Today, they are a First Nation independent of any Aboriginal organization and are considered a “big band” by the Department of Indian and Northern Affairs (McNab, 1999). Walpole Island’s legacy of activism, and advocacy for land and resource rights against dominant forms of governance, has been a rich one. The struggle for wellbeing and autonomy against the development of and pollution from industrialization and agriculture in surrounding communities prompted Walpole Island to form its own research bodies and conduct community initiatives in order to effectively exert political pressure (VanWynsberghe, 2000). The “Research Group”, formed by the Walpole Island Band Council in 1973, was set up to facilitate community-led initiatives that would play important roles in exerting this political pressure (VanWynsberghe, 2000). From this research group emerged the Walpole Island Heritage Centre in 1989 (VanWynsberghe, 2000), which has become “a leader in environment and sustainable development among Canadian native communities” (Beckford et al., 2010: 244). The role of the Heritage Centre has become to address the concerns of the community with industrial

irresponsibility and ineffective governmental policies, and lead interventions and collective action against unsustainable practices (VanWynsberghe, 2000). Furthermore, the Heritage Centre has moved the community away from being subjects of outsiders' research towards being leaders and authors of their own research (Jacobs and Sands, 2012). The Heritage Centre has helped WIFN become active in the production of their own scholarly work, ensuring their own knowledge and interpretations are central to research (Moore, 1998). They have also endeavored to create relationships through collaborative work where Walpole Island residents are primary participants, not "passive objects", in research that concerns them (Moore, 1998). Through the establishment of their Research Ethic Protocol and MOUs with partner research institutions such as Western University, students such as myself are brought in with the understanding that they have a commitment to aid in and produce data that is both helpful to and recognizes the central role of the Heritage Centre and Walpole Island community members (Jacobs and Sands, 2012). Furthermore, they are to work with the Heritage Centre towards community-defined objectives and aspirations, conduct or aid in fieldwork that addresses community concerns and incorporate community input meaningfully into a co-production of knowledge (Dalton, 2010). Successful environmental initiatives at Walpole Island have made the community a source of inspiration and intrigue for many (VanWynsberghe, 2000). It has been the goal of the Heritage Centre to support the aims and efforts of the Walpole Island community, preserve their natural and cultural heritage, protect WIFN rights, improve capacity, and promote sustainable development on the island by upholding community goals, views and aspirations for generations to come (Jacobs, 1992). The Heritage Centre abides by the philosophy that,

For aboriginal people, traditional belief is often expressed by using the circle to represent life. Our life goal can be described as follows: We did not inherit a legacy from our ancestors. We hold it in trust for our future generations. Another way to put it: sustaining the circle of life (Jacobs, 1992:2).

Research at Walpole Island has become a process that attempts to assert First Nation self-determination. Dean Jacobs, former Chief and Executive Director of the Heritage Centre, has been a prominent figure in assuring self-determination and benefits

to the community through environmental research, indicating that the Heritage Centre aims to develop projects that focus on community involvement rather than research that simply aims to produce a piece of paper (Fehr, 2010). Environmental research involves issues of land claims, environmental, and human well being, and shaping dialogue with external agencies and forms of governance (Fehr, 2010) to ensure First Nation community perspectives and goals are understood and meaningfully incorporated into discussions and outcomes that affect them.

Perceptions of Landscape in Indigenous and non-Indigenous Communities

It is important to discuss the differing conceptions of 'landscape' and the perceptions surrounding 'place' when we consider the perspectives of First Nations in environmental management and understand how First Nation communities are unequally affected by environmental degradation. Europeans or "Westerners" and Aboriginal people have fundamentally different views on "sense of place" (Windsor and McVey, 2005). Dominant themes in European thought and worldviews has resulted in Westerners having a 'sense of space' instead of place (Windsor and McVey, 2005). This disconnect and "lack of rootedness" has stemmed from a sense of superiority to nature and a non-reciprocal relationship with the land that grants Europeans a sense of entitlement over, rather than a feeling of belonging within, a landscape (Windsor and McVey, 2005). "Westerners, in their getting and spending and laying waste, have lost their understanding of place in any meaningful sense" (Windsor and McVey, 2005: 149), creating an outlook that sees space as devoid of its own inherent qualities. Hegemonic practices have played a considerable role in dominant, Eurocentric perceptions of space. Western maps, for instance, distort size and shape while also dictating what details are included and what are not (Wishart, 1996). For instance, in maps of Ontario, native communities often go unmarked while non-native communities of similar or equivalent size are clearly visible (Wishart, 1996). Space is constantly being defined by social forces "and the selection will always be on the basis of cultural predispositions" (Trott, 1982: 347). Landscapes are thus a culturally-shaped view of the world, and dominant Eurocentric forms of governance exercise their privileged position in the defining of landscapes by considering their perspectives and representations of landscape as 'fact' (Wishart, 1996). While this

statement might be a generalization, European, and Euro-Canadian/American discourse tends to represent nature at an arms length: something to be admired, an obstacle to overcome, but not a place where people live (Wishart, 1996). Western culture has become “increasingly mechanized” and society required images that viewed the earth no longer as personified or a source of nurturing, but rather something that needed to be conquered and dominated in order to promote ‘progress’ through commercialization and industrialization (Merchant, 1980: 2).

Aboriginal people in Canada construct landscape very differently, thus making their approaches to landscape, such as management and resource use, inherently different (Wishart, 1996). Aboriginal worldviews tend to demonstrate a “greater sense of spatial identity” (Windsor and McVey, 2005: 149). Landscape contains its own intrinsic value since “home is a place where identity is continuously reinforced through connection to the past” and meaning is created through this inseparable relationship between people and the land (Windsor and McVey, 2005: 149). The marked differences in these worldviews are important to understand when considering the distinctive ways in which destruction of, and detriments to, the landscape affect different groups of people. Environmental degradation directly affects “sense of place” and identity can be damaged in a process J.E. Windsor and J.A. McVey have described as “memoricide”: the destruction of memories people have of place (Windsor and McVey, 2005: 148). For instance, as I will discuss later, some community members at Walpole Island expressed their fear that the changes to the landscape brought about by the invasion of plant species such as Phragmites and white sweet clover, would have a drastic impact on a sense of place among the younger generations who had grown up with, and never experienced the landscape before, invasive plant species. This, as I will describe, would have an enormous impact on the ability of future generations to maintain life-ways that have sustained WIFN for centuries. Landscape is defined by an interaction between people and the land in which the experiences, life-ways, and stories of people are inextricably tied to nature, providing a sense of ‘place’ (Basso, 1983). As a result, reciprocity and respect feature prominently in the narratives surrounding resource use and ties to the land at WIFN (Wishart, 1996). A “communal view” towards the land has played a large role in the continued importance of traditional stewardship practices and economies (Wishart,

1996) and has underpinned the particular importance of community-driven environmental management at WIFN in a way that is distinct from non-Aboriginal communities in Ontario. The importance of common natural resources has resulted in many indigenous communities developing rules and practices for respectful use of resources that are integral to indigenous ways of life (Parlee and Berkes, 2006). For instance, Walpole Island’s “Ecosystem Recovery Strategy” was designed upon the premise of a co-existence between people and their environment and upholds the idea that First Nation life-ways and the integrity of the environment are intimately linked (Bowles, 2005). Loss of First Nations languages, culture and traditions would have detrimental consequences for environmental health and a “successful recovery will only be accomplished with the support of the Walpole Island Community” (Bowles, 2005:vi). The goal of this initiative has been to ensure conservation efforts and ecosystem recovery are carried out in a way that is compliant with Walpole Island’s stated environmental philosophy⁴ and to simultaneously benefit the community for cultural and economic development (Bowles, 2005). Both social and environmental goals are inseparable by the standards designed in Walpole Island’s environmental initiatives (Bowles, 2005). WIFN has ensured this approach is understood and essential to any nation-to-nation collaboration between the community and Canadian or Ontario government agencies as they advocate for approaches that both centrally involve and benefit Walpole Island community members.

1.2 Collaborations, Reconciliation Research and Environmental Co-governance

Fostering Mutually Beneficial Relationships: Collaborations and Partnerships in Environmental Research at WIFN

Previous ethnographic work at Walpole Island has demonstrated that many Walpole Island community members do not trust information portrayed as ‘objective’ by

⁴ Walpole Island First Nation Environmental Philosophy statement reads: “To preserve, enhance and maintain a mutual respect and to continue our beneficial dependency upon the environment we shall endeavor to co-exist with Mother Nature and protect this relationship. We the Walpole Island First Nation people pledge to use these resources to the mutual benefit of all peoples. We shall therefore ensure proper respect for all resources. As our elders have done we shall maintain laws that preserve our wildlife, land and resources.” (Bowles, 2005: v).

external researchers due to a history of misuse of local knowledge by outsiders who identify as ‘experts’ (Bend et al., 2011). Often, outsiders who write about aboriginal cultures employ their own European frame of reference and apply mainstream values of dominant society without engaging with culturally-specific information or solutions (Warry, 2007: 28). The prioritization of research paradigms has left local and experiential TEK marginalized and excluded from dominant discourse, which forms the basis of environmental standard making (Nygren, 1999). The co-production of knowledge through collaborative initiatives has often been unequal due to differing worldviews that shape contrasting perspectives, which are most pronounced and explicit during negotiations that take place between representatives of various cultural groups (Pennesi, 1999). During the 1987 World Commission on the Environment, Norwegian Prime Minister Gro Harlem Brundtland issued “Our Common Future”, or the “Brundtland Report”, which brought forth the concept of ‘sustainable development’ (McGregor, 2006). The report provided international recognition for the potentially imperative role of TEK and indigenous peoples in policy making and the creation of solutions for global environmental issues (McGregor, 2006). Indigenous groups simultaneously asserted traditional resource rights and vied for their right to possess and exercise TEK and other practices necessary to their cultural survival (Mauro and Hardison, 2000). Canada responded with some attempts to incorporate TEK into policy making with the Environmental Assessment Act, the Canadian Environmental Protection Act, and the Species at Risk Act (McGregor, 2006). While TEK is incorporated in some public policy, it is commonplace for western science to maintain a privileged vantage point and veto power in environmental resource and conservation action (McGregor, 2006). Thus TEK’s recognition at an international level has not necessarily ensured its meaningful incorporation into environmental research and governance at federal and provincial levels in Canada or in dominant scientific discourse (McGregor, 2006). For instance, quantitative risk assessments that define priorities and form a basis for decision making in dominant environmental governance, are often defined as ‘rational’ and ‘factual’ in contrast with TEK, which is often misrepresented as superstition, taboo, or non-expert, anecdotal knowledge (Nygren, 1999). Western science has been seen as external to social processes and exempt from the reality of knowledge production, which involves a

complex process of negotiation, power, and multiple actors (Nygren, 1999). Knowledge external to western science is frequently seen as the opposition of truth (Nygren, 1999). We must evaluate the processes that legitimize hierarchies of knowledge in order to understand how certain standards have come to dominate environmental discourse. Though many attempts have been made to incorporate local knowledge into environmental research and initiatives, these efforts often come with the attitude that local knowledge is only beneficial as long as it can be legitimized by western science (Nygren, 1999). Because community values are not tangible or quantifiable, they are often disregarded in favor of scientific modeling (Corburn, 2002). Qualitative research involving social processes is seen as a separate stream of study altogether, leaving no room for environmental data to be connected to social understandings, knowledge and perspectives (Jassen et al., 2006). Mathematical, scientific and statistical processes have come to define environmental research strategies and drive decision-making processes on environmental standards that are not beneficial in a number of social and cultural situations (Coburn, 2002). Local knowledge of risk should not be dismissed because in doing so, observations and experiential awareness of locally-specific, adverse effects of environmental degradation are ignored in favor of universal predictive models incapable of representing particular contexts (Coburn, 2002). Measures that arise from risk assessments are often based on short-term, cost-benefit analysis that, when viewed as objective, can promote the belief that quantifiable data is more qualified to represent risk than the more complex real-life experiences of risk (Corburn, 2002). Excluding social factors and local knowledge from collaborative projects and prioritizing western science is therefore, unsustainable (Nygren, 1999). Topics traditionally associated with the work of environmental science such as invasive species have enormous cultural implications that cannot be ignored (Beckford et al., 2010). It has become critical to the Walpole Island community and Heritage Centre to incorporate traditional values of stewardship, coexistence with nature and TEK into community environmental strategies, as well as advocate for the understanding in environmental research of the strong connection between environment, health and identity (Beckford et al., 2010).

This networked perspective is imperative to understanding community standpoints that have driven environmental action at WIFN (Beckford et al., 2010). Many

projects the Heritage Centre has engaged in have been collaborative. Hence it has been critical to WIFN to educate others on their cultural and environmental perspectives and demand equal platform to discuss community-determined goals with practitioners of western science (Beckford et al., 2010). Because WIFN, its land, ecosystems, and biodiversity, have been a great source of intrigue and interest among outside researchers, the Heritage Centre has taken measures such as the creation of the aforementioned MOUs to ensure that information gathered on the island not only belongs to the community, but serves to benefit it as well (Jacobs, 1992). This ensures that researchers work in collaboration with the community and incorporate their perspectives and goals. The Heritage Centre has promoted and developed partnerships “based on mutual trust to achieve a common objective of promoting cultural sharing and understanding of our distinct natural heritage; its protection and restoration” (Jacobs, 1992: 1). A number of successful collaborative projects have managed to grant equal weight to western scientific methods and TEK in the co-production of knowledge (Beckford et al., 2010). In order to ensure that community needs and perspectives play a central role in environmental initiatives, the Heritage Centre ensures research requests are presented in advance after which they must be approved by the Band Council (Williams et al., 2002). This process prevents researchers from simply gathering their data and leaving. The Heritage Centre safeguards community ownership and access to any environmental and resource-related data collected on the island (Williams et al., 2002). In order for a project to be approved it must benefit and involve community members as well as fit in with Heritage Centre directions and programs (Williams et al., 2002). Community partnerships with the Royal Ontario Museum (ROM), for instance, enriched biodiversity research done on the island by incorporating local, cultural, and scientific aims (Williams et al., 2002). This project, which was initially meant to be a three day investigation of a rare fish species, the northern madtom, expanded into larger questions about the abundance of other rare aquatic species after conversations with community members that revealed the presence of channel darters, which are uncommonly found throughout Canada, yet have been abundant in aquatic ecosystems at Walpole Island (Williams et al., 2002). Later collaborative projects with the ROM looked at wetlands and the decline in a number of important medicinal plant species due to the invasion of *Phragmites* (Williams et al.,

2002). Local ecological knowledge and oral tradition were critical to these projects as community members joined and aided survey teams (Williams et al., 2002). Furthermore, the Heritage Centre assisted the ROM in designing interactive drawers to educate museum visitors on culturally important tallgrass species at the ROM's Tallgrass Prairie Alcove Exhibit in the Hands-on Biodiversity Gallery (Williams et al., 2002).

Partnerships with academic institutions have allowed students and scholars to co-produce research with the Heritage Centre, investigating and advocating for WIFN standpoints, and partaking in community-led and defined studies. Academics have been involved in Heritage Centre initiatives and projects that investigate intergenerational observations and oral histories of environmental change critical to empirical understandings that inform standpoints and perceptions of environmental degradation at WIFN. For instance, for her PhD research at McMaster University, Christianne Stephens documented negotiations between WIFN and Sarnia Chemical Valley industrial representatives, and the standpoints that formed community resistance to standards, brought to negotiations in the form of personal narratives (Stephens, 2009). Personal experiences of bioaccumulation, environmental change and health degradation contradicted risk assessment results in a number of cases where WIFN confronted Chemical Valley industries to negotiate and demonstrate resistance to current environmental standards and regulations (Stephens, 2009). Walpole Island representatives believed that corporate language and data that measured 'safe' levels of toxins in the St. Clair River were meant to soften the harmful effects of corporate activities and distract from the negative long-term results of bioaccumulation on environmental and human health (Stephens, 2010). These contested perspectives represent the worldviews that have shaped differing risk perceptions and cultural understandings of the environment (Stephens, 2010). Whereas corporate language often weighs the costs and benefits and relies on scientific standards to define their standpoints, WIFN collective responses have been shaped by a number sources including multi-generational, observational knowledge of bioaccumulation, community-based research, and individual experiential accounts (Stephens, 2010). During the 2008 Shell Canada Refinery Expansion dispute over the proposed expansion of Shell facilities upstream in Sarnia's Chemical Valley onto traditional Bkejwanong territory, collective action was

taken by the Heritage Centre and Walpole Island community members to make their position known (Stephens, 2010). Shell representatives underestimated the emphasis WIFN placed on community experiences and expected scientific ‘proof’ and data representing “safe” levels of pollutants to win them over (Stephens, 2010). To the contrary, the Walpole Island representatives expressed a lack of trust towards Shell’s research, emphasizing that their own multi-generational narratives and discourse of bioaccumulation demonstrated results that conflicted with their data (Stephens, 2010). They expressed the belief that the environmental and health effects of toxic bioaccumulation could not be quantified in the short term, but had been experienced in the long term (Stephens, 2010). Calls by WIFN for ‘zero tolerance’ for the discharge of toxins into the river were made in response to these corporate standards, demonstrating that no level of pollution in the river could be described as ‘safe’ (Stephens, 2010). Thus complex individual narratives along with community research became crucial to collective standpoints on the state of environmental health that were emphasized in negotiations with Shell (Stephens, 2010).

Another PhD student from the University of Toronto, Zoe Dalton, explored negotiations between community and dominant discourse in her dissertation on Canada’s Species at Risk Act and its impact on WIFN environmental stewardship practices (Dalton, 2010). She found that the involvement and consultation of native communities in government species at risk recovery legislation and initiatives are often superficial (Dalton, 2010). While legislation recognizes the role of native contributions in environmental management, the process by which communities are consulted is often exclusionary since the duty to consult does not require input to be ultimately implemented (Dalton, 2010). These systematic inequities are critical to discuss when examining standard making practices that shape dominant standpoints on how to ‘properly’ conduct environmental management (Dalton, 2010). Dalton demonstrated this in her discussion of the Species at Risk Act, which was passed in 2002 and developed under the guise of ‘inclusion’ of First Nation perspectives (Dalton, 2010). It ultimately had colonial implications as it infringed on treaty rights by identifying areas as ‘critical habitat’, subjecting individuals to potential law enforcement for building homes in these areas, or harvesting rare plant and animal species for food, medicinal, or ceremonial

purposes (Dalton, 2010). Furthermore, because rare species or species at risk tend to be more abundant in First Nation communities due to effective stewardship practices and sustainable cultivation of plant and animal species, there is a greater chance of these important practices being deemed illegal or land being designated as critical habitat (Dalton, 2010). Hence, this legislation disproportionately affects and controls First Nations by disregarding rights to maintain traditional economies that have been important to sustaining life-ways at WIFN, and disregards the fact that rare species and ecosystems tend to remain intact and abundant on First Nation land more so than areas outside reserves (Dalton, 2010). At WIFN, for instance, it was determined through a species inventory that the majority of the community's land and waters could be deemed critical habitat, which, if enforced, would have a dramatic impact on the lives of residents at WIFN (Dalton, 2010). Dalton thus advocates holistic approaches and environmental governance that understands both community and ecological needs (Dalton, 2010: 43). Government policy on environmental management often separates the environment from its social context, and as one Walpole Island community member and consultant expressed, "you cannot just support conservation of biodiversity as a goal. You need to really work with the community to solve social needs, social problems" in a holistic manner that accommodates both community and ecological goals (Dalton, 2010: 43). Furthermore, government funding for community initiatives is often affected by standards that suggest the value of certain forms of research over others (Dalton, 2010). This funding is often provided as long as a project fits certain criteria and within a defined scope (Dalton, 2010). For instance, the Species at Risk Act has limited the involvement of First Nation communities in species at risk management because native goals and conceptions of restoration and stewardship are not seen as in line with the scientific criteria that define dominant discourse (Dalton, 2010). It is critical to continue to examine standards that shape perceptions on environmental governance and add to the literature on the success of community based environmental management so as to advocate for, as well as inform, policy and dominant discourse on the importance of environmental co-governance, decision making, meaningful consultation and address the colonial tendencies of these negotiations.

In another collaborative effort, WIFN and the Western University Ecosystem Health Research Team (including Dr. Jack Bend, Dr. Regna Darnell, Dr. Dean Jacobs Dr. Phaedra Henley, and Leanne Bekeris) partnered in a Participatory Action Research Project (PARP) monitoring environmental contaminants in the St. Clair River and their negative effects on human health between 2004 and 2010 (Bend et al., 2011). The Walpole Island Heritage Centre and the research team worked together to form research goals that were relevant to, and addressed, the concerns of the community at Walpole Island with the hazards of industrial pollution on traditional land, food sources and ultimately humans (Bend et al., 2011). Bio-monitoring as well as ethnographic data were collected and analyzed quantitatively and qualitatively in order to produce a holistic study and achieve the objective of accessing potential risk of exposures to a variety of environmental contaminants in traditional foods for Walpole Island residents (Bend et al., 2011). The project provided baseline-monitoring data necessary for understanding current contaminant concentrations and for comparison to historic and future data (Bend et al., 2011). Furthermore, the concerns of the community were properly addressed and integrated, demonstrating the PARP model as one that is capable of carrying out meaningful and sustainable research (Bend et al., 2011). This monitoring project was multifaceted and used a variety of strategies to produce ethnographic, epidemiological and bio-monitoring data (Bend et al., 2011). Multiple data points were utilized including blood and hair samples from 57 individuals at WIFN (34 males and 23 females), and muscle samples from 10 species of traditional food (Bend et al., 2011). 55 samples of hair and 56 samples of whole blood were collected from these volunteers and were analyzed for mercury, other toxic metals, and persistent organic pollutants (POP) at the Trace Elements Laboratory of the London Health Science Centre (Bend et al., 2011). These data points were all used as biomarkers or indicators of the health of the St. Clair River (Bend et al., 2011). The study took place over the course of approximately six years including a feasibility study conducted by Health Canada under the National First Nations Environmental Contaminants Project in 2004 (Bend et al., 2011). In 2005, it was concluded that a study of this scope would be feasible to conduct (Bend et al., 2005). The data collected from the project were meant to serve as a baseline of contaminant levels in a representative sample of Walpole Island community members and traditional foods that

could be used for comparison to both historical and future data and to contribute to later analysis (Bend et al., 2011). The research team cited outside studies that linked exposure to certain contaminants with diseases that could impact the health of individuals at Walpole Island (Bend et al., 2011). Fetal and neonatal exposures to methylmercury through maternal fish consumption are linked to potential neurodevelopment complications when maternal hair mercury concentrations occur at 0.3 µg/g or more (Bend et al., 2011). Exposure to metals that cause oxidative stress or persistent organochlorinated (O.C) chemicals have been linked to an increased risk for the development of type 2 diabetes (Bend et al., 2011). These potential correlations warranted further studies and the need to investigate direct impacts of contaminants on human health (Bend et al., 2011). Implementing bio-monitoring methods to assess environmental contaminants while simultaneously evaluating human health in the area served to achieve the objective of determining correlations between contaminant concentrations in the St. Clair River and traditional foods consumed by Walpole Island community members and the increased risk of disease (Bend et al., 2011). Semi-structured interviews were conducted in order to gather local perspectives, experiential knowledge of ecological degradation and to identify specific areas of concern and local risk perceptions of Walpole Island community members in human and ecological health degradation (Bend et al., 2011). These interviews helped the research team raise important research questions, and develop a social context for the project in order to make the investigation meaningful to the community (Bend et al., 2011). Furthermore, a health questionnaire was developed by representatives of all parties involved in order to gather information about community members' personal perceptions of their health and to identify specific dietary habits, particularly the consumption of traditional food (Bend et al., 2011). These health questionnaires revealed significant information critical to making correlations between traditional foods and the occurrence of contaminants in human hair and blood (Bend et al., 2011). For instance, it was determined that 97% of the participants considered traditional fish a major staple in their households, often serving it twice a day (Bend et al., 2011). Furthermore, experiential knowledge allowed for the establishment of particular point sources (Bend et al., 2011). Of these point sources, Chemical Valley industries was considered in the health survey to be the biggest polluter

and contributor to the tainting of important traditional food (Bend et al., 2011). The incorporation of qualitative research is essential as it aims to develop a deeper, more contextualized study of a problem (Bend et al., 2011). Integrating and making central the perspectives the experiential knowledge of the community allows for a wider focus beyond statistic analysis of associations between variables defined solely by outside researchers (Bend et al., 2011). The research design in this case was much more flexible and open to a variety of variables that add to a more holistic study (Bend et al., 2011). Ethnographic data served to produce research questions and guide the collection and analysis of data (Bend et al., 2011). By analyzing both the ethnographic and bio-monitoring data simultaneously, correlations between social factors and contaminant concentrations were drawn (Bend et al., 2011). This was ultimately successful in determining the threat of exposure to contaminants from industrial activities in traditional food sources, particularly fish, and the potential risk increase in the occurrence of disease (Bend et al., 2011). The focus on community involvement, collaboration and studies that had a direct impact on the lives of individuals at WIFN has resulted in research that will be sustained in the long term by the community, Heritage and Health Centre, and partner institutions. Furthermore, this research design serves as a model that has been applied to a number of communities facing similar issues with environmental contaminants (Bend et al., 2011). For instance, discussions with the Attawapiskat First Nation began in 2008 due to the community's concern with contaminants in traditional water, particularly mercury from the De Beers Victor Diamond Mine located 90km upstream from the community (Bend et al., 2011). Research at Attawapiskat provided data that were compared with data from Walpole Island, allowing for integrated community projects and a better understanding of varying degrees of exposures and contaminant threats to human health (Bend et al., 2011).

Above are only a few of the many examples of successful instances or partnerships and collaborations between WIFN and academic institutions. Academic work with the Walpole Island Heritage Centre has worked to make central the views and perspectives of Walpole Island community members through their narratives, oral testimony, stories and more. This type of collaborative research has been central to 'Reconciliation Research', as will be described next.

Reconciliation Research and Advocating for Environmental Co-governance

Reconciliation research works to enhance understandings and foster better relations between First Nations and non-Aboriginals, particularly in environmental management (Dalton, 2010). The goal of reconciliation research is to produce more meaningful collaborative efforts through the co-production of knowledge and the linking of worldviews and perspectives in a relationship defined by mutual respect and benefit, and by recognizing colonial relationships that have been perpetuated presently and in the past in both research and governance (Dalton, 2010). Zoe Dalton applied this approach to research concerning Canada's Species at Risk Act and the colonial conditions this legislation promoted (Dalton, 2010). Her research worked to expose these colonial effects, suggest a new model for co-governance, demonstrate the marginalization of TEK in species at risk research and governance, and gear the focus of academic research between First Nations and non-Aboriginals towards reconciliation goals (Dalton, 2010). Because colonial conditions in environmental governance often go unacknowledged by dominant forms of governance, research goals to identify these processes and address them is critical. Reconciliation research calls for environmental co-governance: a model that promotes the central involvement of First Nations in environmental decision-making, fulfills their aspirations and self-determination, and decolonizes approaches that have typically ignored or failed to understand First Nation perspectives, rather than having the interests of the dominant society routinely affirmed and made central to the goals of environmental governance and research (Dalton, 2010). Legislation meant to incorporate perspectives and promote the contributions of First Nations in environmental management can often be superficial, as mainstream understandings, knowledge, and dominant agendas tend to trump these perspectives (Dalton, 2010). First Nations are often treated as 'advisors' with no guarantee that their input will be put towards the formation of environmental solutions (Dalton, 2010).

The reconciliation framework for conducting and understanding environmental research has been critical to the stance in my thesis of the need for co-governance in the field of invasive species management. The invasive species management and removal project during the summer of 2013 faced many adversities while attempting to acquire

funding for community-determined aims in invasive species research and control. Community or ‘grassroot’ initiatives often experience difficulties when attempting to acquire sufficient, long term funding for local projects since ideas of scale often play a role in prioritizing project importance from the standpoint of dominant forms of governance. As I will demonstrate, ‘larger scale’ initiatives that apply ‘best management’ strategies, as determined by dominant government agencies, are often preferred to ‘grassroot’ initiatives and are therefore more likely to receive long term funding necessary for the proper control and management of aggressive invasive plant species. While the GLGCF seeks to support communities in their endeavors, project scope, goals, duration and desired outcomes are predetermined, making it challenging for community defined objectives and project designs to be put into practice. Despite the intentions of the MOE with the creation of the GLGCF, exclusionary practices remain central in their decision-making. This model of exclusion fails to recognize the disproportionate way in which invasive plant species affect First Nations. Critical cultural, social and economic practices are all at risk alongside the plant and animal species threatened by the invasion of white sweet clover and Phragmites. Co-governance in invasive species management is therefore imperative to not only the understanding First Nation perspectives, but to designing solutions that benefit the community beyond the conservation of biodiversity and preserve important lifeways that have been, and continue to be, crucial to community members at WIFN. Thus I seek to contribute to, and continue, the discourse in reconciliation research by offering perspectives on invasive species management and advocating for co-governance in this field.

Chapter 2

2 White Sweet Clover Management and Removal

In this Chapter, I will examine the ‘white sweet clover phase’ of the summer of 2013 invasive species management and removal project, which was conducted between June and August. Before describing the details of the project in terms of funding process, fieldwork, and outcomes, it is important to provide context in terms of the history of this invasive species in North America as well as governance in Ontario involving invasive plant management. The discussion of these broader themes will reveal factors at work in Canadian and Ontario invasive species management and environmental governance that shaped the scope of this invasive species initiative at WIFN. I will begin to touch on themes that demonstrate the history and management of white sweet clover in North America, Canada, and Ontario and demonstrate it as a physical product of colonialism that continues to be dealt with and governed under colonial conditions. I will then describe the white sweet clover phase of the invasive species management and removal project, beginning with the funding process and the original proposal for the initiative. I will explain the ways in which the original project design was altered by the standards and revisions of the GLGCF. Finally, I will provide an overview of the project that ultimately took place, the nature of the fieldwork, and project results and outcomes.

2.1 White Sweet Clover Plant Biology and History of Invasion in North America and Ontario

White sweet clover is native to Europe and eastern Asia and was introduced by horticulturalists, among many species of leguminous European shrubs, to the western United States (Dukes and Mooney, 2004). The earliest records of the genus *Melilotus* in North America dates back to 1664⁵, though the species are not identified (Turkington et al., 1978). The plant has since been cultivated for a variety of agricultural purposes

⁵ First record of *Melilotus* in North America comes from Boucherville, Quebec (OIPC, 2014).

including as a fodder crop⁶ (Turkington et al., 1978) and as a cover crop (MRN, 2012)⁷ due to its soil improving qualities (Turkington et al., 1978). The importance of white sweet clover as a fodder crop in eastern Canada diminished by 1906, but the plant regained popularity in the early twentieth century for the purposes of rebuilding soil on eroded slopes and worn out fields (Turkington et al., 1978). White sweet clover continues to be used for agricultural purposes and honey production; processes that have both initiated and perpetuated the spread of this invasive plant throughout North America (Turkington et al., 1978).

White sweet clover is a particularly aggressive invasive plant species that reproduces in substantial numbers, adapts to a large range of climatic conditions, and is typically drought resistant and winter hardy (Turkington et al., 1978). It is a biennial herb⁸ that has two growing seasons. During its first year, the plant grows its strong taproot and primary stems that grow up to 1.5m tall (Anderson, 2013). In its second year, the stems will grow up to 2.6m tall (Turkington et al., 1978). The plant then flowers, sets seed, and dies (Turkington, et al., 1978). A single plant of white sweet clover is capable of self-pollinating and yielding a new population, adding to the potency and effectiveness of this invasive plant species (Anderson, 2012). Under ideal conditions, large white sweet clover plants are capable of producing 200,000-350,000 seeds per plant, which can be dispersed by wind over short distances, or more predominantly by rain wash and stream flow over longer distances (Turkington et al., 1978). White sweet clover is unable to thrive in flooded or shaded areas, thus it is often found along roadside edges, railways and other disturbed areas where they are spread, as well as in their preferred habitats such as open

⁶ Fodder crops are crops that are cultivated primarily for animal feed (Food and Agriculture Organization of the United Nations, 1994).

⁷ Cover crops are used to maintain soil quality and productivity in agriculture, including Ontario farming, by performing a number of functions (OMAFRA, 2013). They help to reduce soil erosion, add organic matter, reduce nutrient loss, improve soil fertility, reduce pest populations, reduce compaction, improve soil structure and more (OMAFRA, 2013).

⁸ Biennial plants complete their life cycles in two years. The first season, a root is established along with the primary stems and small rosette of leaves near the soil surface. The second season, stems elongate, flower, form and disperse seeds, and the plant dies (Anderson, 2013).

pastures and prairies (Turkington et al., 1978). After the plant invades and is established in these habitats, it can alter soil chemistry through a process called “nitrogen fixing” where it increases the rate of nitrogen (N) input into the soil, making it difficult for native plants that are non-nitrogen or less-nitrogen efficiently fixing plants, to thrive (Dukes & Mooney, 2004). White sweet clover is also an allelopathic species, meaning its roots release chemicals in the soil that can prevent the growth of native plants (Anderson, 2013). They also grow taller and in denser patches than many plants in their preferred ecosystems, hence they are capable of shading and crowding out native plants species, degrading areas and forming monocultures where few native species are able to thrive (Anderson, 2013).

The invasion of white sweet clover in ecosystems throughout Ontario has posed major problems for many endangered grassland and prairie habitats (Anderson, 2013). White sweet clover has infiltrated important and fragile ecosystems that offer ideal conditions for its growth and establishment. Because the plant thrives in open habitats, rare ecosystems such as prairies, savannahs, dunes, alvars and meadows are especially vulnerable to its invasion, which is problematic because “these habitats are often at risk in Ontario, and white sweet clover has a negative impact on their recovery” (Anderson, 2013). Two particular areas of concern in Ontario and WIFN, are tallgrass prairies and black oak savannahs. Tallgrass prairies are ecosystems composed primarily of grasses, sedges, and wildflowers with 10% or less of tree cover (Bowles, 2005). They are extremely diverse ecosystems, dominated particularly by Big Bluestem (*Andropogon gerardii*) and Indian Grass (*Sorghastrum nutans*). Black oak savannahs are transitional spaces representing many prairie as well as forest elements (Bowles, 2005). Because the canopies of black oak savannas are not closed, many prairie plants that rely on the sun are still present alongside savannah specialists that thrive in shaded conditions (Bowles, 2005). As a nitrogen-fixer, white sweet clover makes the soil in tallgrass prairies nutrient-rich, and therefore unsuitable to native tallgrass prairie species, which have evolved to thrive in nutrient-poor soil (Anderson, 2013). Black oak savannahs similarly suffer loss in native plant species due to nitrogen fixing and the subsequent aggressive growth of white sweet clover patches, making it an effective and potent colonizer of these habitats (Anderson, 2013).

One of the primary issues contributing to the spread of white sweet clover in Ontario is the fact that the plant is neither federally nor provincially regulated (Anderson, 2013). Unlike Quebec and Alberta, the province of Ontario has not added white sweet clover to the noxious weed list⁹ because it still serves infrastructural and agricultural purposes (Anderson, 2013). White sweet clover has been planted along roadsides for the purposes of soil rehabilitation (because of its nitrogen-fixing abilities) and erosion prevention, and is introduced via roadside seed mixes because the plant is drought resistant, hardy, and can withstand road salt (Anderson, 2013). The plant continues to be used by farmers and recommended by the Ontario Ministry of Agriculture and Food (OMAFRA) as a cover crop, a “common soil management practice for many Ontario farmers” (Ontario Ministry of Agriculture, Food and Rural Affairs [OMFRA], 2009). Cover crops are important to soil maintenance, particularly in lighter soils with lower organic-matter or in fields with short rotations that have less of a return from the use of crop residue or manure (OMAFRA, 2009). ‘Sweet clovers’ (referring to both white sweet clover and the less potent yellow sweet clover) are listed on the OMAFRA website as the “best choice” cover crop for soil compaction reduction (OMAFRA, 2012): a process in which soil is compressed into a smaller volume, often resulting from the use of tillage equipment or heavy-weight field equipment in farming practices (McKenzie, 2010). Furthermore, sweet clovers are credited by OMAFRA for their nutrient management capabilities through nitrogen-fixation, ability to attract “beneficial flowering insects”, erosion control due to its strong taproot, and “intermediate values for water use efficiency”, contributing to soil moisture (OMAFRA, 2012). Hence some of the major contributors to white sweet clover spread in Ontario come from the intentional planting of white sweet clover for the aforementioned reasons (Anderson, 2013), and lack of regulations preventing the use of the plant institutionally in Ontario. At a municipal level, property standard bylaws can be passed under the “Building Code Act” to locally address and regulate the problem of weeds, such as white sweet clover, determined to be noxious by the municipality

⁹ In Canada, plants deemed noxious weeds under subsection 10 (2) or designated as a noxious weed under clause 24(a) of the Weed Control Act are added to the noxious weed list, meaning the plant is recognized as a weed and federally regulated. These lists are also managed provincially (2009).

(Anderson, 2012). Thus white sweet clover is viewed and treated inconsistently at various levels of governance. While certain branches and institutions within the government of Ontario recognize the problem of white sweet clover and recommend BMPs to control it at municipal or grassroots levels, other branches condone and propagate the importance of its continued use in agriculture throughout the province, posing difficulties when forming policy and action to deal with invasive plant species such as white sweet clover.

2.2 WIFN Concerns with White Sweet Clover and Community Designed Initiatives

WIFN is home to some of the aforementioned habitats most vulnerable to invasive species infiltration (Bowles, 2005). Tallgrass prairies once spanned over 100,000 hectares in southern Ontario, and today, less than 1% of the original prairies remain (Bowles, 2005). Most of this grassland has been lost throughout Ontario due to conversion to farmland and urban development (Nin-Da-Waab-Jig et al., 2006) as well as the succession of forest or woodland in the absence of burning practices (Bowles, 2005). Some of the best and largest remnants of these prairies continue to thrive at Walpole Island, maintained by stewardship practices such as regular burning (Bowles, 2005). As a result, prairies at Walpole Island have maintained the greatest species richness in Ontario and a high concentration and prevalence of rare species (Bowles, 2005). Not only have many insects, mammals, reptiles, plant-life, birds and micro-organisms relied on the interrelationships sustained in these prairies, Walpole Island community members “have utilized the natural resources available within the tallgrass prairies for providing food, medicinal plants, crafting materials and as hunting grounds.” (Nin-Da-Waab-Jib et al., 2006: 19). Oak savannas once covered 12 million hectares, and since European settlement have been reduced to 0.02% their original extent (Bowles, 2005) due to conversion to farmland and urban development (Nin-Da-Waab-Jig et al., 2006). Some of the most significant areas of oak savanna left in Canada exist at Walpole Island. These savannas were created and maintained by wild horses that grazed in open grassland and savannah ecosystems (Nin-Da-Waab-Jig et al., 2006). Burning also helped to create and maintain oak savannas as the bark on large oak trees is thick enough to withstand and survive the heat of periodic burns (Nin-Da-Waab-Jig et al., 2006). Burning has help to

maintain the open conditions of both prairie and savanna ecosystems and prevent important plant species from being shaded or choked out (Nin-Da-Waab-Jig et al., 2006). White sweet clover has infiltrated and posed major threats to these two ecosystems that have been ecologically, economically, culturally and socially important at WIFN. It has been the target of a number of initiatives to reduce the threat of invasive species and restore important ecosystems such as prairies and black oak savannas, many of which have been designed to increase community awareness and involvement (Bowles, 2005). The continuity of the tradition of burning has been extremely important to diverse tallgrass prairie and oak savanna sites at WIFN (Hull and Williams, 1992). Burning has served a number of purposes including maintaining conditions suitable for farming and hunting, fertilizing and enhancing wildlife habitats and improving the condition and habitats for plants that are used in traditional medicines, crafts and ceremonies (Hull and Williams, 1992). Furthermore, burning plays a considerable traditional role in ways of life for the community as well and an integral part of the holistic life cycle of individuals at WIFN (Hull & Williams, 1992). The presence of white sweet clover adds to the difficulty of maintaining this way of life due to its resilience and because it can be one of the first species to grow back following burns (Anderson, 2013). White sweet clover poses a serious threat to this traditional way of life and stewardship practice as well as to some of the most important ecosystems and sites on the island. A number of measures and initiatives have been taken on by the Heritage Centre as well as Walpole Island community in order to reduce white sweet clover populations.

One of these initiatives to deal with the threat of white sweet clover was the 2007 “Bounty Program” conducted by the Heritage Centre that was funded by the Walpole Island Trust¹⁰. This program offered some monetary compensation to participants per bag of white sweet clover they collected. Sessions were run by the Heritage Centre for the participants, offering information on the threats of white sweet clover as well as removal

¹⁰ The Walpole Island Land Trust is a “grassroots organization that aims to conserve land in Walpole Island First Nation” as well as maintain and the community’s cultural ties to the land. It became the first aboriginal and trust to receive charitable status in January of 2008 (Walpole Island Land Trust, n.d)

strategies. There were a total of 37 individuals signed up to participate, 25 of which were active participants throughout the summer. A total of 15,320.4 lbs of white sweet clover was collected. The vast majority of participants who completed a questionnaire on the program agreed that the community based initiative made a difference. One commented that the program “cut down some of the problem but not all. Need to keep it up yearly or find a different method”. While many noted the money added to the incentive and well as feasibility of participating regularly in the program, it was indicated that more money might be necessary to compensate regular participants for gas and the effort it took to locate and pick the plants. If given the opportunity, all indicated they would partake in a bounty program in the future. Throughout the summer, I encountered a number of people who remarked on the success of the bounty program, and its importance as a community designed, facilitated and conducted strategy for white sweet clover removal. One landholder recalled the bounty program and how people, who were paid by the pound, could be seen in the prairies collecting “bags and bags” of the plant. Some indicated that they conducted white sweet clover removal on their own initiative hence the money was not critical to their engagement with the issue of invasive white sweet clover. The overall sentiment, however, appeared to be that the bounty program had a significant impact and that more funding for similar programs is important to the treatment and eradication of white sweet clover at WIFN. This past initiative played an important role in inspiring the initial design for the invasive species removal and management project for the summer of 2013, with the intent to continue this initiative and address community concerns with the help of outside funding. This project and strategy for removal of white sweet clover, however, was rejected and considered an inadequate approach by the standards of the GLGCF.

2.3 Invasive Species Removal and Management Project 2013 (White Sweet Clover Phase)

Acquiring Funding

Funding was sought through the GLGCF application process in late summer to fall of 2012 for the 2013 summer season by Heritage Centre Research Advisor, James Jenkins. The proposed title for the project was “Grassroots Management of Invasive

Species on Walpole Island First Nation”. The original aim of this project was to mitigate the threat of invasive plant species at WIFN by involving the community through workshops, and hands-on training in invasive species management and removal techniques. Control techniques could then be used by registered project participants to remove invasive plant species throughout the island with “the overall project taking on a bounty-like approach with financial incentives for invasive species removal” and participants being paid by the weight of invasive plant species they collected (Jenkins, August 2012). The intent was to run a bounty program similar to the one that took place in 2007, and expand the scope to include white sweet clover along with other invasive plant species, garlic mustard and purple loosestrife, as targets for removal, detection, mapping and monitoring (Jenkins, August 2012). A number of habitats including prairie, savanna, wetland and forests would be targeted for invasive species management and restoration (Jenkins, August 2012). Community involvement and awareness was central to the original aims of the project, and it was stressed in the application to the GLGCF that “emphasis should be placed on the community to come together” in order to deal with the threat of invasive species. As a community based project, the goal was to involve as many people as possible through financial incentives instead of using work crews, as this would “encourage community members to actively participate while taking into account issues of low income and high unemployment at Walpole Island” (Jenkins, August 2012).

The GLGCF responded to this application on October 18th 2012 with a number of questions and revisions. In their response, they suggested that the bounty program was likely to be deemed an “ineligible expense for the Great Lakes Guardian Community Fund” and indicated the Heritage Centre should determine alternatives for engaging individuals in invasive plant species removal, such as the hiring of individuals to form a field crew or the recruitment of volunteers without the incentive of a bounty. These restrictions reduced the possibility for the involvement of many community members down to a few individuals who could be hired full time for removal in the summer with the funding granted by the GLGCF. From these revisions, it was ultimately determined that a small field crew would be hired to perform removal and management activities. Hence, project scope was necessarily reduced in terms of sites and invasive plant species

of concern to goals that were manageable for a smaller number of participants. It was ultimately determined that only white sweet clover would be targeted for removal due to its prevalence on the island and density in a number of important sites, and that these removal activities would be limited to a few affected prairie sites.

Field Work

The white sweet clover phase of the project began in June 2013 with the acquisition of landholder permission to conduct research and removal activities on landholdings overlapping the main prairie sites of interest. Four prairie sites became the focus of white sweet clover removal activities: the Sand Pits, Potawatomi Prairie, Altiman Prairie North and Altiman Prairie South. I helped and participated in a field crew team of four individuals, primarily made up of summer students employed by the Heritage Centre, who spent June to August recording GPS coordinates of large patches of white sweet clover for future distribution mapping data. We were also responsible for removing white sweet clover by hand pulling the plant and roots from the ground, or cutting the stems of the plants that were too large to be removed by hand. We counted the number of individual white sweet clover plants in each patch we picked and determined a rough measurement of the size of each patch in order to get an idea of the areas in which white sweet clover patches were most dense and deserved prioritization.



Figure 2



Figure 3

Field team hand pulling white sweet clover in the Sand Pits (Figure 2) and Potawatomi Prairie (Figure 3)

The three most affected sites were the Sandpits, North Altman Prairie, and Potawatomi Prairie. South Altman Prairie, on the other hand, contained a few very small patches of second season white sweet clover. There was, however, some visible growth of first season white sweet clover stems along the south edges of the South Altman prairie, which is likely to be a future concern. Most white sweet clover patches contained between 100-200 individual plants. The largest patch we picked was located on the northwestern roadside of the Sand Pits and consisted of about 1016 individuals and was approximately 50 x 30 ft.



Figure 4: white sweet clover patch in Sandpits Northwestern Roadside consisting of 1016 individual plants.

Other patches throughout the Sand pits were small in size and contained few individuals.

Table 1: Sandpits White Sweet Clover Patches

Patch #	Coordinates	Size (ft)	#Individuals
1	N 42.63016 W 082.49964	2 x 3	2
2	N 42. 63012 W 082.50002	1 x 1	1
3	N 42. 63012 W 082.50002	2 x 1	5
4	N 42.62996 W 082.49995	8 x 5	17
5	N 42.62981 W 082. 50002	50 x 30	1016
6	N 42.6278 W 082.49599	25 x 8	8
7	N 42.62723 W 082.49802	6 x 5	5

Many large patches of white sweet clover occurred primarily along the southern edges of North Altman prairie as well as some large patches on the interior. Many of these patches were extremely dense with large individuals that overtook prairie plants and grass in size.

Table 2: North Altman Prairie White Sweet Clover Patches

Patch #	Coordinates	Size (ft)	#Individuals
1	N 42.54894 W 082.49591	15 x 6	353
2	N 42.59377 W 082.52696	150 x 6	155
3	N 42.59430 W 082.52563	30 x 6	97
5	N 42.59430 W 082.52563	20 x 2	36



Figure 5: white sweet clover patch at the southern edge of North Altman prairie.

Dense white sweet clover patches could be found along a trail that led south from the nearest access road to the interior of Potawatomi Prairie. White sweet clover patches had spread to the interior of the prairie but were difficult to access and remove. We focused on removing average to large-sized patches at the end of the trail within the prairie site.

Table 3: Potawatomi Praire White Sweet Clover Patches

Patch	Coordinates	Size	#Individuals
1	N 42.63512 W 082.50002	6 x 12	60
2	N 42.54897 W 082.49592	10 x 12	69



Figure 6: white sweet clover patch along trail at Potawatomi Prairie

All removed white sweet clover plants were put into plastic bags and removed from the site. They were brought back to the Heritage Centre and collected by Waste Management for disposal. Burning the plants was ruled out as an option since it is possible seeds from the plant could survive the burn, allowing the plants to continue to spread.

Project Outcomes

Approximately 2,005 white sweet clover plants were removed in total. Coordinates for each patch where we conducted white sweet clover removal were taken for future white sweet clover mapping and distribution data, which will be important for removal in the future. Because of the nature of white sweet clover, follow-up treatments would have to occur annually in order to be effective since the primary focus of the removal project was second year growth. Green, first year growth is difficult to detect among other prairie plants during the summer months. White sweet clover is easier to detect and remove in its second year once it has flowered. Continued treatment would ensure removal of these plants in their second years and prevent further spread of these patches into the interior of these prairie sites. The initiative was successful in removing significant patches of white sweet clover, reducing their impact on the growth of native plant species at these sites, and hindering the formation of white sweet clover monocultures.



Figure 7



Figure 8

White sweet clover patch at southern edge of North Altiman prairie before (Figure 7) and after (Figure 8) treatment



Figure 9



Figure 10

White sweet clover patch in the Sand pits before (Figure 9) and after (Figure 10) treatment



Figure 11



Figure 12

White sweet clover patch off the trail at Potawatomi prairie before (Figure 11) and after (Figure 12) treatment

The above photographs (Figures 9 to 12) indicate some of the most dramatic examples of white sweet clover encroachment at each of the major sites of concern and the changes they can make to the landscapes they invade. They are capable of growing much taller and more densely than many native prairie plant species. Removal and repeat treatments

on severely affected sites each year is critical to preventing white sweet clover from outcompeting native plants, either by shading, crowding them out or altering soil chemistry and to ensure first year growth and growth of seedlings can be managed, and ultimately eradicated in future years. One of the field-crew members, who was a former Bkejwanong Ecokeeper¹¹, observed a reduced number of white sweet clover patches and individuals this summer compared to past summer white sweet clover removal projects. This is a positive example for the success of long term community-led management, demonstrating the achievement of sustained initiatives throughout the years.

¹¹ The name of an organization of summer students that work for the Heritage Centre, who have focused on education and removal of invasive plant species in the past at WIFN.

Chapter 3

3 Phragmites Management and Monitoring

This chapter will discuss the *Phragmites australis* phase of the summer 2013 invasive species management project, which was conducted between August and November. I begin by offering an overview of the biology of this aggressive invasive plant species that allowed it to outcompete native plant species for resources and spread throughout the continent of North America. I focus particularly on its history in Ontario and begin to examine the measures that have been taken by the provincial government to manage Phragmites. This will offer context for the problems faced by the Walpole Island Heritage Centre in their effort to cope with and manage the problem of Phragmites. A number of social, economic and cultural factors surrounding the invasion of Phragmites and the subsequent change in landscape at WIFN add to the complexity of the issue and the particular importance of community determined aims in environmental management. I will then outline the Phragmites management and monitoring phase of our project, including the difficulties faced when funding was sought from the GLCGF for removal, and the limitations this posed on the original scope and goals of the project. Finally, I will describe the project that ultimately took place as well as its outcomes.

3.1 Phragmites: Plant Biology and History of Invasion in North America and Ontario

Phragmites australis, also known as the European “common” reed, or “quillweed” at WIFN, is an invasive perennial grass (MNR, 2011) that is capable of infiltrating a number of aquatic, semi-aquatic, and terrestrial habitats (Wilcox et al., 2003). Phragmites is highly tolerant to a wide range of environmental conditions and has become established in every continent with the exception of Antarctica (Meyerson and Mooney, 2007). Unlike native Phragmites (*Phragmites australis americanus*), this particular subspecies (*Phragmites australis australis*) was brought to North America from its native home in Eurasia. The invasion of Phragmites has been documented for approximately 100 years in North America (Bart, 2006). By the early 1900s, botanical records demonstrated Phragmites to be common and spreading along the Atlantic coast of the

southeastern United States (Saltonstall, 2001). Today, invasive *Phragmites* occurs throughout all of mainland United States and much of southern Canada (Saltonstall, 2001). The first record of invasive *Phragmites* in Canada is from Annapolis Royal in southwestern Nova Scotia from September 1910 (Catling and Mitrow, 2011).

Anthropogenic causes for the expansion of *Phragmites* have been attributed to disturbance, particularly due to large-scale development in coastal and wetland habitats (Chambers et al., 1999). The initial invasion of the non-native, Eurasian genotype of *Phragmites* was likely facilitated by international shipping and subsequent disturbance of intertidal habitats (Chambers et al., 1999). Over the course of European settlement in Canada, significant Atlantic and Pacific coastal habitats have been converted for the purposes of agricultural drainage, urban and industrial expansion, the construction of ports, roads and hydroelectric facilities and residential or recreational properties (Chambers et al., 1999). Anthropogenic nitrogen introduced to ecosystems through agricultural runoff and fossil fuel burning cause eutrophication in certain ecosystems¹² and could stimulate the growth of invasive *Phragmites* (Rickey and Anderson, 2004). A study conducted by Anett S. Trebitz and Debra L. Taylor that surveyed 58 coastal wetlands, impacted by a variety of anthropogenic factors throughout the Laurentian Great Lakes, found that wetlands in areas of great agricultural intensity had elevated nutrient levels, which appeared to create conditions that favor a number of invasive plant species including *Phragmites* (Trebitz and Taylor, 2007). While this correlation may be explained by the fact that greater agricultural intensity has historically been practiced in areas in which invasive plant species were introduced, much of this research has suggested that invasive species have tended to increase their frequency and have become more dominant in areas where intense agriculture is practiced, suggesting agriculture contributes in various ways to the problem of invasive plant species (Trebitz and Taylor, 2007). *Phragmites* have been found to respond positively to the higher nitrogen levels (Rickey and Anderson, 2004) while native plant species are greatly impacted over the long term

¹² Eutrophication is an ecosystem's response to increased levels of artificial and natural substances such as nitrates and phosphates through fertilizers or sewage into aquatic systems. This process leads to increased phytoplankton, depletion of oxygen in water, and subsequently the reduction of fish and animal populations (Crowder & Bristow, 1988).

by eutrophic conditions created by increased nitrogen levels (Crowder and Bristow, 1988). While increased nitrogen levels may initially appear to increase growth and productivity of native floating leaved and emergent plants, over time increased planktonic algae shade out these plant species, allowing reeds such as invasive Phragmites to dominate (Crowder and Bristow, 1988). Another suggestion is that agriculture has an effect on the abundance and species composition of arbuscular mycorrhizal fungi (AMF)¹³ that inhabit soil and help maintain plant health and biodiversity (Stover et al., 2012). This fungi is directly impacted through agricultural practices such as the use of fungicides and fertilizers that increase phosphorous levels and reduce AMF populations (Stover et al., 2012). The disruption of AMF is then capable of making ecosystems vulnerable to invasions through an impact on biodiversity and native plant health (Stover et al., 2012).

Invasive Phragmites is considered the “worst” invasive plant species by Agriculture and Agri-food Canada (MNR, 2011). The plant spreads via the dispersal of seeds and rhizome fragments that are distributed by wind, water and human activity (Meyerson and Mooney, 2007). Invasive Phragmites forms a dense network of stems, with as many as 200 stems per square metre (MNR, 2011) that can grow up to 6m high and emerges from an underground network of rhizomes, which can reach a depth of 2m and constitutes two thirds of the plant’s biomass (Lambert et al., 2010). Once it has infiltrated preferred ecosystems, Phragmites is capable of outcompeting native plant communities and forming tall grass monocultures (Lambert et al., 2010).

¹³ AMF supply host plants with nutrients in exchange for photosynthate carbon. They help protect plants from a variety of detriments including water stress, pathogens, and toxic stresses (Stover et al., 2012)



Figure 13: Fieldwork in South Altman Prairie heading towards a large Phragmites monoculture.

This can have drastic impacts on a number of native animal species that rely on native plant communities and plant biodiversity (Lambert et al., 2010) as Phragmites provide poor habitat for wildlife and are not a food source (MNR, 2011). Phragmites grow very quickly, can cause water levels to drop in marshes, and pose a higher risk for fire due to a high percentage of dead stalk (MNR, 2011). Control methods for invasive Phragmites include herbicide treatment, cutting and removing biomass, and prescribed burning, all of which require repetition over the course of many growing seasons in order to effectively suppress growth and offer a greater chance for eradication (Lambert et al., 2010). While restoration of a marsh following Phragmites treatment is possible, restoring the previous condition of the marsh goes beyond revegetation; other factors such as the restoration of sediment characteristics can delay the transition of marshes from Phragmites monocultures to previous conditions (Teal and Peterson, 2005).

The presence of invasive Phragmites in Ontario was first observed in 1916 along the St. Lawrence River (Gilbert et al., 2014). It did not, however, begin to extensively

colonize areas throughout southern Ontario until after 1970 (Catling and Mitrow, 2011). After this time, it took only two decades to become abundant throughout the province, likely due to development and larger road networks (Catling and Mitrow, 2011). The plant, like other invasive species, was likely introduced to Ontario in discarded ballast water from cargo ships and imported goods brought to Canada from various parts of the world (MNR, 2011). *Phragmites* populations have dramatically increased and expanded throughout many lower Great Lakes coastal wetlands in Ontario, disrupting their ecological integrity, and severely degrading their biodiversity (Wilcox et al., 2003). Many of these areas have been compromised by drainage, degradation, and the introduction of other invasive plant and animal species (Wilcox et al., 2003), particularly from shipping activities, conversion of land for agricultural use, shoreline development, and urbanization. These large-scale disturbances have created favourable conditions for the spread and establishment of monospecific stands of *Phragmites*, particularly in wetlands, threatening food resources and habitat for native plants and wildlife, including a number of rare species (Wilcox et al., 2003). Today, *Phragmites* is widespread across southern Ontario and populations are continuing to spread rapidly (MNR, 2011). In Ontario, provincial government policies and literature have addressed the problem of *Phragmites* by developing ‘best management practices’ aimed to educate the general public and teach landholders and municipalities how to cope with the problem. Like white sweet clover, *Phragmites* is not listed on Ontario’s ‘noxious weed’ list and is therefore not technically provincially regulated. The problem of *Phragmites* is exacerbated by this lack of regulation. Some garden centres, for instance, legally carry and sell *Phragmites* as an ornamental plant throughout the province (MNR, 2011).

3.2 Invasive *Phragmites* at WIFN

Invasive *Phragmites* has been detrimental to various habitats at WIFN, particularly in wetlands. It was first observed at the island in 1948 (Gilbert et al., 2014). Since this time, *Phragmites* has spread rapidly. The infiltration of *Phragmites* into these crucial environments has caused vegetational change that has affected important plant species and animals such as waterfowl, that rely on native plant species for food and nesting cover (Arzende & Wang, 2003). *Phragmites* does not act as a food source for

native wildlife and is capable of crowding out cattails (*Typha angustifolia*), which poses a large threat to waterfowl habitat at WIFN (Arzende & Wang, 2003). Many plant species are at risk in WIFN ecosystems due to the invasion of Phragmites as it outcompetes and crowds out native vegetation. Culturally important plants such as sweetgrass, medicinal plants, and rare species such as tall bluestem (*Andropogon gerardii*), small white lady's slippers (*Cypripedium candidum*), skimmers agalinis (*Agalinis skinneriana*), snowy goldenrod (*Solidago speciosa* var. *rigidiuscula*) dense blazingstar (*Liatris spicata*) that are indicative of prairie ecosystem health are thus at risk of being crowded out by Phragmites (Nin-da-Waab-jig, 2006). Industrial farming operations in the region surrounding WIFN are major contributors to agricultural runoff containing organic and inorganic compounds that enter important marsh ecosystems around the island (Crowder and Bristow, 1988). Furthermore Tahgahoning Enterprise, has contributed considerably to agricultural runoff in surrounding wetlands (Jacobs and Sands, 2012). Increased levels of artificial and natural substances such as nitrates and phosphates are introduced through fertilizers or sewage into aquatic systems that leads to vegetation change (Crowder and Bristow, 1988). The increase of planktonic algae results in the shading and subsequent killing of submerged weedbeds used for nesting by migratory birds (Crowder and Bristow, 1988). One consultant for a past research study expressed the consequences of this process:

It's not only the factory chemicals. Look at all the chemicals used by farms. They use pesticides and fertilizers and they drain into ditches and leach into the ground water. That stuff is poisoning us too. I don't know what our farm uses, if they still use the old, dangerous chemicals. But we lease out parts of our land to non-Natives who grow all sorts of stuff, like soya and vegetables. Who knows what they're using and I don't think anyone's monitoring their farming practices. So, we have hazards inside and outside of the community (Stephens, 2009: 112).

The eutrophic conditions that have resulted have likely aided the rapid spread and establishment of Phragmites in many marsh ecosystems throughout WIFN, posing major threats to waterfowl and other marsh-dwelling species that have been both culturally and economically important (Crowder and Bristow, 1988). Furthermore, herbicides and

pesticides destroy streamside buffers of native trees and shrubs that helped to prevent agricultural runoff from entering wetland areas (United States Fish and Wildlife Service [FWS], n.d). These activities reduce water quality and encourage the ability of *Phragmites* to take hold (FWS, n.d). Hunters have noted the detrimental effects of *Phragmites* and the damaging impacts it has had on the hunting industry that once was a great source of income and economic prosperity at WIFN.

The phragmites (quillweeds) that have overrun the native plants have really affected the muskrat population. Muskrats depend on the roots of the cattails that are overrun by these quillweeds. So if there are no cattails, they have no food or shelter and this affects their numbers (Stephens, 2009: 127).

As previously discussed, Walpole Island's local economy has primarily consisted of industries such as hunting, fishing, trapping, recreation and tourism (Jacobs, 1992). These multi-million dollar industries, alongside activities that have allowed many families at Walpole Island to live off the land such as hunting, fishing, trapping, and guiding, have allowed the community to thrive and have been central to their "economic base and cultural integrity" (Jacobs, 1992:1). Since the 1970s, these industries at Walpole Island have suffered major losses due to the invasion of *Phragmites*. Traditionally, Walpole Island has offered many nesting habitats for waterfowl. *Phragmites* stands crowd out wildlife and make it impossible for waterfowl to nest. Furthermore, sites that once contributed to revenue from tourism are in need of restoration to maintain these industries. Hunting activities, both a traditionally and economically important source of food and income, have been severely impacted due to decline in wildlife populations such as duck and muskrat, as well as a transformation in the landscape. As described by one hunter at Walpole Island:

The phragmites has totally changed the landscape. Before, you used to be able to see clear across the marshes. It was an open view. You could see the cattails and the ducks and everything, crystal clear...just beautiful. Now this weed has cropped up. It's taken over the cattails, it's real thick, you can't walk through it, and it obstructs the view." (Stephens, 2009:129).

Income from the lease of the hunt club at WIFN, hunting permits, and jobs for local hunters as guides for outsiders have all suffered major losses because of this changing landscape. In addition to the game license issued by the province of Ontario and a Migratory Waterfowl permit, Walpole Island also issues its own hunting license, which is required for all non-Band members to obtain before hunting on the island (Elliot and Mulamoottil, 1991). Alternatively, non-Band members may purchase membership to the hunt club on the island (Elliot and Mulamoottil, 1991). Furthermore, each non-Band hunter must be accompanied by a guide; hence at peaks points in ecotourism to Walpole Island, many well-paying jobs were available to local hunters (Elliot and Mulamoottil, 1991). Residents were also employed to pluck and clean ducks for non-Band hunters (Elliot and Mulamoottil, 1991). The decline in these industries and the income they brought to the island cannot be compensated by agricultural activities such as those conducted on Tahgahoning since costs associated with agricultural activities are much greater in the long term (Elliot and Mulamoottil, 1991). Landholders have avoided the conversion of important prairie sites into agriculture because hunting and trapping continue to be both an important source of income and sustenance. Walpole Island Heritage Centre naturalist Clint Jacobs described an example from his discussions with landholders: while trying to secure a conservational lease for one of Walpole Island's prairies, he asked one of the landholders why the prairie had not been converted for agricultural use. The landholder described that the diversity of plants attracts deer and rabbits for hunting and that the prairie was used by many for sweetgrass and medicinal plants.

Fire and the use of traditional burning may be impacted by the invasion of Phragmites at WIFN. Because Phragmites increases the risk of fires, making them stronger and more widespread, traditional burning practices that have sustained ecosystems on the island for thousands of years, have become a topic of serious discussion. There is a fear that regular burning might be contributing to the spread of, and resiliency of, Phragmites on the island. Burning has occurred at WIFN since pre-European settlement and has been critical to the community and landscape (Hull and Williams, 1992). This practice has maintained the landscape for farming and hunting activities as well as enhanced wildlife habitats by keeping marshlands open and free of dense undergrowth (Hull and Williams,

1992) and maintaining prairie environments critical to important native plant species that rely on open conditions (Wake, 1993). A number of important and rare prairie plant species rely on burning practices for germination. Pink Milwort (*Polygala incarnate*) and White Prairie Gentian (*Gentiana alba*) are both negatively affected by the suppression of fire in their habitats (Nin-da-Waab-Jib, 2006). Burns are carried out by community members on the island, and are considered a “part of the way of life for the community and an activity that plays a vital role in sustaining many of the plants used in traditional medicines and in traditional crafts and ceremonies” (Hull and Williams, 1992: 39). This practice has already been under scrutiny by community members because of the invasion of Phragmites and the potential impact fire has on its spread. Nevertheless, burning is still regarded as an important practice and is still carried out each fall and spring. The awareness that burning practices might help facilitate the spread of Phragmites, however, may have implications yet to be realized on a practice that has been so vital to the community and ecosystem at Walpole Island.

Memories shared by residents on the island indicated a substantial acceleration of the invasion of Phragmites in the last 20-30 years. Many blame the growth of urban areas and shipping that brought the plant to the island in the first place, and remember the landscape before Phragmites, as well as the consequential changes to the landscape since its invasion. During fieldwork, one landholder discussed witnessing this change in the landscape and pointed to roadsides and areas around septic tanks where dirt removal and use for burial likely contributed to the spread of Phragmites rhizomes and pollen. In a community meeting held at the Walpole Island Community Centre on August 15th 2013, attendees remarked on this considerable change in the landscape. Many in attendance remember first-hand the land before the invasion of Phragmites and were remorseful for the loss of bulrushes in marshlands and wildlife such as frogs and loons. One attendee discussed the wetlands and how they “used to trap in there. But now the Phragmites is so dense that you can’t hunt. You don’t hear any of the birds, and turtles have difficulty walking through the Phragmites. You see a lot more of them on the roads now, and they are in danger of being run over” (Consultant 1, August 15 2013). There was considerable anxiety expressed about how the issue of Phragmites might be handled. A sense of urgency was articulated among community members, emphasizing the need to take action

and find strategies to mitigate the Phragmites problem through the use of tried and true strategies that have been implemented in similarly affected areas throughout the Great Lakes region, or perhaps find ways to make Phragmites economically viable and marketable to compensate the community for the impact they have experienced over the last few decades. Community views on Phragmites were also gathered by the Heritage Centre in 2007 through focus groups and individual interviews. Comments from the community suggested that Phragmites had taken hold on the island and rapidly spread over the last 30-40 years, indicating the seaway and roadside ditches as the most likely method for their spread. Similar to the opinions articulated in the community meeting held in August of 2013, views expressed in this study suggested that people grapple between accepting the invasion, suggesting it may be too late or there might not be a safe way to get rid of it. One comment stated the need to “Put people to work to get rid of it. Make a job out of it” (Walpole Island Heritage Centre [WIHC], 2007). Because the problem of Phragmites at WIFN is so extensive, there is a great sense of urgency to take measures to eradicate the plant. There is also fear that the cost required for the procedures necessary to deal with Phragmites may be too much. Thus the anxiety about how to cope with the changing landscape has led to a variety of perspectives. As one community member at the 2013 meeting expressed, it seems as though “everything stimulates the growth [of Phragmites]. But if you leave it alone, it will keep choking out native plants” (Consultant 2, August 15, 2013). Many felt that continuing to take action was critical no matter the scale of the initiative. “Anything you do will weaken the plant. Phragmites especially because it is all connected [through networks of underground rhizomes]” (Consultant 2, August 15 2013). In other words, a number of attendees feared that if nothing is done, Phragmites will take over the island and the entire Great Lakes region. Attitudes on chemical solutions such as the use of herbicides have not been entirely ruled out by the general stance of ‘zero tolerance’ for pollutants, although this stance is often negotiated in discussions within the community and is approached with caution. One consultant in the community meeting we held suggested the Heritage Centre investigate instances where herbicides were successful in dense Phragmites patches throughout Michigan, whereas another comment given in the Heritage Centre’s study in 2007 suggested “I don’t think we should use poison, we are trying to stay away from that stuff

around here. It literally took over the whole island. If they could find some kind of chemical that wouldn't destroy or hurt the habitat here, sure I would go for that" (WIHC, 2007). While some remained against the use of chemicals, some attitudes of openness towards herbicide application were expressed as long as herbicide use could be demonstrated as safe and capable efficiently eradicating Phragmites, thereby causing more good than harm. The discussion on coping with this change in the landscape brought up the concern of how Phragmites might be dealt with in the long run. As one attendee noted, for the younger generations "all they've ever known is Phragmites. So do we have to come to the realization that this is the natural succession? Who are we to decide and act as creator?" (Consultant 4, August 15 2013). These views that suggest the need to accept change and anxiety in the community over coping with environmental change could perhaps be characterized by "pragmatic acceptance", or the notion that people now must learn to 'survive' these challenges, "but with psychosocial consequences reflecting deep-seated anxieties" (Luginaah et al., 2010: 355). Whether the changes to the environment are coped with or not, collective experiences from the loss of certain lifeways would continue to be damaging.

3.3 Project Funding Process and Restrictions

In the initial application to the GLGCF, the Heritage Centre proposed a project that involved Phragmites removal by community members in wetland, marsh and prairie ecosystems. During these early stages of the application process for project funding, Phragmites removal was ruled out immediately by the GLGCF as an acceptable project aim. James Jenkins expressed that this was likely because Phragmites treatment and removal is often beyond the scope of acceptable community led project designs from various funding sources as progress is slower and results cannot be seen for many years. Removal of other species, such as white sweet clover, garlic mustard, and purple loostestribe tend to be an easier "sell" to government funding sources such as the MOE because progress can be made over a much shorter period of time and short-term success

can be observable. A report from the Port Franks Community Control Project¹⁴ indicated similar difficulties in acquiring funding for Phragmites removal. They were only successful in their aims because they had already managed to complete herbicide applications with the help of the Municipality, Conservation Authority, Nature Conservancy of Canada and land-owners (Vilder, n.d). The report indicated that a “lack of funding for projects such as ours has presented a huge challenge” (Vilder, n.d). They were unable to acquire funding through the MNR or Federal Government, and though the GLGCF is an accessible funding source for community led projects, standards for project scope and acceptable project design proved limiting both in Port Franks (Vilder, n.d) and WIFN for similar projects and community determined aims. It was suggested by the GLGCF that the Phragmites management project at WIFN focus on monitoring as opposed to removal.

Dr. Leonardo Cabrera from Parks Canada was brought in to help conduct and lead monitoring of Phragmites with our small field team. The experience he brought from past work in Phragmites monitoring at Point Pelee Provincial Park near Windsor, Ontario offered insight into developing a protocol for Phragmites monitoring at WIFN. Furthermore, his emphasis on baseline monitoring with a long-term vision aligned with Heritage Centre goals for developing long-term strategies for Phragmites removal. Cabrera had already been involved with Clint Jacobs on a project involving community fear of increased risk of fires due to Phragmites invasion at WIFN. On June 28th 2013, he met with the Heritage Centre staff to discuss aims for the Phragmites phase of the invasive species project and determined to conduct an initial survey that would indicate the most critical areas, as well as establish a realistic timeline and prioritize sites for monitoring. This initial survey included trips to the Sand Pits, North Altman Prairie, South Altman Prairie and Potawatomi Prairie where Phragmites invasion was

¹⁴ Port Franks Community Phragmites Control Project was a project conducted in the summer of 2013 that was also funded by the GLGCF. It applied direct management techniques of herbicide spraying and burning to 33 hectares of Lake Huron coastal wetlands and dunes for Phragmites eradication and control in the community of Port Franks (Vilder, n.d).

significant. Due to time constraints and field team size, it was determined that the best course of action would be to focus on and prioritize prairie sites for restoration. Thus, the Phragmites monitoring project became an initiative to develop a protocol that would “evaluate the current distribution, growing condition, and wildlife use of *Phragmites australis*” at WIFN’s most important prairie sites” (Cabrera and Jenkins, 2013). The project would provide a baseline for future monitoring of Phragmites and its impact on native biodiversity in these prairie sites. This would in turn allow the Heritage Centre to “prioritize areas for Phragmites control and prairie restoration” (Cabrera and Jenkins, 2013). The prairie sites we managed to evaluate over the course of the Phragmites phase were North Altman Prairie, South Altman Prairie, Potawatomi Prairie, Triangle Prairie and the Sand Pits. Other projects led by the Heritage Centre over the course of the summer 2013 field season include a project led by Clint Jacobs involving herbicide application to Phragmites patches,¹⁵ hence this particular project sought to focus on and contribute to the particular issue of increased Phragmites invasion in WIFN prairies.

3.4 Phragmites Project Fieldwork and Outcomes

Fieldwork for the Phragmites phase of the invasive species project began in August of the 2013 field season conducted primarily by Dr. Cabrera and one other field crew member. A combination of assessment tools was used to locate, measure, mark, map, record Phragmites patches and collect samples of plant species found in association with these patches (Cabrera and Jenkins, 2013). A walkthrough of each field site was used to locate significant patches of Phragmites and determine particular routes that would be used to travel through these prairie sites in order to minimize disturbance (Cabrera and Jenkins, 2013).

¹⁵ Clint Jacobs acquired funding from the Habitat Stewardship Fund to conduct an herbicide application project on a number of Phragmites patches during the summer of 2013.

recorded for each patch. Below is a map of the sampling units evaluated throughout the course of the project:



Figure 16: Map of Sampling Units at each Prairie Site of focus during the Phragmites phase of the invasive species project.

Outcomes

In the preliminary findings, it was determined that all prairies significant to the project at WIFN demonstrated the presence of Phragmites, some more so than others (Cabrera and Jenkins, 2013). Furthermore, there are considerably less native prairie plants in areas experiencing more Phragmites invasion (Cabrera and Jenkins, 2013). This project ultimately allowed for the development of a monitoring protocol that can be employed for future assessments and fieldwork at WIFN and would prioritize sites for

restoration and guide decision-making (Cabrera and Jenkins, 2013). Future management directions could also be applied to selected prairie patches that were recorded over the course of the 2013 field season (Cabrera and Jenkins, 2013) in hopes that these patches may eventually be eradicated, preventing further invasion into these prairie sites. Data collected from the Phragmites phase of the field season is in the process of being analyzed by Dr. Cabrera for the production of a baseline report on the condition of Phragmites in these prairie sites.

Chapter 4

4 Environmental Management and Co-governance

This chapter will contribute a theoretical discussion of the colonial processes at work in environmental co-governance that have contributed to the difficulties of invasive species management at WIFN. I will begin by offering a discussion on the colonial process of standard making practices that attempt to ‘standardize’ environmental management and restoration, creating uniformities and universals in management strategies and environmental solutions. This discussion contributes to the discourse on “Articulating Standards: Translating the Practices of Standardizing Health Technologies” led by Dr. Janice Graham and Dr. Regna Darnell. This interdisciplinary project investigates “how different types of engagement affect knowledge translation when stakeholders come together to create and negotiate standards” (Graham and Darnell, et al.). I demonstrate that dominant standard making practices are problematic to recognizing the complexities in issues related to environmental degradation brought about by invasive plant species and the unequal, adverse effects they have on First Nations. Standards that preset goals for environmental restoration in the dominant discourse can act as an oppressive force and perpetuate colonial relationships with First Nations. I consider the flaws in policy making and the formation of ‘best management’ strategies as well as the current condition of collaborative processes that do not guarantee inclusion of First Nation perspectives. Furthermore, I advocate that colonial processes, which brought invasive species to North America and subsequently served to hinder their management, fail to be recognized by dominant forms of governance. I will demonstrate how this lack of acknowledgement has created colonial conditions in invasive species management and contention in decision-making processes between First Nations and provincial government agencies. These colonial processes affected the Heritage Centre’s summer of 2013 invasive species management project, presenting a need to advocate for a more effective model of co-governance that would better serve the mutual interests of First Nations and non-Aboriginals and create a more equitable platform for environmental decision making.

4.1 The Current State of Environmental Governance: Standard Making Practices and the Privileged Vantage Point of Western Scientific Knowledge

Standard Making Practices and the Interaction of Knowledge Systems

I gave a general definition and discussion on the concept of “Standard Making” and will now begin to tie this concept to the theoretical context and discourse so as to demonstrate its role in hegemonic structures of power and governance. Research in the “Articulating Standards” project, as it relates to Walpole Island, has examined collaborative efforts as well as “community responses to externally imposed standards in health and environment” (Graham and Darnell, et al., 2011-2015) This research has become critical to developing models for consultation in standard negotiations with First Nations. While these negotiations are mandated by provincial and federal law, this does not guarantee meaningful communication, based on mutual respect and benefit, will occur (Graham and Darnell, et al., 2011-2015). Dominant structures that grant privilege to certain standards and forms of knowledge serve hegemonic forms of governance and the maintenance of power.

Neo-liberal reform and ideals in Canada and Ontario have been justified by the conviction that liberating individual choice and entrepreneurial freedoms is critical to human wellbeing and prosperity (Mascarenhas, 2007). Neoliberalism has also worked to marginalize local expertise in order to protect the dominant discourse and keep environmental resources under the control of colonial organizational structures and private interest (Mascarenhas, 2007). Similarly, governmentality has been a tradition in the West that has made it possible for government to continually define what is “within the competence of the state and what is not, the public versus the private, and so on” (Foucault, 1978: 245). The dominant discourse on environmental hazards has been traditionally Eurocentric and based in western scientific models and ways of knowing (Beckford et al., 2010). Environmental risk assessment methods that analyze the gravity and repercussions of industrial impacts on the environment fail to holistically incorporate detriments to social, cultural wellbeing, and spiritual values and focus primarily on the biologic, chemical and physical data (Arquette et al., 2002). These assessments are

routinely conducted by government agencies or contractors in order to collect data that will form the foundation for environmental decision making on standards for environmental and human health (Arquette et al., 2002). Neoliberal notions of progress tend to involve simplifying processes, which will be further discussed, in order to solve challenges presented by complexities and pluralities in perspectives on environmental problems (Parkins, 2006). Investment for development and progress in fields of scientific rationality thus tend to outweigh efforts put towards engaging with these complexities and multiplicities in 'lay' opinions (Parkins, 2006). Stakeholders have traditionally been incorporated into environmental management processes via consultation rather than participatory means; "rather than sharing decision-making power with affected and effecting interests, governments have tended to involve the opinions of citizens through public surveys and meetings" where those in charge are able to fulfill their commitment consult the public, whether or not their responses are put into practice (Shrubsole, 2004: 8). In Canada, this involvement has typically been limited at best to the assessment process, which is often conducted after the biggest decisions have already been made (Shrubsole, 2004: 8). First Nations are often systematically excluded from decision-making processes in this way.

Individuals within communities such as WIFN have offered detailed oral testimony and narratives on the wide range of effects of environmental degradation, but these testimonies are often dismissed or looked upon as anecdotes since 'stories' by the Western sense of the word, are seen as having little relevance to scientific data (Arquette et al., 2002). This dismissal not only neglects the rights of First Nations to participate in discussions about their land, resources and wellbeing, it also ignores and belittles stewardship and environmental management practices that have been integral to WIFN. As Dean Jacobs describes:

I resent very much when outsiders tell us we now have an obligation to preserve these plants for the benefit of human kind. This kind of attitude ignores our contribution and traditional management legacy. At its worst it is racism. It implies that underdeveloped native communities, those who can least afford it, must bear the burden of previous uncontrolled and unsound development. (Jacobs, 1992:2).

Dean Jacobs described in a presentation given on Walpole Island's conservation approaches how he has often been offended by tourists to Walpole Island who insisted that WIFN must protect their rare habitats and species while neglecting to note that conservation is already practiced in their stewardship traditions and ways of life (Jacobs, 2008). He remarked "I felt we were conserving our land, but not in the sense the tourists were used to – such as nature reserves, provincial parks, national wildlife areas, etc. that restrict access and activities" (Jacobs, 2008: 3). First Nation communities are routinely denied meaningful participation in decision making that affect their rights, lands and resources, as well as lifeways that have traditionally maintained the integrity of the land (Arquette et al., 2002). Financial resources for First Nations to address environmental concerns are limited due to inequitable practices of granting these funds (Arquette et al., 2002). While on the surface, many agree that sociocultural impacts should be considered in environmental research and decision-making, frameworks remain flawed and narratives of these impacts are perceived mainly as values or social contexts for traditional environmental assessments (Arquette et al., 2002: 261).

Outside government and funding agencies underestimate the integral value of community-based management at WIFN. It is commonplace for individuals to conserve and maintain the integrity of landholdings for their own, cultural reasons (Jacobs, 2008). Often, landholders we spoke to during fieldwork guided us and described where invasive plant species had cropped up on their land, that they regularly managed themselves. One of the fieldworkers told me they frequently saw community members on band land removing invasive plants and that this summer, on one of their trips to the Sand Pits, they encountered someone also picking white sweet clover. Everyday practices and interactions with the land contribute to its conservation in ways inherently different from non-Aboriginal practices of conservation. These approaches are regularly misunderstood and disregarded in mainstream, or government-run environmental initiatives, making it difficult for First Nations to offer perspectives on community-based environmental management.

Government initiatives seldom involve First Nations in the early conception and planning stages of the project (Dalton, 2010). While input from First Nations is often

mandated, TEK and indigenous ways of knowing are approached with caution, and measured against scientific findings (Dalton, 2010). Only the experiential narratives that accord with these findings are considered for incorporation into government discourse, while contradictions are dismissed as ‘interpretive mistakes’ insufficient for explaining environmental detriments (Dalton, 2010). Science is a process of accumulating information, assembling observations, classifications, and measurements into an investigation where they act as ‘evaluative witnesses’ (Verran, 2002) and must recognize the situatedness of their perspective. Though government agencies attempt to work and collaborate with First Nations and local knowledge, there is still a remarkable misunderstanding among practitioners of western science about how to responsibly work with TEK without perpetuating colonial relations. A numbers of barriers have served to maintain the imbalance and inequalities between TEK and western scientific knowledge in cases of collaboration. These include communication barriers, such as language and forms of expression that seem foreign to westerners (Ellis, 2005). Other barriers include conceptual barriers in which Euro-centric organizations or representatives may not attempt to understand the values, practices, and specific contexts that add to the complexity of First Nation perspectives (Ellis, 2005). Finally, political barriers may result from an unwillingness to acknowledge TEK that conflicts with the agendas of government or industry (Ellis, 2005). Because community values are not necessarily tangible or quantifiable, they are often disregarded in favor of scientific modeling (Corburn, 2002). Qualitative research involving social processes is seen as a separate stream of study altogether, leaving no room for environmental data to be connected to social understandings, knowledge and perspectives (Jassen et al., 2006).

TEK poses a great challenge when methods of collaboration are considered because of intellectual property rights that protect TEK (Siebenhüner et al., 2005) and may prevent western-defined processes of ‘gathering’ information. The right of communities to protect certain knowledge from outside researchers must be understood as a result of a long, colonial history of researchers harvesting TEK for their own benefit. The advantages from the protection of knowledge include preventing the misappropriation of knowledge by unauthorized, outsider groups, especially when this is done without prior informed consent (Sarma and Barpujari, 2012). Furthermore, the

protection of knowledge forces outsiders to recognize local knowledge and TEK as the ‘property’ of its creators “just as knowledge created in the laboratories is acknowledged as the property of the innovators” (Sarma and Barpujari, 2012: 2). Postcolonial theory dictates the need to recognize the inherent differences in perspectives and worldviews. Euro-centric collaborative efforts have typically involved the mining of TEK for evidence that supports western scientific claims (Verran, 2002). Effective collaboration and the recognition of difference within this process is only achievable through an “opening up and loosening...increasing possibilities for cooperation while respecting differences” in ways that may make “amends for past injustice” (Verran, 2002: 730). Finding common ground does not involve universalizing and making important only that which is commonly agreed upon across knowledge systems; it is about enabling “difference to be collectively enacted” (Verran, 2002: 730) creating a post-colonial space in which difference is regarded as mutually beneficial and critical to achieving goals that are defined by both parties and valued equally. Collaboration does not involve the homogenization of discourses; instead, it serves to elevate perspectives in an equitable forum of discussion among agents interested in promoting new understandings. These spaces or “cultural edges” can thus be imagined as liminal spaces between difference in which interaction between social groups promotes “exchange of knowledge, technologies, and resources in such a way so as to increase the adaptive repertoire available to any one local group” (Turner et al., 2011: 456). Since we must now understand collaboration to be a process in which differences are acknowledged and respected, the right of communities to maintain the privacy of culturally important information must also be recognized and upheld, not seen as a barrier preventing Western conceptions of collaboration. An example where collaboration failed to grant equal weight to TEK was a study conducted on James Bay Cree traditional knowledge of the sharp-tailed grouse (Tsuji, 1996). In an effort to add local knowledge to species databases so as to aid in resource co-management, the author proclaimed that “if co-management is to work effectively, it must be shown that traditional ecological knowledge has “scientific” merit, being in some sense “factual” rather than just anecdotal”(Tsuji, 1996:68). In other words, any information presented by James Bay Cree Elders was only valid as long as it matched scientifically known ‘facts’ about the

species of grouse relating to habitat, morphology, diet, and more (Tsuji, 1996). During the interview process, statements made by Elders that matched the ‘facts’ the interviewer came equipped with were incorporated into the data collection process, while any information that strayed from what the research group believed to be the ‘correct answer’ was dismissed as “interpretive mistakes” rather than investigated for their enriching or perhaps enlightening qualities (Tsuji, 1996). Shelving social interpretations and ‘anecdotal’ (Tsuji, 1996) information is a fatal flaw and an unsustainable practice among many resource co-management initiatives.

Nicholas J. Reo (2011) offers a way TEK can be understood by outside collaborators. Aboriginal hunters require a specific knowledge of animals, their populations, habitats and weaknesses in order to be aware of their migration patterns, preferred habitat, and any indicators of changes to habitat use patterns and population levels (i.e. indications of decline) (Reo, 2011: 1). This knowledge is gained experientially, by spending time on the land, and inter-generationally through teachings that form TEK (Reo, 2011). Furthermore, TEK involves the interaction of a number forms of knowledge including “deep content expertise, local field knowledge, knowledge of spiritual traditions, and ethical knowledge” (Reo, 2011: 1), hence the experiential knowledge of hunters is not purely practical, but includes embodied spiritual understandings as well (Reo, 2011). For instance, the understanding that prey animals only “willingly give themselves up to respectful hunters” is pervasive in hunting-related decisions based on traditional values (Reo, 2011:1). In a similar situation I experienced in the field, Clint Jacobs ascribed successful fieldwork locating prairie plants to be harvested for sampling to demonstrations of respect such as the laying of tobacco and greeting the first plant of the species he was trying to find. He described an instance where he had forgotten his tobacco while the other fieldworker had brought hers, and over the course of the day, she encountered over 100 rare species while Clint only found 20. Cultural traditions and respect are critical and inextricably tied to practices on and knowledge of the land. Non-aboriginal researchers, policy makers and resource managers tend to disregard the integratedness of TEK since western science has prided itself on the pursuit and accomplishment of ‘secularism’, though practitioners of western science often overlook the social values and moral judgments that underlie scientific management

techniques and policy decisions (Reo, 2011). Thus, it is common for outside researchers partnering with TEK to want to harvest ‘data’ from TEK while ignoring traditional values and the relationships between people and the land (Reo, 2011). Successful collaborations understand TEK holistically and would “include explorations into the ways that worldviews inform natural resource values, which in turn inform moral judgments important to decision-making and resource prioritization” (Reo, 2011: 2). Collaborative partnerships are often difficult to put into practice given a history of colonial power relations between First Nations and dominant forms of governance such as the provincial and federal government. Gathering of information in joint initiatives between dominant forms of governance and First Nations is an inherently political process (Bruhn, 2014). First Nations have been treated as objects and in ways that have “disempowered, misrepresented, and even brought physical harm to them” (Bruhn, 2014: 12). Interest in indigenous knowledge has often created relationships that are not equitable or beneficial to the community (Brascoupe et al., 2001). It must be recognized in the formation of any partnership or collaborative process that if First Nation communities decide to share knowledge with outsiders, it must be done in a way that respects and is consistent with their traditions, social values, and ensures community participation (Brascoupe et al., 2001). In practice, these approaches ensure First Nation self-determination, enacting Indigenous ethical frameworks and protecting their decision to engage with certain research (Boulton and Ahuriri-Driscoll, 2014).

Governmentality and Politics of Knowledge

“Governmentality” refers to the “ensemble formed by institutions, procedures, analyses, and reflections, the calculations and tactics” that allow dominant, hegemonic governments to exercise and secure power over others (Foucault, 1978: 244). Governmentality evolved as the state became centralized and acquired more administrative powers (Foucault, 1978: 245) leading to the politicization of knowledge systems. Much of the attitude behind the exclusionary practices of disregarding First Nation input comes from the attitude that western scientific knowledge is not only paramount, but it is ‘factual’; hence any knowledge systems not in line with these set of ‘factual’ statements that form western scientific discourse are inherently untrue and can

be disregarded. Foucault argues that “the history of the sciences is not the history of the true...it cannot hope to recount the gradual discovery of truth that has always been inscribed in things or in the intellect” (Florence, 2003:11). Instead, the history of science contains a number of ‘truthful discourses’, that self-developed truth by re-envisioning and erasing content over time (Florence, 2003:11). The eighteenth century European “Enlightenment” period not only saw the development of western scientific knowledge, but also the politicization of ‘reason’ and the concept of reason to exert power through ‘knowledge’ (Foucault, 1979:180) Reason, when applied to knowledge and exercised by the state or in governance is considered ‘rational knowledge’ (Foucault, 1979:193). Control over what was and was not ‘rational knowledge’ perpetuated the idea of ‘rational government’, granting dominant forms of governance the ability “to increase the state’s strength in accordance with itself” (195). As the dominant form of knowledge in mainstream society, western sciences have maintained a “privileged vantage point” through their separation and they currently cannot fathom incorporating entire networks of thought into their studies (Latour, 2003). Scientific disciplines are separated and categorized for the sake of simplicity and maintaining “expertism” and an ownership of each discipline. Separation of humans from plants, animals, chemicals, disease, technology etc... is a false representation of the constant interaction that has occurred in a network of all these ‘actors’ throughout time (Latour , 1990). The idea of a network disrupts binaries traditionally used to organize discursive units of information that can be easily managed and governed (Latour, 1990). Bruno Latour and Catherine Porter address the notion of ‘modernity’ as part of their argument for ANT, expressing that we have ‘never been modern’ (Latour and Porter, 2003). The ‘modern’ idea that we have separated social and non-social elements and have become ‘disentangled’ is nothing more than a ‘modernist dream’ (Latour and Porter, 2003). They argue that entanglement and networks have always been a reality, hence we have never been ‘modern’ and modernity has always been nothing more than an interpretation (Latour and Porter, 2003). This European thought was derived from notions of categories and innovations in science from the Enlightenment period, where the “Great Divide” sought to differentiate nature from culture and make constructed categories and organization of thought into ‘common sense’ (Cruikshank, 2005). As Foucault indicated in his work *Omes Et Singulatim*:

Toward a Critique of Political Reason, “rationalism” plays a central role in governments’ claim to power (Foucault, 1979) and is discussed as a basis for policy making when faced with the dilemma of coping with groups claiming their own reasoning and rationale (Pal, 2014: 18). Hence dominant forms of knowledge marginalize all “other” forms of knowledge when resorting to rationalism, so as to make decision-making processes more efficient. The system of “rationalism”, derived from Western forms of knowing, is often employed in dominant forms of decision making, also known as the “rational decision-making paradigm” that employs types of reasoning such as ‘normative, legal, logical, or empirical’ (Pal, 2014: 19). The tendency towards the ‘rational’ models for decision-making has to do often with ‘efficiency’ (Pal, 2014: 21). “Common sense solutions” are often favoured by dominant forms of governance because they imply “simple understandings of the world” and employ the concept of “parsimony” in instances where two explanations are equally valid, but the “simpler of the two solutions should rule” (Warry, 2007:30). Hence, where marginalized forms of knowledge are seen as complex and incoherent by dominant forms of governance, dominant society’s ‘common sense’ often prevails as the simpler solution. These constructions have directed western thought as hegemonic ideals have marginalized indigenous knowledge and moved their ‘dominant’ version of common sense into doctrine and legal policy (Cruikshank, 2005). It has been a ‘modern’ mission to disentangle a seemingly chaotic world and introduce categorical and linear thought through western philosophical paradigms (Latour, 2003). ANT reveals that this idea of a shift from a confusing past to an organized modern understanding is faulty and defined by binaries that misrepresent the reality of perspectives and contexts outside of western thought (Latour, 2003). Network thinking reveals complexities that are overlooked in modern western dichotomies that have brought about a false sense of clarity (Latour, 2003). Latour thus argues that we have never been modern and that modernity has always been an interpretation, not a natural break from a messy past (Latour, 2003). Sandra Harding in her work *Is Science Multicultural* (1998) demonstrates a similar perspective. She suggests that the ‘neutrality’ and ‘rationality’ of modern sciences are indeed ‘culturally specific values’ (Harding, 1998). She emphasizes that “claims for modern sciences’ universality and objectivity are ‘a politics of devaluing local concerns and knowledge and legitimating ‘outside experts’”

(Harding, 1998: 319). Therefore, though science has made many strides, claims to its sole proprietorship over natural 'laws' and a rational understanding of the world are a politically motivated means of marginalizing all other forms of knowledge and exerting power over landscapes (Harding, 1998). The aim is not to abandon science but to reconsider its claim over modernity and whether or not it is viable and sustainable to future research to exclude all other traditions of knowledge (Harding, 1998). 'Modern' separation of nature and culture has the tendency to ignore complex tangible and intangible interactions that are necessary for addressing current and emerging environmental and cultural issues (Cruikshank, 2005). ANT is an approach that has the capacity to break down dominant categories made by modern science and remove the distance that western science has placed between environmental concerns, and the social world (Cruikshank, 2005). It must be understood going forward that we can no longer look at western science as the sole progressive and modern form of knowledge (Harding, 1998). Community environmental projects are driven by both environmental and social aims, which are inextricably linked (Nygren, 1999). By rejecting social understandings and worldviews that shape perspectives on the environment, we fail to understand the complexities of their aspirations (Nygren, 1999).

As long as our dominant paradigms and ways of thinking remain based on categorical understandings, it will be difficult to conceptualize how traditionally separate topics such as health, nature, technology and social morality are indivisibly linked in a network of action (Latour, 2003). Topic boundaries in positivist and essentialist approaches have led to the idea that separate categories have their own essential nature that determines action and operation (Tatnall and Gilding, 1999). These scientific approaches dismiss variables that interact and can create differing circumstances in a number of cases (Tatnall and Gilding, 1999). The attributed characteristics of 'rational' and 'factual' often associated with sciences tend to marginalize situated knowledge systems, causing clashes in situations where differing perspectives must interact (Nygren, 1999). Knowledge external to Western science is seen as the opposition of truth (Nygren, 1999), and as long as dominant forms of discourse are regarded as 'truth', while other ways of knowing are marginalized, co-governance models will not work based on an agreement of mutual respect and understanding. Dominant discourse offers a range of

possibilities and ‘acceptable’ statements, which exclude statements and ways of knowing that do not fall within this range.

What permits the individualization of a discourse and gives it an independent existence is the system of points of choice which it offers from a field of given objects, from a determinate enunciative scale; and from a series of concepts defined in their content and use...and a single discourse can give rise to several different options...one must be able to register the distribution of points of choice, and define, behind every option, a field of strategic possibilities. (Foucault, 1968: 411).

In “Truth and Power”, Foucault refers to the concept of the “specific intellectual”, referring to intellectuals who specialize in certain forms of knowledge and are thus considered ‘expert’ (Foucault, 1976). “Truth” in this case, is not outside power, but rather is produced “by virtue of multiple forms of constraint” and is subject to the general politics of society and the type of discourse it accepts that makes it possible to be “true” or function as “truth” (Foucault, 1976: 316) It is “centered on the form of scientific discourse and the institutions that produce it” and is shaped by dominant forms of political and economic apparatuses (Foucault, 1976: 316). The ‘intellectual’ in this case, is determined by what ‘truth’ is sanctioned, and their status is determined by who is “charged with saying what counts as true” (Foucault, 1976: 316). The intellectual, who occupies a specific position, is linked to the general functioning of truth (Foucault, 1976: 316). Thus the problem is not to detach truth from power, but to detach the power of ‘truth’ (Foucault, 1976: 318). Experts, in this case, are those who practice western science in environmental management. Their ‘expertise’ is not only considered important for fitting within the acceptable discourse, it also it is critical to the maintenance of political power. Strategies for environmental research and management are exercised by scientific experts who maintain control over the process to ensure that the interests of dominant society are protected.

State Simplification and Policy Making

Dominant forms of governance have dealt with the complexities of their ‘duty’ to govern by employing simplified and standardized forms of scientific knowledge for the

purpose of what from their perspective constitutes effective management. James Scott's work, "State Simplifications", looked at the tendency of the state to disperse power through productive knowledge (Scott, 1995). The natural world is both physically and theoretically simplified by the state who create 'natural categories' for their own means (Scott, 1995). For instance, plants are not inherently "weeds" (Scott, 1995). Governments control the status of plants and list some of them as 'weeds', such as the noxious weed list in Ontario, so long as they, by governmental standards, pose a threat to important land and resources, as defined by the concerns of the dominant society (Scott, 1995). Standardization of knowledge attempts to enact control over people and space, but cannot be fully imposed since individuals conceptualize and utilize space in a variety of ways (Scott, 1995). However, these complexities are rarely addressed since "local practices of measurement and land-holding were *illegible* to the state in their raw form. They exhibited a diversity and intricacy that reflected a great variety of purely local, not state, interests" (Scott, 1995: 197). That is to say they could not be assimilated directly into an administrative grid without being reduced to a convenient "shorthand." (Scott, 1995: 197). Along with the centralization of Western scientific knowledge came the centralization of linguistics and official language involving this form of knowledge, "devaluing local knowledge and privileging all those who had mastered the official linguistic code" (Scott, 1995: 225). This hegemonic centralization created a periphery that was viewed as lacking competence by administrative standards (Scott, 1995). While 'official' languages have marginalized First Nation language and the worldviews and perspectives incorporated within them, so too has western scientific language sent to the periphery other ways of discussing environmental issues that are dismissed as 'laymen's terms' incapable of effectively addressing and conducting environmental management.

In Ontario provincial policy making, problem definition is the process by which policymakers "orient themselves toward certain problems they think need solving; expertise with a set of policy tools encourages one to seek out problems and goals that are consistent with what is achievable with tools." (Pal, 2014:11). Policy-making is considered in governance as the "disciplined application of intellect to public problems" and involves "multidisciplinary" consultation in order to critically assess, understand, and improve policies (Pal, 2014:15). This process involves both social and scientific research,

but there is an overwhelming attitude that excludes ‘laymen’ or non-experts as it is suggested that “insofar as policy analysis seems to be allied with scientific disciplines, not just anyone can do it well” (Pal, 2014:16). Distrust from dominant forms of governance suggests they feel ordinary citizens might have opinions about public policy dictated by “prejudice or what happened to be on that morning’s front page” or may have opinions that they “cannot explain” (Pal, 2014:17). Thus there is a clear distinction made by policy makers between experts and citizens and that raises the question in dominant forms of governance about whether or not ordinary citizens can “engage in ‘real’ policy analysis” (Pal, 2014: 17). According to Leslie A. Pal, the dominant view is that policy analysis relies on “practical reason” from a variety of techniques, experience and exploration (Pal, 2014: 17). Policy making itself has predetermined methodologies and practices that dictate how it is formed, which simplifies the process by making it inaccessible to non-experts, and maintains the exclusivity of the practice (Pal, 2014). More often than not, ‘problems’ are defined and identified by indicators managed by dominant governmental and non-governmental institutions that rely on their own forms of monitoring and statistical analysis to gather information (Pal, 2014: 101). Hence, under the current circumstances for policy-making, co-governance faces barriers due to fundamental differences in approaches to decision making, as I will discuss in Section 4.3. Policy networks that theoretically provide a model to allow for the involvement of various stakeholders and the “attentive public” have an active role in policy making however, they are often organized and coordinated for efficiency in a hierarchical form (Pal, 2014) and are imagined visually either in a top-down form or in “bubble” diagrams where “central policy structures” and “lead agencies” form the hegemonic center, and all others including pressure groups, local governments, and individuals sit on the periphery (Pal, 2014: 236). Hence, state simplification has reduced opportunities for all those imagined below or further out from central governing structures (Pal, 2014).

4.2 Invasive Species as a Colonial Process

Invasive species arrived in North America as a direct result of colonial activities. They arrived first by way of international shipping and spread as ships navigated and began to regularly travel through intercontinental channels such as the St. Clair River.

Urban development, the creation of larger and more elaborate road networks, and agriculture, have all since been major contributors to the spread of invasive plant species. The role of these colonial activities in the spread of invasive species is casually noted in Ontario's governmental discourse, such as the MNR's Ontario Invasive Species Strategic Plan (OISSP), which describes Ontario's 'higher risk' for invasive species establishment as a result of:

Favourable environmental conditions and the nature of our society (industrialized, urbanized, locally and globally mobile, and a high population density) our economy (large quantities of imports, significant goods-producing industry sector), our geographic location (proximity to a major international shipping channel, the Great Lakes St. Lawrence Seaway, and multiple land and water entry points on Ontario's borders), and the degraded habitat and ecosystems in many of Ontario's ecological regions. (MNR, 2012).

While these activities are acknowledged, the role of colonialism is not discussed, nor is there any indication that 'business as usual' activities such as these will be targeted in an effort to cope with the problem of invasive species. Instead, the focus in government discourse has been to approach the problem of invasive species with 'outreach programs' in an effort to "change public attitudes" (MNR, 2012). Targets of these programs have been citizens and strategies to educate (MNR, 2012). While certain controls have been placed on shipping to prevent ballast water from introducing invasive species to Ontario's waters¹⁶ (MNR, 2012), discussion of other large scale, colonial activities have largely been absent from the discourse. In government discourse specifically targeting certain plant species, citizens are asked to limit their impact and reduce their presence in

¹⁶ Regulations enacted by Transport Canada in 2006 and by the St. Lawrence Seaway Development Corporation in 2008 require that all ocean-going vessels flush their tanks with salt water before they are allowed to enter the St. Lawrence Seaway (MNR, 2012: 10). This requirement is enforced through inspection programs, which had a compliance rate of 97.9% in 2009 (MNR, 2012: 10). Non-compliant vessels are "dealt with on a case-by-case basis (MNR, 2012: 10). Despite these intentions, even this government document admits "If these regulations had been enacted earlier, they might have prevented aquatic invasive species from entering the Great Lakes basin (MNR, 2012: 10).

important habitats so as to prevent their continued spread, as will be discussed in the next section.

The impact of invasive species is described in the OISSP categorically rather than holistically. Each headline indicates a ‘type’ of impact, outlining the repercussions invasive species has had in each. Economic costs of a number of invasive species are discussed in monetary terms, focusing primarily on impacts to Ontario. Ecological costs describe a number of invasive plant and animal species and their impact particularly on biodiversity and habitat loss. While the document vaguely recognizes that invasive species have social impacts, these impacts are hardly touched upon or discussed at any sort of length. Furthermore, strategic actions are defined by six main categories organized in a top-down order. These categories include: “Leadership and Coordination, Legislation, Regulation and Policy, Monitoring and Science, Risk Analysis, Management and Measures, Communication and Education” (MNR, 2012: 20). Engaging with Aboriginal communities is discussed; however, they are lumped among other ‘stakeholder’ groups that are best engaged with through advisory committees, councils, and stewardship groups. It is unclear how the input might be gathered and prioritized in these advisory committees, which are themselves separated categorically into “Wildlife Committees, Forest and Plant Pest Committees, Aquatic Invasive Species Committees” (MNR, 2012), suggesting the primary role of western ‘experts’ in these separated fields rather than perspectives that consider the interconnectedness of these issues. While these committees are described as a means to prioritize species of concern, this document indicates that priorities will be defined through the “scientifically-based process called risk analysis” utilizing the “best available scientific information” in order to determine the consequences and threats of certain invasive species (MNR, 2012: 36). These methods are often unable to capture or represent the variety of social contexts and factors that cause invasive plant species to disproportionately affect different communities and individuals.

The impact of environmental degradation due to factors such as invasive species has an exaggerated significance in communities such as WIFN where socio-economic conditions are worsened by loss of wildlife and habitat (Jacobs, 1992). These losses have

massive implications on human health and wellbeing as well as economic development, which has relied on “the viability of [their] natural resource base” (Jacobs, 1992: 2). Environmental degradation disrupts “traditional supporting structures” that have sustained WIFN and provided economic independence (Jacobs, 1992:2). The health of aboriginal communities and culture are inextricably tied to the health of the environment, as well as access and control over resources (Jacobs, 1992). Hunting, fishing, and trapping are all activities and industries that have been associated with self-sufficiency in First Nation communities and a decreased reliance on government subsidies (Warry, 2007). Many communities have demonstrated that millions of dollars can be brought into First Nations through these traditional economies (Warry, 2007). It is important to acknowledge not only the colonial factors that brought about environmental degradation from the infiltration of invasive plant species, but the continued colonial conditions that prioritize knowledge and control participation in environmental decision making. Furthermore, “we need policies that acknowledge the role of history and colonialism in the production of Aboriginal problems, and we need to appreciate that the solutions to these problems are long term” (Warry, 2007:30-31). Exclusionary practices of dominant forms of governance in environmental management are a direct result of continued colonial practices, based on the premise that European forms of governance and knowledge systems are superior to those of First Nations, and the responsibility to govern and manage First Nation affairs and resources is that of the state (Warry, 2007:53).

Best Management Practices

Government defined “Best Management Practices” (BMP) are an example of colonial processes that marginalize other forms of knowledge by selecting and prioritizing input. Overarching themes in dominant management discourse include the need for ‘containment’ and ‘quarantining’ in order to better manage healthy ecosystems by separating people from the landscape and to ‘inform’ the uneducated public, who are not as well versed in expert knowledge, and therefore are major proponents of the problem of invasive species (MNR, 2012: 46). “Control” programs therefore limit the capacity of First Nation communities to deal with the problem of invasive species in complex ways that address environmental health without compromising or disregarding critical ways in

which people interact with and are part of the landscape. Agencies such as MNR and OMAFRA attempt to work with communities and implement BMPs in order to control “pathways”, referring to ways in which invasive species enter and spread throughout the region (MNR, 2012: 47). BMPs for prevention of invasive species introduction and spread often call upon communities to “reduce disturbance in natural areas and natural corridors, such as stream riparian areas and wetlands” (MNR, 2012: 47). While these attempts are meant to keep ‘pristine’ environments intact, they ignore the importance of accessing these habitats for First Nation communities and the impact quarantining these areas would have on First Nation well being. Furthermore, this generalization disregards ways in which First Nations people already benefit the environment and mitigate disturbance through stewardship practices and community engagement. While conducting fieldwork, Clint Jacobs indicated pathways we could take through our prairie sites to ensure our presence did not have a major impact on the rare plant species that could be found in these areas. This was not described as a method to separate people from nature, but a reminder that all species in the prairie are living things. We were asked to “give thanks, tread lightly, and be respectful”. He also described the increased use of ATVs at Walpole Island, specifically remarking on a young boy he knew who would bring his four wheeler into a prairie site to pick sweet grass. Many, including Clint, were frustrated with young people “not walking around instead like their grandparents did”. Some had wanted to keep the boy out by putting up a wooden or chain linked fence, but Clint was afraid the boy might get hurt as a result if he attempted to ride into the prairie on his four wheeler not expecting the fence. Instead, Clint simply talked to the boy, explaining the significance of the prairie and consequences his four-wheeler might have and the boy never did it again.

BMPs are decided upon for each ‘key’ invasive plant species; indicating particularly how they might be eradicated and managed through techniques such as cutting, pulling, burning and more. These initiatives are defined as the best possible strategies for coping with particular species and are developed through a “partnership approach” as indicated in the OISSP. This partnership approach, however, was not well defined in the document as it might relate to communities. Instead, awareness programs are described as the main form of communication between government agencies and the ‘public’. This is done

through “a toll-free hotline” for members of the public to report sightings of invasive species, “a website, brochures, fact sheets, DVDs, displays...outreach events and tradeshows, media relations, public service announcements, and school curriculum activities” (OISSP, 2012: 49). Francine Macdonald, my informant from MNR, acknowledged that BMPs designed to target and eradicate specific invasive species may not apply to every situation. She explained BMPs work best when they are applied to “integrated management so every situation has different approaches. Certainly combinations of burn and chemical controls are considered *best* options, but it’s entirely site dependent” (Francine Macdonald, August 2013). In our discussion she explained particularly that chemical control due to government regulations may be hindered in some areas where pesticides cannot be used such as Phragmites in water. It was not considered in this discourse on herbicide use that chemical control may also be a culturally contentious issue that arise from specific contexts and local narratives such as the long standing notion of ‘zero tolerance’ for chemicals contaminating the environment at WIFN that as previously mentioned. Ultimately, the Heritage Centre did run an herbicide application project for Phragmites in the summer of 2013, but this was not achieved without careful cultural consideration and an understanding of contexts for perspectives. Decision-making and the development of BMPs in invasive plant species management is the responsibility of the Ontario Invasive Plant Council, composed of different environmental groups, industry groups, and government agencies. While those on the council are meant to be representative of the population, this means that not everyone “is empowered to articulate policy” (Pal, 2010). Participation for ‘grassroot’ groups in this decision-making process includes an open invitation to their annual general meeting. Provincial policy such as the OISSP are developed and made available to the public via an Environmental Registry set up by MNR that encourages feedback and comments. While this is intended to incorporate perspectives, once feedback is given it goes to the Environmental Commissioner who attempts to “incorporate as much as [they] can, or as much as possible, into the next version of the document” (Francine Macdonald, August 2013). This does not offer an equal opportunity for input as quality of the information and feedback given is decided upon by dominant governing bodies and responses are not necessarily given meaningful consideration. Instead they are

incorporated as long as they are able to fit it into the next version of the document. Dean Jacobs argues that the information of First Nations is critical to decision making processes that affect local resources:

Those who earn part of all of their livelihood through trapping and other harvesting activities develop a detailed knowledge of wildlife populations and local environmental conditions which is of value to resource monitoring, management, and conservation. This detailed knowledge gives aboriginal people the authority to speak on behalf of the land, and to make decisions about the disposition and use of local resources. (Jacobs, 1992: 4).

Social concerns with invasive plant species in First Nations are far more multifaceted than simply “aesthetic reasons”. Without meaningful consideration, not only is pertinent information on the complex issues surrounding invasive species disregarded, First Nations remain subject to colonial conditions that attempt to exclude them from control over valuable natural resources.

Ideologies of Scale and Limitations of Scope

The Heritage Centre and Walpole Island community members cannot be seen as ‘rooted’ or solely acting locally. They have participated in worldwide discussions on environment and sustainability, and negotiated their positions, perspectives and worldviews in a network of research partnerships, corporate and governmental relations, and more (Stephens, 2009). James Ferguson and Akhil Gupta describe how images of state vertical encompassment envision the ‘state’ as being above ‘grassroot’ or ‘on the ground society’ (Ferguson and Gupta, 2002). This imagined topography suggests vertical structures with ‘levels’ of society and is often taken for granted and reinforced in a wide variety of discourse including within academia, popular media, governmentality and more (Ferguson and Gupta, 2002). Metaphors of vertical encompassment become pervasive in state practices by creating a sense of importance or entitlement over ‘lower’ levels of society (Ferguson and Gupta, 2002). These images create a sense of scale,

which is very persistent in environmental governance in terms of participation and funding.

The OISSP incorporates terms that indicate scale and prioritize by utilizing vertical or top-down imagery. The document describes invasive species initiatives sequentially in an order that represents this hierarchy of scale. On the first page, Canada's National Strategy is defined, which was "approved by the Provincial and Territorial Ministers with responsibility for Fisheries/Aquaculture, Wildlife, and Forestry in September 2004" (MNR, 2012:2). It was the Minister of Natural Resources that approved this document for Ontario, defining a "framework under which provincial plans can be developed" (MNR, 2012: 2). The OISSP therefore was designed to meet the goals of the 'larger scale' National Strategy that defines and informs provincial priorities and approaches to invasive species management (MNR, 2012: 2). "Success Stories" describe primarily "larger scale initiatives" citing the Canadian Cooperative Wildlife Health Centre and Ontario Federation of Anglers and Hunters as these entities are seen as most capable of carrying out western scientific risk assessment, surveillance and monitoring strategies and a "cost effective program that addresses provincial, territorial and national interests" (MNR, 2012: 8). Communities, or "smaller scale" actors, are viewed as occupying a lower rung of public laymen who are discussed in this strategy as needing to be educated through outreach programs controlled by higher up agencies. Leadership is indicated as an "intergovernmental coordination" involving governmental agencies while communities are granted stakeholder or advisory status (MNR, 2012). The "scope" of the OISSP is provincial with "some of the identified actions" taking place at a "local scale"; reasons provided for these local exceptions indicated that "certain points of entry may require different actions than those located much farther away from key points" (MNR, 2012). While this may be true, no where is it indicated that different social contexts or community interests might play a role in defining and creating need for local initiatives.

A sense of scale was often referenced in my discussion with Francine Macdonald. She described how larger funding opportunities such as through the Canada-Ontario Invasive Species Centre "don't tend to fund on the ground projects" and focus funding to provincial or "bigger picture" initiatives (Francine Macdonald, August, 2013). This fund grants up to \$35,000 a year, and according to Macdonald:

Because of the amount of money, they don't tend to fund sort of on the ground projects because they would be overwhelmed by project requests across the province, so they tend to think more strategically on how do we make a difference from a provincial perspective instead of a local level. So they may not fund projects at a local level, that's not what they'd be interested in. They would be interested in more projects that engage many different partners in the project. So it's more *bigger picture* type projects. (Francine Macdonald, August 2013).

This ideology can be limiting since dominant standards dictate funding, as well as project scope due to government based standards for research determined by dominant society and discourse. Certain initiatives are not seen as a possibility within the 'scope' of smaller or 'grassroot' initiatives, limiting opportunities for funding, funding duration, as well as the range of possibilities for project design. The figure below indicates the dramatic reduction in project scope from the proposed 2013 invasive species initiative to the final project design following revisions from the GLGCF.



Figure 17

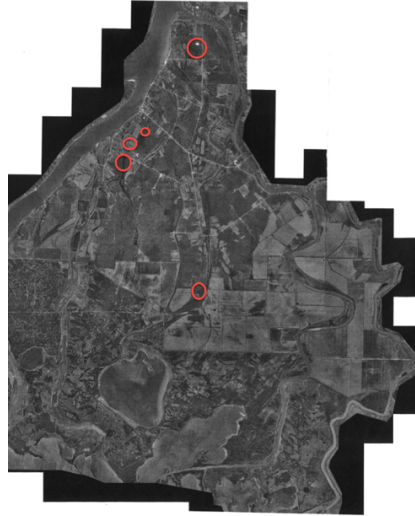


Figure 18

Invasive Species Project scope before (Figure 17) and after (Figure 18) GLGCF revisions

Because a community-based bounty program was ruled out in favor of a small field crew, a number of sites as well as invasive plant species that the project originally intended to manage and treat necessarily had to be ruled out due to constraints on time and numbers. A broader, community-based initiative that sought to address wide range of habitats, invasive species, and community concerns was necessarily exchanged for a more narrow and targeted initiative that, while fulfilling the standards outlined by the GLGCF, did not necessarily address the concerns of the community. In our community meeting, one member noted they felt “monitoring is useless, you’re only going to see how severe [the problem] is” (Consultant 2, August 15, 2013) when it is already apparent to the community that the problem of white sweet clover and Phragmites is severe. While monitoring of invasive species will certainly be helpful to ongoing Heritage Centre initiatives, feedback from some individuals indicated a feeling that baseline monitoring would only serve to reinforce what they already knew, and those who provided feedback on our project suggested that efforts should be put towards producing tangible results. Monitoring did not necessarily fit into community-determined aims, especially for those who have grown up with, experienced, and witnessed the infiltration of invasive species throughout the island. The history of invasion is well known in the community, and there

is sense of urgency to do something about it. This was not acknowledged by the GLGCF in their proposal to put their funding towards monitoring instead of removal. Because invasive species disproportionately affect First Nations, it is important that funding agencies partner with First Nations in order to recognize the complex and pertinent threat invasive species pose to the health and wellbeing of First Nations people. The need to take action to eradicate invasive plant species in initiatives that can be sustained for a long period of time is especially critical in these communities. It is inappropriate to limit these initiatives based on ideologies of scale that consider grassroot, or community-based initiatives to be prioritized below “bigger picture” initiatives.

4.3 New Models for Partnerships and Environmental Co-governance

It has been acknowledged by many in the scientific community, as well as those involved in provincial and federal government agencies that conventional attitudes to resource management that involve a top-down approach and ‘expert driven’ processes are incapable of addressing complex environmental issues (Shrubsole, 2004). The complexities surrounding environmental management makes it inappropriate to develop a single perspective or solution for how these issues might be addressed (Shrubsole, 2004). Partnership approaches are currently limited to intergovernmental cooperation involving provincial, federal and sometimes international government agencies (Shrubsole, 2004). Co-management or collaborative management with First Nations would involve decentralization, and joint planning that encourages power sharing, consensus-based decision making, and “a process in which all those who have a stake in the outcome aim to reach agreements on actions and outcomes that resolve or advance issues related to environmental, social and economic sustainability” (Shrubsole, 2004: 8). While putting effective co-management into practice continues to be grappled with, many recognize the benefit this form of decision-making has over hegemonic forms of management. For instance, single levels of government lack the capacity to deal with all the tasks surrounding environmental issues (Shrubsole, 2004). Simplification processes have only allowed governments the ability to conceptually cope with the complexities of environmental management, not resolve or face these complexities. Furthermore,

dominant forms of governance can no longer afford simple solutions that limit public involvement so as to control and manage the perspectives on environmental management that are realized during consultation processes. Hence, decentralization is the only conceivable solution, and the only means by which effective forms of environmental co-management can be put in place.

A statement of political relationship was signed between the government of Ontario and the Chiefs of Ontario on August 6th, 1991 that committed Ontario to protecting First Nation culture, self-reliance, and self-governance by entering all negotiations on a government-to-government basis (Jacobs, 1992: 3). This agreement for co-governance that recognizes aboriginal governments as sovereign powers on an equal level for negotiation made it inappropriate to consider aboriginal people as simply “one of a number of stakeholders” (Jacobs, 1992:3). This relationship has continued to be a contentious one as Ontario consistently fails to treat and recognize First Nations on a government-to-government basis in environmental decision-making. As part of a move towards sustainability, First Nation self-government and self-determination must be recognized as especially critical (Jacobs, 1992). This has a direct impact on the management of resources and “shared jurisdiction” in management and environmental decision-making (Jacobs, 1992). Problems arise when government agencies view First Nations as “stakeholders” or “interest groups” (Jacobs, 1992), entities that have typically experienced a finicky relationship with policy makers who, while often required to form partnerships or to consult, have an unclear vision of how these relationships should work, and may view what ultimately constitutes co-governance, to be a hassle.

Consultations and citizen engagement can be seen as empty theatrics where interest groups rant predictably while decision-makers watch the clock, waiting for it all to be over so they can go and make the decisions they were going to make anyway. (Pal, 2014: 247).

This cynicism is not only warranted, but often the reality of collaborative efforts despite the level of enthusiasm for consultation from either party (Pal, 2014). Because consultation is not well defined, the relationship is often controlled by dominant forms of

governance because of the reluctance to relinquish control and efficiency, and the difficulty they might perceive with “balancing public demands with the realities of hard decisions...balancing accountability with autonomy” (Pal, 2014: 248). Much of the problem lies in the broad definition of consultation, since it could be perceived as everything from government polling to even elections (Pal, 2014). Thus the duty to consult can be fulfilled through a wide variety of communication, which renders it virtually useless (Pal, 2014: 248). The consultation process can often be one-sided and take on a form that is more likely “engagement” where information flows in one direction from policymakers to the ‘community’, for instance (Pal, 2014). However, not only do those consulted want to offer their advice, information, and perspective, they also want to see their input used and incorporated meaningfully into policy outputs (Pal, 2014). While the ideal model for co-governance would be a horizontal relationship where “coordination and management of a set of activities between two or more organizational units, where the units in question do not have hierarchical control over each other, and where the aim is to generate outcomes that cannot be achieved by units working in isolation” (Pal, 2014: 253), this may not be achievable as long as First Nations are seen as simply one of many ‘stakeholders’ and ‘interest groups’.

Dean Jacobs argues that, with a deep knowledge of local ecosystems and experiential knowledge that has led to effective monitoring and recognition of changes in the landscape, First Nations “are in an excellent position to... provide information on local ecosystem health” (Jacobs, 1992). Furthermore, aboriginal knowledge and its juxtaposition to mainstream scientific knowledge, is critical to enriching and improving sustainable development and management strategies (Jacobs, 1992). Fundamentally different views on resource management has hindered co-governance. Aboriginal approaches to management involve local managers with experienced, specific knowledge of the local area that integrates human well being into management strategies and resolves issues at a community level (Jacobs, 1992). On the other hand, dominant government forms tend to approach environmental management with a preference for outside ‘expert’ managers that employ a generalized western scientific knowledge using technical approaches that separate humans and the environment categorically, and resolve problems at a distance through bureaucratic and political systems (Jacobs, 1992: 4). He

argues that these two models for environmental governance, while fundamentally different, must work together in tandem in order to carry out co-governance (Jacobs, 1992). Aboriginal approaches to management must not only be respected and acknowledged, but seen as a crucial and equal model for environmental management that is not simply sanctioned only when it meets the aims of dominant society, but for First Nation community driven and defined goals. In order to do this, dominant forms of governance must be willing to relinquish their control and veto power and open environmental decision making up to First Nations, while acknowledging their right to self-government and self-determination. Furthermore, Aboriginal knowledge cannot be seen as a knowledge system that is only called upon when it supports the claims of Western scientific knowledge. It must be viewed as a separate but equal way of knowing while also acknowledging Western science as a socially constructed knowledge system heavily involved in political and colonial processes meant to reinforce the dominance of those who practice it.

In invasive species management, this model for co-governance is especially crucial. The Ontario government must recognize the problem of invasive species to be one that affects more than the biodiversity and aesthetics of the landscape. They must recognize the cost of the invasion of Phragmites and white sweet clover to be more than its impact on tourism and agriculture in mainstream society. Invasive plant species disproportionately affect First Nations who rely on the maintenance of biodiversity to protect certain life-ways that have sustain individuals socially, culturally, and economically. Invasive plant species are directly tied to the health and wellbeing of First Nations, which has been impacted by colonial factors directly at work in the spread and management of these plant species. As a result, it is absolutely critical that First Nations take on a co-governance role and engage directly in decision-making practices that have a direct impact on these communities rather than being viewed as another interest group. The current model of consultation, regardless of its intention, is extremely flawed and often perpetuates exclusionary tactics that benefit mainstream society, while ignoring the needs of First Nations. It must be recognized that dominant forms of governance cannot maintain their current power while also partaking in effective models for co-governance. The abdication of certain powers and decision-making privileges may currently be

perceived by dominant forms of governance as a headache waiting to happen. However, the process of reconciliation is a means of offering solutions and developing partnerships that are better equipped to cope with the problem of invasive plant species. An attitude change towards invasive species management hence involves the recognition of co-governance as a process that offers mutual benefits to both parties, and solutions that are formed through meaningful collaboration, while respecting the sovereignty, goals, and self-determination of First Nations.

Conclusion

Since the 1980s, the Walpole Island Heritage Centre has created and maintained partnerships with institutions such as the Western University, allowing researchers such as myself the opportunity to help with and learn from the many community based environmental initiatives the Heritage Centre staff run and oversee. While deciding on a Masters project, I was initially drawn to the ways in which the Walpole Island Heritage Centre and community have taken a stand to both negotiate and pressure industrial and governmental practices. Their initiatives have challenged the ways environmental standards are created, perceived, enforced, and have made strides towards decolonizing current environmental decision making models and pushing for co-governance between First Nations and dominant forms of governance such as the government of Ontario. WIFN has lobbied not only for consultation but meaningful forms of inclusion by helping to facilitate community perspectives on and experiential knowledge of the social, cultural, environmental, and health related impacts of the infiltration of invasive plant species into important habitats. Oral testimony of lived experiences within these hazardous circumstances offers a sense of urgency for mitigating negative environmental and health issues that scientific risk assessments do not. Hence these narratives are critical to the overall discourse on environmental remediation and management, yet are often systematically excluded by dominant discourses and the tendency to privilege the knowledge of western science. Thus a major goal of the Heritage Centre has been to lead research that establishes the importance of co-governance for the sake of improved environmental action as well as reconciliation and a fulfillment of commitments to aboriginal rights (Dalton, 2010).

Environmental co-governance between WIFN and the Ontario government in invasive species management can only be achieved through the understanding and acknowledgement of standard making practices, which marginalize First Nation community forms of knowledge and models for management. Standard making gives credence to certain forms of knowledge and paradigms over others, and has affected environmental governance by predetermining acceptable forms of environmental research, and strategies for management. This process tends to prefer western forms of

scientific knowledge and the role of predefined ‘experts’ in decision making while sometimes trivializing ‘other’ forms of knowledge and community experiences, making meaningful participation of First Nations in environmental decision making, extremely difficult. Furthermore, standards are created to determine who and what projects are eligible for funding, and dictate funding duration as well as the nature of project design and objectives. This leaves little room for community-determined project aims and designs, that may not fit this predetermined criteria, to be considered for adequate funding. BMPs designed by the MNR and MOE as well as preset goals set up by the GLGCF in their funding criteria, are a product of dominant forms of standard making. While the intentions of funding agencies are to increase capacity and facilitate community projects, these standards disengage funding agencies with community goals and only accept projects so long as they are in accordance with the aims and values of dominant society. Furthermore, funding can be prioritized based on ideologies of scale that range from ‘bigger picture’ projects involving larger, dominant agencies and partnerships over ‘grassroot’ initiatives typically based within communities and municipalities. These projects are less likely to receive adequate funding over a long period of time, which ultimately affects the scope of the project and its ability to make a difference in coping with issues such as invasive species, which require treatment over a long period of time.

Ultimately, the exclusionary practice of standard making perpetuates colonial relationships between dominant forms of governance, such as the government of Ontario, and First Nations. Neo-liberal governance systematically marginalizes indigenous forms of knowledge and management in order to maintain control over environmental resources and protect the interest of the dominant society (Mascarenhas, 2007). This practice of exclusion that dictates and upholds dominant knowledge systems, forms of research and management, ensures political regulation of natural resources and the simplification of processes of management that keep these resources under the control of the state (Foucault, 1978). First Nations have not only suffered the consequences of colonial processes that brought about the spread of invasive species in the first place, but are now forced to cope with the effects of invasive species with little in the way of funding and support to aid in this process. Despite the disproportionate way in which First Nations are

affected by invasive species, they are still seen as an ‘interest group’ or one of many stakeholders, offering reduced opportunities participation in dominant discourse, or equal abilities to protect their land, which is inextricably linked to culture and human health (Dhillon and Young, 2010). State generalizations in policy making suggest that this relationship is maintained for the sake of simplifying decision making processes in order to avoid the complexities involved in considering multifaceted factors, experiences, and alternative forms of knowledge (Pal, 2014). Rationalism and ‘common sense’ are terms that are often employed to justify this simplification (Pal, 2014). Any suggestions outside of what the state considers ‘rational’ or ‘common sense’ are disqualified in a variety of ways in order to maintain state control. Western science and mainstream society has remained in a privileged position that has the power to veto the aims of First Nations when they do not meet dominant standards and goals. This is both an act of environmental racism and a perpetuation of a colonial relationship that disregards the right to sovereignty and self-determination for First Nations.

The Heritage Centre and Walpole Island community have persisted nevertheless, and have made considerable strides in advocating for indigenous perspectives and redefining relations with outside environmental research and forms of governance. They have asserted their right to self-determination and ensured all partnerships formed are based on mutual respect and equality so as to challenge the colonial nature that has so often characterized these relationships. As a result, WIFN has been successful in achieving numerous community determined aims, particularly in environmental research and have become strong leaders in the field of First Nation led environmental management and the advocacy for self-determination (Beckford et al., 2010). Invasive species management has been, and will continue to be, a major endeavor within broader goals for sustainable development and environmental research at WIFN as the Heritage Centre continues to find ways to work with provincial agencies, and avenues to express input and seek opportunities to facilitate community led and defined management strategies. Given the success of the Heritage Centre and Walpole Island community in advocating for indigenous perspectives in a number of areas in environmental management, there is no doubt WIFN will persist in making the community central to conversations with provincial agencies in an effort to promote meaningful partnerships in

invasive species management. Government structures must be willing to decentralize environmental management and facilitate these types of discussions in order to garner benefits for both parties.

Continued engagement in reconciliation research that questions current frameworks of environmental management and their relationship with First Nations is a critical direction for future research. Adding to this discourse examining standard making practices and the reconciliation of colonial relationships perpetuated through environmental governance is imperative in advocating and pushing for effective models of environmental co-governance. More community engagement will be necessary to gain feedback on the project and understand directions the Heritage Centre should take in order to manage invasive white sweet clover and Phragmites, and overcome limitations imposed by funding opportunities and exclusionary tendencies in dominant forms of invasive species management and environmental governance.

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Appendices

Appendices A: Research Ethics Board Approval Form



Research Ethics

Use of Human Participants - Ethics Approval Notice

Principal Investigator: Dr. Regna Darnell
 File Number: 103722
 Review Level: Full Board
 Approved Local Adult Participants: 40
 Approved Local Minor Participants: 0
 Protocol Title: Negotiating Standard Making Practices and Cultural Perspectives on Environmental Health at Walpole Island
 Department & Institution: Social Science\Anthropology, Western University
 Sponsor:
 Ethics Approval Date: May 24, 2013 Expiry Date: September 30, 2013

Documents Reviewed & Approved & Documents Received for Information:

Document Name	Comments	Version Date
Western University Protocol		2013/04/09
Instruments	Interview Questions	
Response to Board Recommendations	Revisions based on the Recommendations form.	2013/05/21
Revised Letter of Information & Consent	Revised Letter of Information and Consent	2013/05/19
Response to Board Recommendations	Memorandum of Understanding between Walpole Island First Nation and University of Western Ontario	2009/06/01

This is to notify you that The University of Western Ontario Research Ethics Board for Non-Medical Research Involving Human Subjects (NMREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the applicable laws and regulations of Ontario has granted approval to the above named research study on the approval date noted above.

This approval shall remain valid until the expiry date noted above assuming timely and acceptable responses to the NMREB's periodic requests for surveillance and monitoring information.

Members of the NMREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussions related to, nor vote on, such studies when they are presented to the NMREB.

The Chair of the NMREB is Dr. Riley Hinson. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Curriculum Vitae

Name: Nicholson, Kristy Anne

Post-secondary Education and Degrees: Queens University
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2007-2009 B.A History (*transferred*)

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2009-2012 B.A (Hons) Anthropology, Minor History

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2012- 2014 M.A. Socio-Cultural Anthropology; Specialization in Environment and Sustainability

Honors and Awards: Queens Excellence Entrance Scholarship
2007

Dean's Honors List
2008-2012

Western Graduate Research Scholarship
2012-2014

Related Experience Teaching Assistant
Western University
2012-2014

Western Anthropology Graduate Society
Undergraduate Representative
2012-2014

Western Anthropology Graduate Society Executive
V.P. Communications
2013-2014

TOTEM: Western University Department of Anthropology
Journal
Peer Reviewer
2014

**Conference
Presentations:**

Western Anthropology Graduate Society
Working Anthropology: a Student Conference
“Collaborative Research and Traditional Ecological Knowledge
at Walpole Island First Nation.”
April 18th – 19th 2013

American Society for Ethnohistory
Water Ways: The Ethnohistories of People and Water
“River Narratives: Oral Histories, Experiential Knowledge and
First Nation Resistance and Resilience to Industrial and
Agricultural Practices on Water.”
September 11-14, 2013

Canadian Anthropology Society (CASCA)
Promising Uncertainties: Unsettling the Future of
Anthropological Terrain
“Negotiating Hegemonic Standard Making Practices and
Marginalization of First Nations in Environmental Governance:
An Examination of Invasive Plant Species Management
Initiatives at Walpole Island First Nation.”
April 30-May 3, 2014