

**Exploring the Influences of Institutions on Water Governance and
Management: A First Nation Case Study**

by

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Kate Cave

ABSTRACT

Water is vital for the lives of First Nations people, but many First Nations' communities are persistently dealing with unsafe drinking water. Over the years studies have repeatedly conveyed the deplorable drinking water conditions of First Nations. These conditions undermine the economic, social, and cultural health of these communities. Despite the ongoing attempts by various actors to change these conditions; water related concerns remain a major issue for First Nations across Canada.

The intent of this research is to explore water institutions and how they are influencing water governance and management in a First Nations context. Oneida Nation of the Thames (hereafter referred to as Oneida) is used as a case study for this research because of the current drinking water concerns and the institutions commonly used in governing and managing water resources in First Nations throughout Ontario. To accomplish this research, Ostrom's Institutional Analysis and Development (IAD) framework was used to analyze how institutions are influencing water governance and management in Oneida.

Through this analysis, an opportunity was afforded to describe the water institutions (formal and informal) and to enhance the understanding of how these institutions are guiding the behavior of people involved in water governance and management in Oneida. This research revealed several issues that are influencing the overall performance of the institutional arrangements including 1) the jurisdictional division of responsibilities to manage water resources in the Thames watershed; 2) the deficiency in public trust between the community and Elected Council; and 3) the inequity in the involvement of Traditional Council and women in water governance and management.

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LIST OF ABBREVIATIONS

AANDC	Aboriginal Affairs and Northern Development Canada
AFN	Assembly of First Nations
CBSWPP	Community-Based Source Water Protection Plan
CCME	Canadian Council of Ministers of the Environment
CHR	Community Health Representative
COO	Chiefs of Ontario
EHO	Environmental Health Officer
FNESL	First Nations Environmental Services Limited
FNIHB	First Nations and Inuit Health Branch
GNWT	Government of Northwest Territories
GUDI	Ground Water Under the Direct Influence of surface water
GWP	Global Water Partnership
HETF	Haudenosaunee Environmental Task Force
IAD	Institutional Analysis and Development framework
MOE	Ministry of the Environment
NGO	Non-Government Organization
OCWA	Ontario Clean Water Agency
ONFTSC	Ontario First Nations Technical Services Corporation
OSDWA	Ontario Safe Drinking Water Act
REB	Research Ethics Board
SWLHIN	South West Local Health Integration Network

SWPC	Source Water Protection Committee
TUC	Trout Unlimited Canada
UTRCA	Upper Thames Regional Conservation Authority
WWAP	World Water Assessment Programme

CHAPTER ONE: INTRODUCTION

Water is life giving. All natural things need water. We humans co-exist with the water because we need healthy, clean water to bring us good health, and likewise, we have to care for the water in order for water to be clean.

Muchkegowuk Elder as cited in Lavalley 2006, p.18

1.1 PROBLEM CONTEXT

Water is critical to the lives of First Nations people (Chiefs of Ontario 2006). First Nations people believe they have a responsibility to protect and respect water because water is a living thing, a spiritual entity (Lavalley 2006). As Walkem (2007, p.311) explains, “water is the lifeblood of the land and of the indigenous peoples and cultures that rely upon it and its waters.” For First Nations people, water quantity and quality are not only ecological and health issues, but also part of a much broader holistic perspective which recognizes that all aspects of Creation are interrelated (McGregor 2009). Water is not only for drinking. It has traditionally been used in ceremonies, to grow medicines, and for cleansing and purification (Lavalley 2006). With a lasting and inherent relationship with the land, aboriginal people interact with the ecosystem and its components in ways which protect ecosystem health and their communities (Government of Northwest Territories 2010). Traditions and traditional activities are important to First Nations people and thus the degradation of water quality threatens their very survival (McGregor 2009).

Changes to water and land from human activities (both adjacent to, and within First Nations communities) have created significant human health impacts to First Nations’ communities (COO 2006). Although these impacts can be broad, concerns for human health in regards to drinking water are particularly acute. According to Wilson (2004, p.70), “First

Nations communities have experienced outbreaks of shigella, Hepatitis A, diarrhoea, and isolated cases of mild cholera caused by e-coli, giardia, cryptosporidium and water polluted from sewage treatment plants, agricultural run-off and heavy metals (e.g., uranium, mercury and benzene).”

During the Walkerton inquiry in 2002 Justice O’Connor (2002, p.487) stated that: “there was ample evidence that the water provided in First Nations communities falls well short of the standards of safety and adequacy that are considered acceptable in other parts of the province.” Justice O’Connor (2002) noted several major problems regarding water supply management in First Nations’ reserves including inappropriate, low-quality infrastructure; limited trained or certified operators; frequent microbial contamination; and insufficient distribution systems to meet the needs of the community. In 2008 the Polaris Institute released *Boiling Point*, a synopsis of six First Nation communities facing deplorable water conditions. Highlighted communities included Landsdowne House (Neskantaga), Ontario, which has been on a boil water advisory for 13 years as well as Kitigan Zibi Anishinabeg, located a merely 130 kilometres north of Ottawa, where well water users (accounting for the majority of community members) have been on a ‘do not consume’ drinking water advisory since 1999 (Harden and Levalliant 2008). Christensen et al. (2010) stated that from 2003 to 2005 several First Nations’ communities had drinking water advisories with an average duration of 343 days. More recently, Neegan Burnside Ltd. (2011) prepared a comprehensive and independent *National Assessment of Water and Wastewater Systems in First Nation Communities* that categorized 39% of First Nations water systems as high risk and 34% as medium risk. High risk communities are categorized as communities on boil water advisories with major infrastructure problems (Eggertson 2008).

Since 2003 the federal government has implemented several strategies to improve water and wastewater services on reserves including: the *First Nations Water Management Strategy* (2003), the *Plan of Action for Drinking Water in First Nation Communities* (2006), and the *First Nations Water and Wastewater Action Plan* (2008). The objectives and outcomes of these strategies progressed over time, from addressing the “high-risk” systems in First Nations’ communities to the proposed new federal legislative framework for safe drinking water in First Nations’ communities. In 2008 the federal government allocated \$330 million to ensure all First Nations had access to safe drinking water (Eggerston 2008). However, it was not enough for several First Nations’ communities requesting new or upgraded infrastructure in addition to training and certification (Eggertson 2008). Despite these attempts water related concerns remain a paramount issue for First Nations across Canada. According to Health Canada, drinking water advisories have increased yearly in First Nations’ communities. As of November 2011, 131 First Nations’ communities were under drinking water advisories, an increase from the 118 advisories in June 2011 (Health Canada 2011). Access to safe drinking water is important to all Canadians, however for many First Nations’ communities “unsafe drinking water is a persistent reality of their daily lives” (Simeone 2009, p.1) despite the numerous reports and policies (Harden and Levalliant 2008).

These alarming statistics and experiences conveyed in documents such as *Boiling Point* provide a glimpse into the deplorable drinking water conditions of many First Nation communities. These deplorable conditions affect not only the access to clean water to ensure the protection of the community’s health and well-being, but also its social, cultural (Mascarenhas 2007), and economic well being (Harden and Levalliant 2008). Responding to

the situation of water in First Nation communities and gaining insights into approaches to water governance and management are therefore important research tasks.

Institutions and institutional analysis is one perspective that is well suited to responding to this research challenge. Institutions are sanctioned rules and norms of a society; they provide stability, expectations, and meaning (Vatn 2008). Institutional analysis is the process of breaking down these institutional contexts to understand how they affect each other and shape outcomes (McGinnis 2011). Employing an institutional approach provides the opportunity to identify what the water institutions are and how they are influencing (or not) water governance and management in a First Nations context. Water governance is about the decision-making process (i.e., who are the decision-makers and how decisions are being made) while water management refers to the day-to-day operational activities. Exploring the institutional context offers a way to address the issues of source water protection and to enhance water governance and management strategies in First Nations' communities.

In considering this institutional context, it is fundamental to understand the cultural and spiritual connection that First Nations people have to water. It is equally important to understand the historical events that have influenced water governance and management practices in First Nations' communities. For example, in 1876 the Government of Canada passed the *Indian Act* as a way to manage Aboriginal affairs in the country (Coates 2008). This *Act* was a powerful tool for the government because it provided federal officials control over the lives of Aboriginal peoples and communities (Coates 2008). The *Indian Act* gave authority to the government to create elected band chief and councils to maintain control over their political and administrative structures (Coates 2008). Through the band chief and councils, government funding was provided (Coates 2008) to administer and regulate services,

such as the local distribution of water on the reserves. However, despite the government's control many Aboriginal communities found ways to resist or ignore the rules and restrictions of the *Indian Act* by maintaining their traditional political systems and cultural practices (Coates 2008).

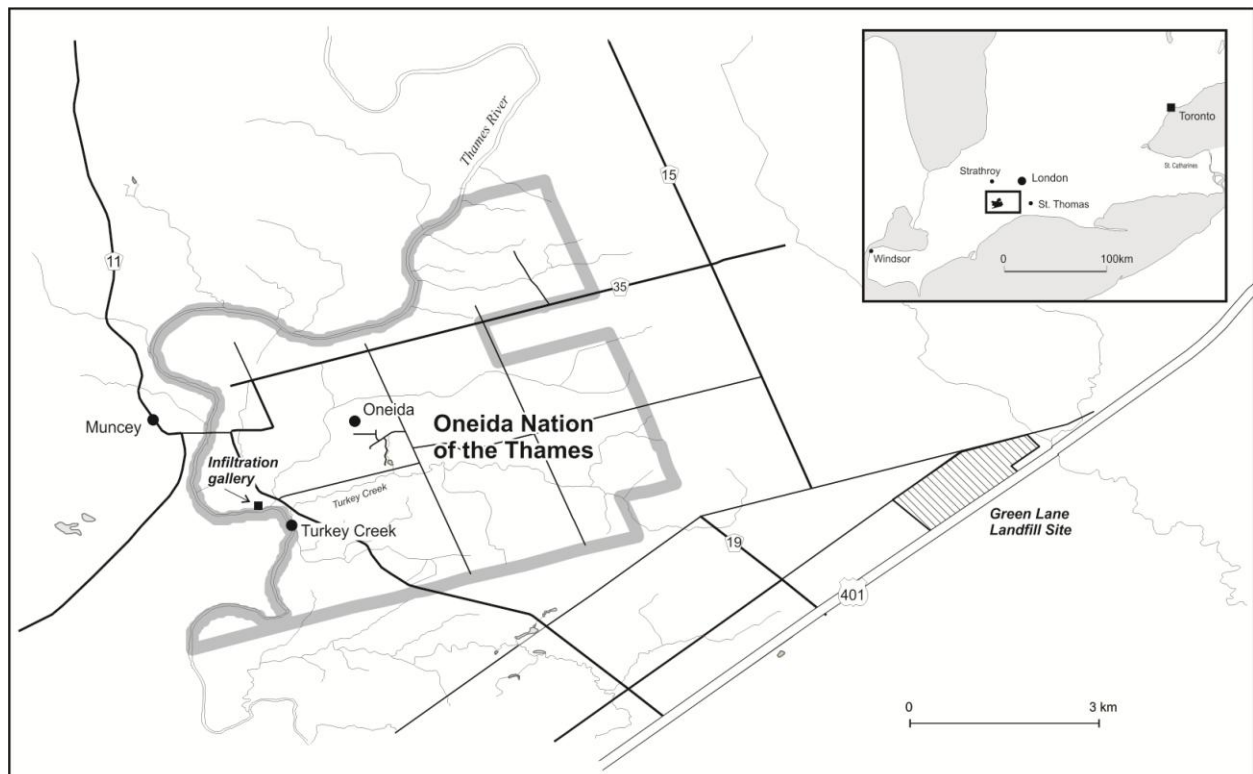
While understanding water related institutions and their influences on water governance and management in First Nations is the broad concern of this research, it is necessary to ground the examination in a particular context. Oneida provides a valuable context for the research because it is a community with rich institutions (formal and informal) often associated with water management and governance in First Nations'. Historically, Oneida has faced the range of social and cultural consequences from the federal government intervening in Aboriginal affairs, for example with the creation of the *Indian Act*. These government interventions have impacted how water resources are governed and managed in First Nations' communities. Oneida is also experiencing many drinking water concerns commonly confronting First Nations' communities throughout Ontario.

For the past 11,000 years the Thames watershed area has been an important cultural heritage site (Taylor et al. n.d.). First Nations people in the watershed use the Thames River (known as Askunessippi or "Antler River") for hunting, fishing, shelter, and transportation (Taylor et al. n.d.). Oneida is one of four First Nation communities located along the Thames River in southwest of London, Ontario (Figure 1.1). Oneida has raised environmental concerns about the impacts to the river water quality from agricultural runoff, the City of London, and the Green Lane Landfill site on the community's health, traditional activities, and way of life. The Green Lane landfill site is located within the traditional territory of Oneida (Union of Ontario Indians 2007) and 2.2 km from the community itself (Mascarenhas 2007). The landfill

site is of deep concern to the community as it draws its drinking water from an aquifer located under the Thames River (Union of Ontario Indians 2007). Similar concerns are raised in First Nations' communities throughout Ontario, giving reason for researching water institutions and how these institutions influence water governance and management practices in Oneida.

Figure 1: Case Study Region: Oneida Nation of the Thames

Source: Ministry of the Environment, 2011



1.2 RESEARCH PURPOSE AND OBJECTIVES

First Nation communities across Canada confront a myriad of historical and current social, political, and economic issues (e.g., diabetes, loss of the connection to the land, economic dependency). The problem of power differentials threads throughout these issues, making it difficult to pull them apart. Power issues stem from the historical process of colonization as the government established Indian reserves, residential schools, and

government policies to maintain control over First Nations' people and communities (Alfred 2009). For example, through the establishment of Indian reserves, First Nations' people have become disconnected from the land and disempowered due to laws and policies enforced by government authorities (Alfred 2009). While it is important to acknowledge these interconnections and the issue of power, this research purposefully focuses on water institutions because it offers a way to move towards enhancing water governance and management strategies in First Nations' communities and address the deplorable drinking water conditions in First Nations' communities. Thus, the purpose of this research is to explore institutions associated with water in the First Nations context at the community scale and to understand how they influence water governance and management. The research purpose is associated with the following two objectives.

Objective 1: To describe the formal and informal water institutions in Oneida.

Objective 2: To examine and evaluate how these formal and informal institutions influence water governance and management in Oneida.

1.3 THESIS OUTLINE

This thesis is presented in seven chapters. Chapter One introduces water related issues confronting First Nations and presents the research purpose and objectives. Chapter Two presents an overview of the literature related to the research. It explores the relationship between institutions and water governance and management in Canada and more specifically within a First Nations context. This chapter includes a discussion on Ostrom's IAD framework – a widely used tool in institutional analysis. Chapter Three discusses the research methods used to explore water institutions, and how these institutions influence water governance and management within Oneida. The IAD framework was applied in Chapters Four and Five to

communicate the results from the objectives stated above. Chapter Four provides a narrative describing the formal and informal water institutions in Oneida. It offers a discussion on the biophysical conditions and community attributes that are influencing the institutional arrangements. Chapter Five communicates how the institutions are influencing water governance and management in Oneida and provides an evaluation of the overall institutional performance. Chapter Six summarizes the key findings and discusses their relationship to the literature. Scholarly and practical contributions from this research as well as future research challenges and opportunities are also set forth.

CHAPTER TWO: LITERATURE REVIEW

This chapter reviews scholarly and other relevant literature to the topic of water institutions and their influences on water governance and management in a First Nations context. It begins by defining institutions, recognizing their formal and informal nature, and exploring institutional theoretical perspectives and frameworks. Secondly, the chapter explores the concepts of water governance and management and illustrates examples and implications of specific formal and informal water institutions. This is followed by an overview of institutions that influence the decision-making and management of water resources in a First Nations context. Exploring the literature on water institutions, governance and management reveals a knowledge void concerning water institutions and the influences on water governance and management in a First Nations context. Reviewing the existing literature informs the inquiry and provides the conceptual framework for the investigation based on antecedent literature and topic relevant information.

2.1 INSTITUTIONS

2.1.1 Defining Institutions

Institutions are a common focus of inquiry in a majority of social science disciplines (Young 1999) because they structure aspects of political, social or economic transactions in society (Pagan 2009). Institutions have been defined as the humanly devised rules and norms that guide societal behaviour (Hearne 2007; Nkonya 2008), shaping actions and defining goal-oriented success (Crane and Gandhi 2009). Institutions depend on the shared patterns of thoughts and activities and the interactions of individuals (Hodgson 2006). Institutions are often characterized by the repetition of social practices by members of a group (Vatn).

The terms “institution” and “organization” are sometimes used interchangeably and it is important to differentiate between these two concepts. Polski and Ostrom (1999, p.4) define organizations as, “a set of institutional arrangements and participants who have a common set of goals and purposes, and who must interact across multiple action situations at different levels of activity.” Organizations can be both formally and informally constructed and include government agencies, non-government organizations, social networks, clans, tribes, and families (Polski and Ostrom 1999).

In defining institutions, Bell (2002) notes, there is a general agreement that both formal and informal aspects need to be considered. The formal and informal institutions “define and fashion the behavioral roles of individuals and groups in a given context of human interaction, aiming at a specified set of objectives” (Bandaragoda 2000, p.4). Several scholars define formal or statutory institutions as rules that are observable through written documents. These include written codes, regulations, constitutions, ordinances, and binding laws that outline what may or may not be done (Nkonya 2008; Leftwich 2006; Hearne 2007). Informal or customary institutions are defined as the unwritten social norms and codes of conduct based on social behaviour and include sanctions, traditions, cultural norms, beliefs, social networks, values, and accepted ways of doing things (Nkonya 2008; Leftwich 2006). Over time and through regularized practice informal institutions are socially created and upheld (Leach et al. 1999). Leach et al. (1999) explain that informal institutions can change as actors deal with new economic, social, and political circumstances. A discussion on institutions and organizations relating specifically to water governance and management is presented in section 2.2 *Water Institutions, Governance and Management*.

While Vatn's (2005) research underscores the existence of a diverse set of definitions of an institution across the social sciences, Vatn (2005) recognized the importance of formulating a definition that reflects the existence of both the form of institutions (both formal and informal) and the reason behind their existence (roles or motivations/rationales). For the purpose of this research, Vatn's (2005, p.60) definition will be used as it provides an understanding of both institutional forms and their roles. These considerations are important in understanding how institutions influence water governance and management.

Institutions are the conventions, norms and formally sanctioned rules of a society. They provide expectations, stability and meaning essential to human existence and coordination. Institutions regularize life, support values and produce and protect interests.

Vatn's definition allows for a broad and comprehensive interpretation to guide the research, enabling the consideration of biophysical conditions, unwritten social norms and codes of conduct/human behaviour, and community attributes.

2.1.2 Institutional Theories

Over the last few decades, theories associated with 'new institutionalism' have gathered momentum throughout the social sciences, covering a range of perspectives on human affairs (Young 2002). According to Nee (1998), this momentum is motivated by progression in interdisciplinary research that is focused on understanding and explaining institutions. The shift to this new institutional paradigm has had a different response across disciplines within the social sciences (Nee 1998). For example, in sociology the shift from 'old institutionalism' to 'new institutionalism' is directed at understanding and explaining institutions rather than simply describing institutional arrangements (Bell 2002).

Between the political science and sociology disciplines there are three major schools of thought in new institutionalism: rational choice institutionalism, historical institutionalism,

and social institutionalism (Bell 2002; Immergut 1998). In rational choice institutionalism, actors are assumed to be rational, utility maximizing individuals (Bell 2002) analyzing choices under conditions of interdependence (Immergut 1998). Rational choice institutionalists take the position that “relevant actors have a fixed set of preferences or tastes, behave entirely instrumentally so as to maximize the attainment of these preferences, and do so in a highly strategic manner that presumes extensive calculation” (Bell 2002, p.6). Rational choice institutionalists consider the efficiency of institutions and how individuals and organizations find ways to maximize material well-being (Hall and Taylor 1996).

Historical institutionalists focus on understanding which institutions matter and how they matter (Hall and Taylor 1996). Historical institutionalism places less emphasis on rules or institutional restraints, with more emphasis on the appropriate response to a situation depending on our position and responsibilities (Bell 2002). This perspective focuses on the relations between politics, state, and society (Immergut 1998). This school of thought incorporates both a ‘calculus approach’ – human behaviour that is based on strategic calculation, and a ‘cultural approach’ – behaviour bounded by worldview, to understand the relationship between institutions and action (Hall and Taylor 1996).

Hall and Taylor (1996, p.15) explain that social institutionalists define institutions more broadly by including formal rules, procedures, and norms in addition to incorporating culture as a form of institution by viewing culture as “a network of routines, symbols or scripts providing templates for behaviour.” Social institutionalism focuses on understanding the structure and behaviour of organizations through the lens of institutional theory (Scott 2008a). Scott concentrates particularly on the different pillars of institutions (regulative, normative, cognitive), and various elements of institutions (conventions, norms, rules) within those pillars

(Vatn 2005; Scott 2008b). The regulative pillar stresses clear regulatory processes – setting rules, monitoring, and sanctioning mechanisms to enforce rules (Scott 2008a). The normative pillar focuses on how implicit or explicit values are involved (Vatn 2005), where sanctions are not necessarily needed to hold institutions together due to social pressures and norms (Gronow 2008). The cultural cognitive pillar refers to how we give meaning and act to objects we classify (Scott 2008a). This classification claims institutions are cultural scripts that do not require sanction mechanisms at all (Gronow 2008). Giddens' (2005) theory on structuration also concentrates on social codes and norms, but emphasizes the role that actors play in maintaining and recreating informal institutions. Structuration is a circular process where structure exists in the practice of recreating social codes and it is also where structure is transformed (Giddens 2005). As a result, the “practical use of society’s structural components (norms, rules, institutions)” in the daily lives of actors effectively forms society (Giddens 2005).

For the purposes of this research, social institutionalism theory has been selected as providing the most relevant perspective because it focuses on understanding behaviour of organizations and individuals by concentrating on both formal and informal institutions. As discussed in Chapter One, it is important to recognize the significance of water in First Nations culture. Since social institutionalism embeds culture as a form of institution, it is relevant to use this theoretical approach in understanding water institutions and how these institutions influence water governance and management in a First Nations’ context. This work trspecifically draws upon the political and social schools of thought in ‘new institutionalism’ for studying the institutional frameworks and enabling mechanisms in First Nations’

communities because ‘new institutionalism’ gives attention to how institutions are being used, the behaviour between institutions and action, and incorporates culture as a form of institution.

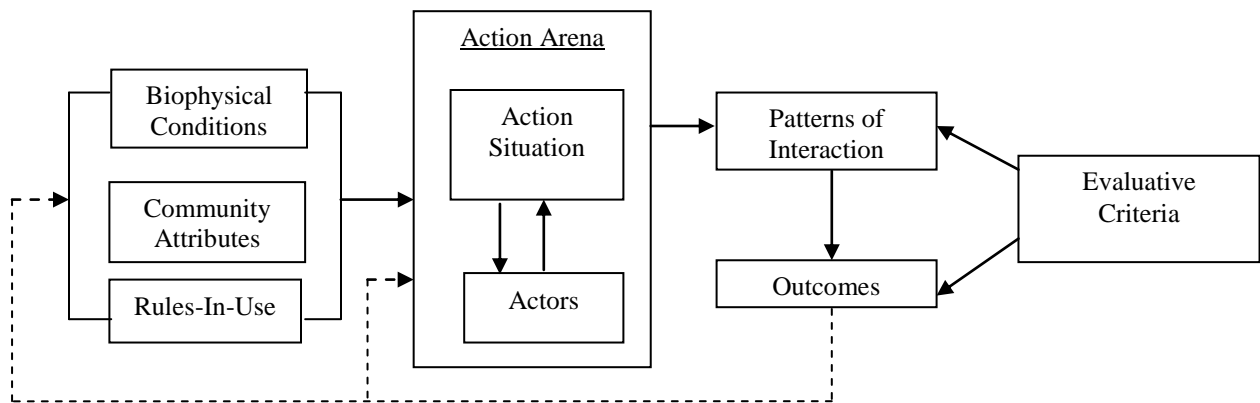
2.1.3 Institutional Frameworks

Frameworks are used to create a coherent structure for inquiry by identifying and organizing the general sets of variables of interest and their relationships to each other (Koontz 2003). Frameworks assist in identifying the elements and associated relationships that should be considered for institutional analysis (Ostrom 2005). Various scholars, (e.g., Bandaragoda 2000; Nkonya 2008; Saleth and Dinar 2005; Williamson 2005), have developed frameworks to strategically analyze institutions by exploring institutional arrangements, assessing performance, and developing strategies for change.

One of the most widely used institutional frameworks within ‘new institutionalism’ is Ostrom’s IAD framework (Figure 2). The magnitude of her body of scholarship and leadership in institutional analysis was recognized with the award of the 2009 Nobel Memorial Prize in Economic Sciences (Nobel Prize.org 2009). The IAD framework links research from different disciplines to analyze how institutions are formed and how they affect human behaviour (Hikkila and Isett 2004; Snell et al. 2010). The framework has been applied in a variety of situations “to systematically analyse the structure of situations faced by individuals and to determine how rules, the nature of events and the attributes of the surrounding environment and local community affect these situations over time” (Smajgl et al. 2009, p.18). It has been used to analyze common-pool resources, along with many other various policy and management issues (Polski and Ostrom 1999; Hikkila and Isett 2004; Rudd 2004).

Figure 2: Institutional Analysis and Development (IAD) Framework

Source: Ostrom, 2005.



Institutional analysis involves examining the exogenous factors (biophysical conditions, community attributes, and rules-in-use) that are external to the decision makers and influence the structure of the action arena, and in turn the patterns of interactions and outcomes (Imperial 1999). The biophysical conditions can vary from setting to setting, affecting the action situation and the humans that interact within the biophysical conditions (Koontz 2003). For example in a watershed this could include water quality, land cover, and sources of pollution (Hardy and Koontz 2010). Bravo (2002) explains that biophysical conditions could also affect some of the variables of an action situation and possible outcomes. The attributes of the community are the second set of variables that affect the structure of an action arena. These attributes are based on local culture, and include the norms of behaviour, community accepted beliefs and values, and the level of common understanding about action arenas (Ostrom 2005). Imperial (1999) explains that the IAD framework stresses the importance of rules and institutions. In this framework, rules can be formal (e.g., regulations, laws, policies) or informal (e.g., social norms) (Imperial and Yandle 2005). Ostrom (2005, p.17) suggests that rules can be thought of as “the set of instructions for creating an action situation in a particular

environment.” The IAD framework differentiates between three levels of rules: operational rules that affect the day-to-day decision making about how, when, and where to do something; collective-choice rules that determine how operational rules can be changed and who can participate in those changes; and constitutional-choice rules that determine who can participate in and make changes to collective-choice rules (Polski and Ostrom 1999; Rudd 2004). The higher levels (constitutional-choice) influence lower levels (collective-choice and operational) and the outcomes at the operational level also may feed back to influence changes at higher levels (Smajgl et al. 2009).

The action arena includes the action situation (a specific activity) and the actors (individuals and groups) who are involved in the situation (Polski and Ostrom 1999). The action situation refers to the space where actors with different interests or concerns interact and do many things such as, exchange goods and services; solve problems; and argue with one another (Ostrom 2005). These interactions may involve a range of actors located outside of the geographic boundaries (e.g., watershed boundary) if their decisions affect the issue or problem (Imperial 1999).

Institutional analysis also involves identifying and evaluating the patterns of interaction that are associated with behaviour in the action arena and the outcomes from these interactions (Polski and Ostrom 1999). Once the exogenous factors are taken into consideration the behaviour of actors in the action arena will create the patterns of interaction, and similarly insight about outcomes will flow logically from the patterns of interaction (Polski and Ostrom 1999, p.24). Participants behave according to the incentives and constraints created in an action situation, and these behaviours combine into the patterns of interaction that establish the relationships of an institutional setting (Smajgl et al. 2009).

Academic scholars have commonly used Ostrom's evaluative criteria (economic efficiency, equity, accountability, and adaptability) to assess institutional arrangements and outcomes related to policy issues (Polski and Ostrom 1999; Imperial 1999; Rudd 2004; Imperial and Yandle 2005; Ostrom 2005). Ostrom and Polski (1999) explain how the institutional analyst evaluates the patterns of interaction and outcomes from these interactions. Through the evaluation process the overall performance of institutional arrangements can be examined to better understand their strengths and weaknesses (Imperial 1999). Smajgl et al. (2009, p.20) suggests that evaluations may lead to, "insights about how current institutional arrangements restrict or enable desirable outcomes and to recommendations about a set of institutional arrangements that may be able to bring about more desirable outcomes."

2.2 WATER INSTITUTIONS, GOVERNANCE AND MANAGEMENT

Institutions shape or influence the manner in which people govern and manage water resources. This section explores the relationship between institutions, water governance and management. An effort is made to illustrate how formal and informal institutions influence water governance and management in Canada.

The concept of governance refers to "the different ways in which societies can organize themselves to accomplish a goal" (de Loë et al. 2009, p.1). Governance is about the decision-making processes, including who makes decisions and how they are made (Government of British Columbia 2010). It involves developing and implementing "socially acceptable allocations and regulations" to manage resources (e.g., social, economic, natural) (Rogers and Hall 2003, p.4).

Water governance refers to the processes and institutions related to the development and management of water resources (Government of British Columbia 2010). There are

several different definitions of water governance. However, the Global Water Partnership's (GWP) (Rogers and Hall 2003, p.16) definition of water governance is commonly used: "water governance is the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society." Water governance is, "conducted through formal and informal institutions, social relationships, and through the 'rules in practice' of everyday water use" (Franks and Cleaver 2007, p.301).

Water management is about the day-to-day operational activities to regulate and monitor water resources (Government of British Columbia 2010). Marsalek (1990, p.315) defines water management as "the complex of activities and measures designed to satisfy human needs and social demands concerning water in an optimal way." Water management involves understanding the physical sciences (e.g., biology, physics, chemistry, and natural processes), and the interactions of the natural environment with human society (Corkal et al. 2007). Water management strives to meet economic development demands while creating an optimal living environment by protecting society from the harmful effects of water (Marsalek 1990). Water management institutions are often employed to improve water quality and to manage water quantity at the local and/or basin wide level (Hearne 2007).

The World Water Assessment Programme (WWAP) (2003) explains how water governance and management are two interdependent processes. When a governance system is established a platform is built for effective water management (Hoover 2007). From this platform water governor's task water managers with a set of policy objectives along with a set of important values and decision-making processes through which to achieve the objectives (Hoover 2007). Thus, an effective governance system should enable practical water

management tools to be implemented correctly (WWAP 2003). Without the political and administrative systems in place, public participation, partnerships between actors and regulatory instruments will be ineffective (WWAP 2003). As water governance and management are interdependent, in the context of this research, they will be considered as two interrelated processes.

Institutions pertaining to water can be both formal and informal. They influence both the governance and management of water resources. Through the decision-making process, water institutions are developed and implemented to manage water resources. Water institutions influence water management by guiding how the water managers regulate and monitor water resources. Institutions such as a formal legislations inform people's behaviour and affects how the decision-making and management of water resources occur. At different levels of the Canadian government various formal water strategies, policies or management frameworks have been developed (Wilson 2004). The Canadian federal government provides guidelines and regulations to water managers for water management through a variety of formal institutions including the *Canadian Environmental Assessment Act*; *Guidelines for Canadian Drinking Water Quality*; and the *Canada Water Act* (Corkal et al. 2007). Provincial and territorial governments have the primary authority for the management of water resources, drinking water quality, maintaining responsibility for surface and groundwater management, and controlling the use and flow of water and pollution control (Corkal et al. 2007). This authority is prescribed through formal legislation such as the Ontario *Clean Water Act* and the *British Columbia Drinking Water Act*. In Ontario, for example, the purpose of the *Clean Water Act* (2006, p.3) is to “protect existing and future sources of drinking water” and it is

through this *Act* the province has regulated the development of source water protection plans to protect drinking water quantity and quality.

Institutions pertaining to the governance and management of water resources can also be informal. Informal institutions, such as social codes of conduct, can inform people on what is acceptable behavior in governing and managing water resources. In a community or household setting it is common to find informal rules that define people's behaviour and the nature of their relationships (Diaz et al. 2006). There are several empirical examples of water management mechanisms in place to reinforce certain water pollution control behaviours. For example, the Yellow Fish Road program is a mechanism that encourages the inherent understanding of what is acceptable behaviour regarding water protection (Trout Unlimited Canada 2009). In 1991 Trout Unlimited Canada (TUC) developed the Yellow Fish Road Program, a nation-wide environmental education initiative to raise awareness about pollution entering their local water supply and how to protect it from hazardous wastes (TUC 2009). While Yellow Fish Road is a formal institution (i.e., a program) the program creates informal institutions (i.e., accepted ways of doing things) about water management.

2.3 FIRST NATIONS WATER INSTITUTIONS

Through the literature review there is an understanding of how institutions shape water governance and management in other contexts, but this does not necessarily apply in a First Nations context. This section focuses on water institutions that are influencing water governance and management in First Nation communities and shaping their water related issues. Additional factors contributing to source water issues and challenges relating to water governance and management are also discussed in this section.

Institutions shaping water governance and management in First Nations' communities are numerous and complex. The federal government of Canada has the legal authority for the provision of drinking water in First Nations' communities (Simeone 2009). There are three federal bodies predominately responsible for water management on First Nation reserves: Aboriginal Affairs and Northern Development Canada (AANDC), Health Canada, and Environment Canada (Harden and Levalliant 2008). AANDC shares responsibility with First Nation Band Councils for community water and wastewater systems including the construction and maintenance of water infrastructure, while Health Canada and Environment Canada are responsible for providing funding and support to help ensure there is safe drinking water on reserves (Corkal et al. 2007).

Federal and provincial governments have developed several formal water institutions that are influencing water governance in First Nations' communities. The *Indian Act 1985* is the principal legislation that regulates a broad range of activities relating to First Nations' communities (Foerster 2002). The *Indian Act* determines the powers and authority of the Elected Council, and allows the council to regulate certain services including the local distribution of water on the reserves (Wilson-Raybould and Raybould 2011). More recently, between 2003 and 2008, AANDC implemented several strategies to improve water and wastewater services on reserves including the *First Nations Water Management Strategy* (2003); the *Plan of Action for Drinking Water in First Nation Communities* (2006); and the *First Nations Water and Wastewater Action Plan* (2009). The objectives and outcomes of these strategies progressed over time, from addressing the "high-risk" systems in First Nations' communities in the *First Nations Water Management Strategy* (2003), to the initiation

of a new federal legislative framework for safe drinking water in First Nations' communities through the *First Nations Water and Wastewater Action Plan* (2009).

In 2006 the federal government established the Expert Panel on Safe Drinking Water in First Nations' Communities to examine options for a new regulatory framework for safe drinking water (Simeone 2009). The panel explored five options to regulating drinking water on-reserve (Simeone 2009). Of the five options, one involved asserting First Nations jurisdiction and customary laws; however, the panel noted this option could create "uncertainty, both in terms of how to get a comprehensive modern water regime and how long the process might take" (Willms and Shier 2006, p.59). In the end the panel recommended the creation of a new federal statute that would establish a single water standards regime (Willms and Shier 2006). However, despite the panel's recommendations AANDC's position is to regulate drinking water on reserves by integrating provincial water laws into new federal legislation (Simeone 2009). Over a period of eleven months, AANDC held a series of engagement sessions with First Nations' communities, organizations, and officials to discuss the proposed approach to the federal legislation initiative (AANDC 2010). In May 2010, the federal government brought forward Bill S-11 before the senate (Simeone 2010). This proposed bill is for regulations governing the safety of drinking water in First Nation communities (Simeone 2010).

In response to the proposed legislative framework for safe drinking water in First Nations' communities, the Chiefs of Ontario (COO) voiced their concerns regarding this proposed framework, stressing the importance of the federal government's responsibility to address the existing infrastructure needs before the development of any legislation (COO 2009a). COO (2009b, p.1) has stated that "Canada must fulfil its fiduciary obligations to

consult with and accommodate First Nations in Ontario to ensure safe drinking water and to respect our Aboriginal, Treaty and inherent rights to apply our laws and values respecting the management of the waters, including drinking waters.” Canada’s fiduciary obligations to consult and negotiate with First Nations originate in historical links (e.g., treaties) and section 35 of the *Constitution Act, 1982*, confirmed through several Supreme Court of Canada decisions (Hurley 2002). It is undetermined how the new Federal legislation will address the ongoing calls by First Nations communities for improvement to current drinking water conditions. However, despite efforts made by AANDC and other federal actors thus far, source water issues have remained a fundamental problem in First Nations’ communities.

As discussed earlier, the Government of Ontario has established the *Clean Water Act* to protect drinking water quantity and quality by implementing new changes to water management practices. Through the *Clean Water Act*, 19 Source Water Protection Committees (SWPC’s) have been established to develop watershed-based drinking water source protection plans (Ministry of Environment 2010). If reserve land falls within a source water protection region (Halpin 2009) Ontario Regulation 288/07 of the Clean Water Act (2006) requires First Nation representation on the SWPC. However, outstanding First Nations land claims have limited the seats reserved for First Nation representation to only 12 of the 19 Committees (Halpin 2009).

Alongside the various federal and provincial water policies and programs there are also several formal First Nations institutions influencing water governance and management. In terms of water governance, in October 2008 First Nations’ communities from across Ontario met in Garden River First Nation to share their perspectives on water and to discuss current water issues and models on how to move forward in protecting the waters (COO 2008).

Following this event, First Nations leaders gathered to confirm and endorse the *First Nations Water Declaration in Ontario*. The *Declaration* (COO 2008) explains the importance of water to the First Nations culture and the responsibilities of the First Nations Peoples to protect and respect the waters for future generations. The *Declaration* (COO 2008, p.2) states that: “First Nations in Ontario have the laws and the protocols to ensure clean waters for all living things.” While the *Declaration* (2008, p.2) could be categorized as a formal institution, there are several elements within the *Declaration* that address the informal water institutions (beliefs and values) including the following statement: “We announce and proclaim our role as the First peoples of Turtle Island – the original caretakers – with rights and responsibilities to defend and ensure the protection, availability and purity of freshwaters and oceans for the survival of the present and future generations.”

The Six Nations of the Grand River is one of many First Nations’ communities that have issued boil water advisories themselves because of high coliform counts (Six Nations of the Grand River 2007). In response to these advisories, the Six Nations Environment Department has developed a Community-Based Source Water Protection Plan (CBSWPP) to identify threats to the quality and quantity of source water in the community and to develop recommendations to reduce or eliminate the threats (Six Nations of the Grand River 2007). During the process, the significance of the community’s value of culture and spirituality beliefs or informal institutions were identified and consequently traditional knowledge was incorporated into the CBSWPP to aid and benefit in ideas, risks and strategies (Six Nations of the Grand River 2007). Traditional ecological knowledge is defined as “a cumulative body of knowledge, practice and belief evolving by adaptive processes and handed down through generations by cultural transmissions, about the relationship of living beings (including

humans) with one another and with their environment” (Berkes 1999, p.8). Currently, the draft CBSWPP is the main strategy or formal institution that is guiding water management issues in the Six Nation community.

The Haudenosaunee (Iroquois) environmental philosophy through the “Words That Come Before All Else” or the thanksgiving address is an example of an informal First Nations institution that includes elements of water management (Haudenosaunee Environmental Task Force 2009). In 1992 the Haudenosaunee Environmental Task Force (HETF) was established to identify environmental problems in their communities and work towards finding solutions, at which time the Task Force developed the “Words that Come before All Else”, a book that explains an indigenous and culturally-based approach to environmental problems (HETF 2009). The Haudenosaunee philosophy on the environment incorporates several principles on environmental sustainability including the importance and respect for water (HETF n.d.). In the “Words that Come before All Else” there is a philosophy that states “if our blood becomes contaminated, it will spread throughout our bodies, and reach our heart, killing us. We must view the Waters of the world the same way and ensure the health of our Mother Earth” (HETF n.d., p.27). While the “Words That Come Before All Else” is a written document, in accordance with the definition of institutions used in this research, it would not be considered a binding law or regulation because it describes the social norms and codes of conduct about how people should behave with regards to environmental sustainability.

2.3.1 Contributing Factors to Institutional Performance

In discussing water institutions and how they are influencing water governance and management in First Nations’ communities, it is important to note and briefly discuss pivotal factors contributing to water issues that are shaping water governance and management. Two

important factors include the fragmented jurisdictions over First Nation reserves and the lack of recognition for Aboriginal title, Aboriginal rights, and treaty rights.

2.3.1.1 Fragmented Jurisdictional Issues

As different levels of government share water management responsibilities in Canada, jurisdictional issues are a persistent concern and pose a particular challenge to First Nation communities (Wilson 2004). Under Canada's constitution, the Federal government has a fiduciary responsibility to the health and safety of First Nations' communities, including access to safe drinking water, while provincial government has the authority and mandate for managing water resources within watersheds (Corkal et al. 2007). Consequently, provinces are responsible for developing legislation and regulations (and accompanying management activities) for drinking water provision, but these do not apply on reserves (Simeone 2009). The Expert Panel on Safe Drinking Water in First Nation Communities describes the current situation as "consisting of a number of parties whose roles and responsibilities are bound by government policies and contribution agreements. These arrangements are neither comprehensive nor easily deciphered; most critically, there are numerous gaps and a lack of uniform standards, as well as enforcement and accountability mechanisms" (Willms and Shier, 2006, p.1). This jurisdictional division has traditionally left First Nations absent from the provincial water management decision-making process, which can be characterized as a larger water governance issue. Intergovernmental forums, for example the Canadian Council of Ministers of the Environment (CCME), have been established to discuss national and international environmental concerns (Wilson 2004). However, First Nations governments are not included in the process (Wilson 2004).

As a result of the waterborne disease outbreak in Walkerton, Ontario, the Ontario provincial government has moved to implement new laws and regulations relating to multiple aspects of water quality protection and management (de Loë and Kreutzwiser 2007), including: the *Safe Drinking Water Act* (2002); the *Walkerton Clean Water Centre* (2004); and the *Clean Water Act* (2006). However, since the Ontario provincial regulatory water standards do not apply to on-reserve First Nations' communities (Simeone 2009) these laws and regulations may do little to assist First Nations' communities in protecting water quality (Phare 2009). The Expert Panel on Safe Drinking Water in First Nation Communities stressed that "source water protection is featured as a central pillar of the planning and management of all drinking water supplies on federal lands/facilities including First Nations communities" (AANDC 2006, p.70). However, Phare (2009) indicates that First Nations' in Ontario are not decision-makers in the source water protection planning process, even though their waters and communities will be greatly impacted by choices at the provincial level. As water does not have jurisdictional boundaries, First Nations' communities have continued to advocate for a meaningful role in the source water protection process in surrounding watersheds (Simeone 2010). In response, the Expert Panel recommended that the regulatory framework for the proposed *Safe Drinking Water for First Nations Act* include source water protection standards (AANDC 2006).

2.3.1.2 *Aboriginal Title, Aboriginal Rights, and Treaty Rights*

A second factor that shapes institutional performance relating to water in First Nations' communities is the lack of recognition of Aboriginal title, Aboriginal rights, and treaty rights. Traditionally First Nations were responsible for governing and managing water resources and in some instances the inherent right to govern has been recognized (Wilson 2004). However, several First Nations continue to struggle to have their rights recognized in an effort to protect

their territories and continue the use of traditional water management laws (Walkem 2007). The Assembly of First Nations (AFN) (2007, p.1) emphasizes the importance for the recognition and implementation of First Nations jurisdiction, which includes the “right to self government and inclusion of First Nations as equal partners on a government-to-government basis in drinking water and source water decision making.” However, Canada has historically denied the existence of any indigenous territorial rights (including water), leaving First Nations people to turn toward Canadian courts in an effort to have the recognition and protection of their water rights (Walkem 2007). First Nations rights are recognized and protected through reserve water rights, Aboriginal title, Aboriginal rights, and treaties rights (Walkem 2007) and a pressing requirement is to understand where First Nations needs and rights fit among the demands for water (Phare 2009). The need for Canada to consider undertaking fundamental change to the decision-making process regarding water is identified (Walkem 2007). Phare (2009, p.78) suggests this change should start with a new administrative and legal regime based on “Indigenous Peoples’ governance and water rights, to manage their water resources and solve the water-related problems in their territories.”

2.4 SUMMARY

Access to safe drinking water is important to all Canadians. However, for many First Nations’ communities “unsafe drinking water is a persistent reality of their daily lives” (Simeone 2009, p.1). Currently on reserves there is a lack of drinking water quality and safety regulations, beyond federal policies and administrative guidelines (Harden and Levalliant 2008; Simeone 2009). The Office of the Auditor General of Canada (2005, p.1) has reported that: “First Nations do not benefit from a level of [drinking water] protection comparable to that of people who live off reserves. This is partly because there are no laws and regulations

governing the provision of drinking water in First Nations communities, unlike other communities.”

Institutions are important to and shape both water governance and management. Exploring the literature on water institutions, governance and management in this chapter reveals a knowledge void concerning water institutions and their influences on water governance and management in a First Nations context. Describing the water institutions in Oneida thus represents an important step to gaining insights into the institutional landscape in First Nations’ communities confronting water challenges.

Ostrom’s IAD framework has been applied in a variety of situations to explore and strategically analyze institutional arrangements. While Smajgl et al., (2009) has applied the IAD framework to water and Indigenous peoples in Australia, it has not been applied in a Canadian First Nations context. Applying the IAD framework in Oneida will illuminate the exogenous factors that are influencing water governance and management, reveal the different relationships between actors involved in implementing these institutions and identify the potential outcomes of these interactions.

CHAPTER THREE: METHODS

This chapter describes the research methods used to follow the IAD framework in exploring water institutions and how these institutions influence water governance and management in Oneida. The methodological approach is specifically intended to achieve the associated objectives of 1) describing the formal and informal water institutions in Oneida and 2) examining and evaluating how these institutions influence water governance and management. The chapter is organized into three parts. The first part provides an overview of the research orientation and design employed to fulfill the aforementioned research purpose and objectives. The second discusses data collection procedures and protocols. The final section sets forth data analysis and reporting.

3.1 RESEARCH ORIENTATION

The following section describes the research orientation and the approaches used to explore water institutions and how they influence water governance and management in Oneida. In order to meet the research objectives, a qualitative research orientation was taken. Qualitative research is conducted to explore and gain an understanding of a problem or issue (Creswell 2007). It is also used to understand the context in which study participants address a certain problem or issue and to help develop theories or models (Creswell 2007).

Although there are many traditions within qualitative research, this work is oriented towards a ‘grounded theory’ approach that “calls for a continual interplay between data collection and analysis to produce a theory during the research process” (Bowen 2006, p.2). A grounded theory approach allows for themes to emerge from the data during analysis, capturing the essence of meaning or experience drawn from different situations (Bowen 2006).

Hodkinson (2008) explains that it is quite common for researchers to use selected features associated with grounded theory without adopting the approach in its entirety. A grounded theory approach in this work specifically informs data collection techniques and analysis discussed below in Sections 3.3 and 3.4.

Qualitative research also draws attention to the need for cultural sensitivity. In the context of First Nations research, the Interagency Advisory Panel on Research Ethics (PRE) (2008) states the importance of respect for the culture, knowledge, and traditions of First Nations' communities. First Nations' people are very interested in ensuring an accurate and informed research process is used when it involves their heritage, customs, and community (PRE 2008). Research in First Nations' communities have often resulted in difficult ethical issues including a lack of respect by researchers, inappropriate use of research methodologies, and expropriation of intellectual and cultural property (PRE 2008). In order to avoid the problems associated with conventional research, Smith (1999) calls for the "decolonization" of methodologies, to develop a new approach that focuses on effective and ethical ways of undertaking research with indigenous peoples. Decolonization is "about the process, in both research and performance, of valuing, reclaiming, and foregrounding indigenous voices and epistemologies" (Denzin and Lincoln 2008, p.21). Even though decolonizing research does not have a common definition or adhere to one specific method or methodology, researchers, activists and writers have generated similar distinctive characteristics of decolonizing research situated in the "motives, concerns, and knowledge brought to the research process" (Denzin and Lincoln 2008, p.33). In order to avoid the problems of reinforcing colonizing processes, research methodologies that respect First Nation cultural integrity and benefit or empower the community were employed throughout the research process.

There are different traditions or approaches to undertaking research with Indigenous peoples (e.g., participatory action research, collaborative research, establishing research agreements) (PRE, 2008; Latendre and Caine 2004; Hoare et al. 1993). To ensure this research was culturally appropriate and sensitive, cross-cultural research methods were applied. Cross-cultural research approaches ensure that there is equal involvement and benefit for both the researcher and indigenous participants throughout the research process (Gibbs 2001). Gibbs (2001, p.684) emphasizes that: “respectful, open, honest, and timely communication, ideally leading to relationships of trust between researchers and researcher participants, is the foundation of successful cross-cultural collaborative cross-cultural research.” In conducting cross-cultural research it is important to consider several cultural sensitivities. Researchers need to have respect for the research participants’ cultural beliefs and practices and ensure interview questions are culturally sensitive and asked in an appropriate manner (Liamputtong 2008). Liamputtong (2008) also explains how building a trusting relationship and establishing a good rapport with the research participants are important steps to collecting exceptional and reliable data in a cross-cultural setting.

Cross cultural researchers have suggested several ways to conduct culturally sensitive research, such as employing a case study approach and conducting interviews to gather research data (Laverack and Brown 2003). Since Oneida culture is based predominately in oral traditions, conducting interviews with participants is an appropriate way to create a narrative on water institutions and to explore how they influence water governance and management. In conducting the interviews several cultural sensitivities were considered. The interviews were conducted in a participant-selected setting (e.g., the participant’s home or place of employment) and appropriate time was allocated to allow for participants to tell their story. It is also

important to have research participants involved in reviewing and evaluating the data at the time of collection and of analysis to prevent misinterpretation of the data (Laverack and Brown 2003). The culturally appropriate instruments used for this research are described in section 3.3 *Data Collection Protocol*.

3.2 CASE STUDY RESEARCH DESIGN

Case studies are anchored in real-life situations and result in a rich accounting of a particular phenomenon (Merriam 2009). Creswell (2003, p.73) explains that a case study research design involves the “study of an issue explored through one or more cases within a bounded system (i.e., a setting, a context).” A case study approach offers insights and illuminates meanings, playing an important role in advancing a fields’ knowledge base (Merriam 2009). Yin (2003, p.42) explains several rationales for a single-case study approach, one of which is the *revelatory* case where the researcher has “an opportunity to observe and analyze a phenomenon previously inaccessible to scientific investigation.”

For this research, a revelatory single-case study approach was adopted to address the research objectives. The literature review revealed that institutions shape water governance and management. However, the institutions described and how they influence water governance and management may not necessarily apply in a First Nations context. Employing a single case study approach to understand water institutions in a First Nations context will contribute to the knowledge base on water institutions, governance and management. Creswell (2003) explains that selecting the case study requires establishing a rationale for choosing and gathering information about the case. There are several factors that facilitated the decision to choose Oneida as a case study. This research was part of a larger three year Social Sciences and Humanities Research Council (SSHRC), *First Nations and Source Waters: Understanding*

Vulnerabilities and Building Capacity for Environmental Governance. The overarching purpose of the SSHRC project is to enhance source water governance in three First Nation communities (Six Nations of the Grand River Territory, the Mississaugas of the New Credit First Nation, and Oneida Nation of the Thames). Thus, the purpose and objectives of this thesis research coincides with the goals of the SSHRC project. The second factor was the strong interest specifically from Oneida to participate in the thesis research because exploring water institutions and how these institutions influence water governance and management in Oneida has not been previously investigated. The third factor was related to the current water issues impacting the physical and cultural uses of water in Oneida. The community currently faces drinking water supply challenges and has concerns with various land use activities impacting the community's health, traditional activities and way of life. For Oneida, the Thames watershed has been an important cultural heritage site and impacts to the water quality of the Thames River and its tributaries is of concern to the community. Therefore, exploring Oneida as a single case study increases the depth of the analysis and discussion on water institutions and their influence on water governance and management in a First Nations context.

3.3 DATA COLLECTION PROTOCOL

Yin (2003) explains that it is appropriate to use various sources of evidence in a case study as doing so allows an investigator to address a range of behaviour, attitudinal, and historical issues. Researchers use multiple data collection techniques for several reasons, such as to increase the accuracy of research findings and to generate new knowledge by synthesizing findings from different methods (Alexander et al. 2008). Multiple data collection techniques (document review, participant observation, interviews, and workshops) were used

to collect the data for this research. The main data collection methods were document review (section 3.3.1 *Document Review*) and key informant interviews (section 3.3.2 *Key Informant Interviews*). Personal observation (section 3.3.3 *Personal Observations*) provided a supplemental source of information.

Before entering the field, in order to meet the research objective a research guide (see *Appendix A – Field Research Guide*) was developed to assist in determining what data should be collected and by which data collection method. The research guide was generated by replicating aspects of the IAD framework. Its purpose was to ensure that the correct data were collected relative to the components of the framework (i.e., the exogenous factors and the action arena) and to examine the patterns of interaction and outcomes.

Prior to the field research, Oneida Chief and Council and the University of Waterloo Research Ethics Board (REB) granted approval for the study. The following sections detail each of the data collection methods and the ethics protocols employed. The procedures for data analysis are discussed in section 3.4 *Data Analysis*.

3.3.1 Document Review

Yin (2003) explains how collecting information from documents is relevant and should be part of a data collection plan in a case study design. For case studies, documents can be used to corroborate evidence from other sources by verifying information, to provide specific details and may provide conclusions worthy of further investigation (Yin 2003). Issues associated with document research involve locating materials and obtaining permission to use the materials (Creswell 2007).

While the Oneida culture is based predominately on oral traditions, the Elected Council does maintain various documents including policy documents, council meeting minutes, and

staff reports. It is important to note that the majority of these Council documents are confidential and unavailable to non-community members and researchers. However, time was allocated to identify and review available community water-related documents throughout the research process (e.g., source water protection plans, water polices/regulations/laws). The research guide was used to determine what documents should be acquired to provide insight into the elements of the IAD framework (i.e., exogenous factors and action arena). A comprehensive search of websites was conducted to gather existing Oneida-relevant documents. Permission was also obtained from Chief and Council to acquire relevant community documents through the Oneida Environmental Coordinator.

In total, 14 documents were analyzed to provide insight into the exogenous factors and action arena (see *Appendix B – List of Documents*). These included community documents (4), NGO publications (3), regional, provincial and federal government documents (6), and other relevant documents (1). The results from reviewing documents are presented predominately in Chapter Four to describe the biophysical conditions and rules-in-use.

3.3.2 Key Informant Interviews

Interviews are one of the most valuable sources of case study information because most case studies are about human affairs and therefore specific interviewees can provide insight on a specific situation or issue (Yin 2003). Interview types are differentiated by the degree of structure imposed on their format. They included structured interviews (questions and structure are identical for all interviews) to unstructured (interviewers have a list of topics for respondents to talk about) (Fielding and Thomas 2008). In order to meet Objective 1, the interviews were of a semi-structured nature to provide the opportunity to seek the facts on water institutions as well as the respondent's opinions on how institutions are influencing water

governance and management (see *Appendix C – Informal Interview Guide*). In a semi-structured interview the questions are worded more flexibly, providing the opportunity for the researcher to “respond to the situation at hand, to the emerging worldview of the respondent, and to new ideas on the topic” (Merriam 2009, p.90). The IAD framework was used to generate an informal interview guide with questions that capture the elements of the framework (i.e., exogenous factors, action situation, and actors). A trial interview was conducted with the Oneida Environmental Coordinator to ensure the interview guide was culturally appropriate and specific to water institutions, governance and management practices in Oneida.

The Oneida Environmental Coordinator led the recruitment of potential participants at first and subsequently through snowball sampling to recruit additional informants (see *Appendix D – Verbal Script for Environmental Coordinator*). Based on extensive conversations with the Environmental Coordinator about institutions and the influences on water governance and management, an initial list of potential interviewees about these practices was identified. Yin (2011) explains how snowballing occurs when the researcher learns of other people who could be interviewed during the course of an interview.

Eighteen key informant interviews were conducted with community representatives who are involved with water governance and/or management practices. The informants included current on-reserve administrators (4), community members (2), Traditional Council members (2), and two former administrative staff (i.e., previous water treatment operator and past councillor for Elected Council). The key informant interviews were conducted between July and September 2010 (see *Appendix E - List of Key Informants*). All the interviews were conducted in person and ranged in length from thirty-five minutes to two and a half hours. Eight of the ten participants were interviewed on two occasions. On the first occasion the

participants provided broad insights into the cultural importance of water, and water governance and water management practices in Oneida. On the second occasion additional questions were asked to gain a deeper understanding of water institutions, the action arena and how institutions are influencing water governance and management. Interview results are presented in Chapter Four and Five to describe the exogenous factors and provide insights into how institutions are influencing water governance and management in Oneida.

Once the Oneida Environmental Coordinator made the initial contact with participants, the researcher followed-up with participants via telephone and/or e-mail to explain the purpose of the interview and proposed research. At this time interviews were scheduled with willing participants and verbal consent to conduct an interview was obtained. Oneida clearly stated that verbal consent is the only acceptable form of explanation in the community due to the issues of trust and perceptions in forms and documents. In accordance with the University of Waterloo REB regulations, an information letter with oral consent was obtained from the participants for any data shared during the interviews (see *Appendix F – Verbal Consent for Interview Informants*). Upon completion of the study, a participant feedback letter (see *Appendix G – Participant Feedback Letter*) and a short summary of the results was prepared and circulated to all participants.

3.3.3 Personal Observation

In qualitative research, keeping a reflective journal is a common practice to record the researcher's experiences during the process (Ortlipp 2008). Journal writing allows the researcher to reflect on data collection techniques (e.g., interview transcripts) and various issues about the research process (Janesick 1998). Personal observations were made during July to September 2010. For the purpose of this research, personal observations were used to

gain insight into the water institutions in Oneida and how these institutions are influencing water governance and management. A field journal was used throughout the research to document observations and impressions collected during the interviews, a community event, and multiple visits in the community. These observations were used during the analysis to present insights that are important to a broad understanding of the water institutions and how these institutions are influencing water governance and management. Personal Observations reported in the results chapters will be referenced by citing *Kate Cave, Observation Log*.

3.4 DATA ANALYSIS

The following section describes data treatment, data analysis and reporting of the results. Once the research data were collected, they were transcribed and member checking was undertaken. Creswell (2003, p.196) suggests that member checking is used “to determine the accuracy of the qualitative findings through taking the final report or specific descriptions or themes back to participants and determining whether these participants feel that they are accurate.” Member checking was undertaken by providing the interview transcriptions to the participants to verify the findings. Following the process of member checking the transcribed interviews, collected documents, and personal observation notes were entered into a QSR Nvivo database for analysis. Nvivo is a software package to assist the researcher in organizing and analyzing qualitative data (Welsh 2002).

After the data were entered into the database the process of analysis was undertaken. In following the orientation of this research coding was used to categorize data and illuminate connections between issues, concepts or themes (Monette et al. 2011). Ellinger and Watkins (2005) suggest that data should be analyzed for several overlapping purposes including for a *descriptive purpose* and for an *analytical purpose*. The process of open coding is used to break

down raw data (interviews, document analysis, and participant observation) into themes and patterns for a *descriptive purpose* (Benaquisto 2008). Data analysis began with the open coding process to organize the data for Objective 1. Memoing was used throughout the process of open coding to take note of ideas or reflections about the evolving theory (Creswell 2007). Once themes and patterns were identified a narrative was created to provide a detailed description of the formal and informal water institutions in Oneida. Moen (2006, p.4) defines a narrative as: “a story that tells a sequence of events that is significant for the narrator or her or his audience”. The researcher undertakes a process to reorganize the stories and in the end the “narrative story tells the story of individuals unfolding in a chronology of their experiences, set within their personal, social and historical context, and including the important themes in those lived experiences” (Creswell 2007, p.57). Narratives connect individuals to their social, cultural, and institutional settings (Moen 2006). In Aboriginal culture stories are passed down orally (Kulchyski et al. 1999). Thus, creating a narrative to describe the water institutions in Oneida is an appropriate way to report the results in Chapter Four that correspond to Objective 1 of the research. Open coding was also employed to describe the action arena (the action situation and actors involved in water governance and management) presented in Chapter Five.

The process of open coding sets the stage for axial coding (Benaquisto 2008), to code the data a second time for an *analytical purpose* (Ellinger and Watkins 2005). Axial coding is “the phase where concepts and categories that begin to stand out are refined and relationships among them are pursued systematically” (Benaquisto 2008, p.51). The process of axial coding pulls apart the narrative of the case studies in a different way to dig deeper into the stories (Ellinger and Watkins 2005) and provide insight into categories or themes that influence or explain the central phenomenon (Creswell 2007). Axial coding was employed to examine how

these formal and informal institutions influence water governance and management in Oneida (Objective 2). Guided by the IAD framework axial coding was used to illuminate the patterns of interaction resulting from the combination of exogenous factors and the behavior between actors in the action arena, the outcomes, and ultimately the evaluation of institutional performance in regards to water. The remaining results are reported according to the structure of the IAD framework in Chapter 5.

CHAPTER FOUR: NARRATIVE ON WATER INSTITUTIONS

This chapter develops a rich understanding of the formal and informal water institutions in Oneida. In following the IAD framework, it specifically addresses the three exogenous variables (biophysical conditions, community attributes, and rules-in-use). The chapter starts with a brief community profile. The three exogenous variables are then broadly categorized into the biophysical/material conditions, community attributes, and the rules-in-use. The biophysical/material conditions are described in terms of the hydrogeological features in the region and the water management infrastructure. The community attributes include the physical and cultural uses of water and addresses community awareness/knowledge about water governance and management. The section on rules-in-use describes the formal (e.g., written codes, regulations, laws, and programs) and informal (e.g., values, beliefs, and customs) water institutions that are used in the governing and management of water resources in Oneida. Since Aboriginal title, Aboriginal rights, and treaty rights influence water governance and management, the chapter ends with a brief description on the perceptions about rights and environment in Oneida.

4.1 ONEIDA COMMUNITY PROFILE

The Oneida Nation is one of the six nations of the Iroquois Confederacy (Cornelius 1999). The Iroquois are also known as the Haudenosaunee people or the “People of the Longhouse” and are located within the Great Lakes Basin (HETF 2011). Each nation of the Iroquois Confederacy has a definable territory (the original land base) and a former or current land base (Cornelius 1999). The Oneida Nation is originally from the Finger Lakes District of New York State (McCallum n.d.). In 1840 a large group left and settled along the Thames

River and over the next five years several other groups arrived (McCallum n.d.). In 1939 the Oneida people purchased the 5200 acre tract of land from a family in the area (McCallum n.d.). The fact that this land was purchased and not set aside as a reserve, is unique to the Oneida Nation (McCallum n.d.). Oneida is one of the four First Nations' communities that have permanently settled on the Thames River (Taylor et al. n.d.).

There are four First Nations' communities within the watershed, with lands accounting for 1.5% of the total watershed area (Taylor 2004). The Oneida community is located approximately twenty-five kilometres southwest of London in the Township of Delaware in the County of Middlesex. The community encompasses 2,412 hectares of land along with a 142 hectare parcel of land formerly known as the Cotterill/Prior properties (First Nations Environmental Services Limited 2009). It is bordered along the west and north banks of the Thames River (R. J. Burnside and Associates Ltd. 1987; Oakridge Environmental Ltd. 1998). As of December 31, 2006, 2,023 members lived on the reserve and 3,174 members lived off the reserve (FNESL 2009).

Many Haudenosaunee people still maintain the traditional system of government which is predominately a matriarchal system with Clan Mothers providing leadership and guidance to the Haudenosaunee people (Six Miles Deep 2009). However, the Indian Act AANDC has imposed Elected Chief and Councils within the communities (South West Local Health Integration Network 2010). In Oneida, both forms of Councils (Traditional and Elected) exist but the community is governed by the Elected Chief and up to twelve councillors (SWLHN 2009). The Director of Operations and Divisional Administrators manage the day to day administration (SWLHN 2009). The community has several services including a police force, volunteer fire department, day care, an emergency shelter, churches, halls, retail complex,

medical and social services complex, and a seniors residence (FNESL 2009). Unlike many other First Nations the Oneida community has multiple people within the community who provide services such as healing, education, grief, and treating conflicts or problems (Powless 2009).

Clint Cornelius (2010b), past Elected Council member, estimated that approximately 40% of the community has maintained the traditional Haudenosaunee culture. Lo:t[^]t (2010) and Al Day (2010a), members of the Traditional Council, explained that Tsi ni yu kwali ho:tu' is a full immersion school where fifty to seventy children learn about the traditional Haudenosaunee ways including beliefs, language, and ceremonies. There are also two traditional longhouses in the community (Chief Abram 2010a). While advertised community events are rare, every September the Oneida Fall Fair brings community members together with vendors serving traditional foods and selling local crafts (Kate Cave, Observation Log).

4.2 BIOPHYSICAL/MATERIAL CONDITIONS

4.2.1 Hydro geological Features in the Region

The Thames River is the second largest watershed in Southwestern Ontario and one of Canada's most southern watercourses (Taylor 2004). The River originates northeast of London, Ontario draining 5285 square kilometers of land southwesterly into Lake St. Clair and subsequently Lake Erie (Taylor 2004). The Thames River is 273 km long (Taylor et al. n.d.), 12.5 km of which are along the lands of the Oneida community (FNESL 2009). Throughout the community the Thames River averages approximately 30 meters in width with fluctuating water depths (FNESL 2009).

Oneida is situated on a gently rolling plain, broken up by numerous streams (FNESL 2009). The tributaries that enter the Thames River have been described as "short and steep

with relatively mature tributary valleys carved into the sand and clay plains” (Upper Thames Regional Conversation Authority 2008, p.6). There are several small natural tributaries with intermittent flows (Chief Abram 2010b; Clint Cornelius 2010b), travelling in a northwest direction through the community towards the Thames River including Turkey Creek and Oneida Creek (FNESL 2009). Existing studies and geological maps indicate the soils in Oneida are predominately sand and clay (R.J. Burnside and Associates Ltd. 1987). The eastern side tends to be predominately clay while the western side tends to be sandy loam to sand. The majority of the remaining usable springs are located in the western side (Al Day 2010b; Yotwaniyohstę 2010b).

Historically, there have been several sources of water in the Oneida community including wells, springs, creeks, and the Thames River. Before the construction of the community’s waterline, the majority of the residents obtained their water from either bored or dug shallow wells (R.J. Burnside and Associates Ltd. 1987). Even though community members commonly used wells they also frequently collected water from the springs (Al Day 2010b). Al Day (2010b) remembers when he was growing up “there wasn’t any hesitation, [when] walking to the store and on our way, drinking from the water coming out the side of the hill. And I don’t know that you’ll find that anymore.” Chief Abram (2010a) is aware of a spring towards Komoka where community members would collect water but it was closed because of pollution problems (Chief Abram 2010a). Al Day (2010b) believes that community members are reluctant to use the few remaining springs in the community because they are unsure about water contamination. In the past, the Thames River was also used as a popular source of drinking water (Joanne Summers 2010a; Ida Cornelius 2010b; Lois Cornelius 2010b). Ida Cornelius (2010b) remembers “when my mom, when she was growing up...she can recall

when that Thames River was clear, that you could see the bottom [and] you could swim in the river. You don't see that [anymore].” Families would also haul water from the Thames River for their farms (Lois Cornelius 2010b). Turkey Creek was also an important source of water particularly for ceremonies and to provide an environment for medicinal plants and traditional foods to grow (Clint Cornelius 2010b; Joanne 2010b).

4.2.2 Water Management Infrastructure

In 1975 and 1976 a small water supply and distribution system was constructed (R. J. Burnside and Associates Ltd. 1987) for a section of the community including the administrative buildings, the Standing Stone Elementary School, and a small subdivision (Lois Cornelius 2010a; Al Day 2010a). In 1981, Chief and Council hired McLarens Engineers and Planners to conduct an examination of the existing water treatment plant and the conditions of services to the community (R. J. Burnside and Associates Ltd. 1987) including the undertaking of a well improvement program. During the investigation 136 of the 153 inspected wells had faults (R.J. Burnside and Associates Ltd. 1987). Al Day (2010a) was Elected Chief at that time and explained that since the majority of the wells were shallow there were concerns with the application of chemicals on adjoining agricultural lands impacting the water quality. As a result, the Chief and Council had the wells sealed by excavating around and backfilling them with bentonite (Al Day 2010a). However, Al Day (2010b) remembers that community members started complaining that their wells were drying up and they had to start buying water.

Several years later the Chief and Council hired R.J. Burnside and Associates Ltd., (1987) to undertake a study for a proposed extension to the existing water distribution system in addition to the development of a waste water disposal system. It was determined there was sufficient data and justification for a new water treatment facility (Al Day 2010a). After

several years of lobbying the federal government, funding was granted to construct a new water treatment plant (Al Day 2010a). Chief Abram (2010a) explained that since the majority of community members were on wells and concerned about water quality, constructing an upgraded water treatment plant and waterlines was a significant improvement. Over a period of three years the Chief and Council paid to have the distribution system installed throughout the entire community (Al Day 2010a).

Currently the water distribution system includes an infiltration gallery located in the Thames River floodplain, a water main network with several fire hydrants, an elevated water storage reservoir, and a Greensand filtration system (FNESL 2009). Oneida has an aquifer approximately 1500 meters in length, with a depth of 15 meters supplying water to the community (Oneida Nation Health Centre 2009). In Oneida the raw water is pumped to the water treatment plant by two submersible pumps and a force main (FNESL 2009), supplying water to over 460 community homes (Oneida Nation Health Centre 2009). In the community there are forty-seven fire hydrants along the water main (Oneida Nation Health Centre 2009). As a previous councilor for Elected Council, Clint Cornelius (2010b) indicated that there is insufficient fire protection throughout the community because the fire hydrants need to be connected to six inch diameter water mains which are currently only four inches in diameter. The community's water tower is used to meet peak demands of water use, required water for fire flows, and to maintain pressure throughout the distribution system (Oneida Nation Health Centre 2009). However, due to the demand for water (e.g., to build a 64 bed nursing home), it has been suggested the water tower is close to reaching its maximum capacity (Clint Cornelius 2010b).

Oneida's water supply is categorized as GUDI (Ground Water Under the Direct Influence of surface water) (Oneida Nation Health Centre 2009). According to Regulation 170 under the Ontario Safe Drinking Water Act (OSDWA) (2002, p.11), GUDI is defined as:

A drinking water system that obtains water from a raw water supply that is ground water under the direct influence of surface water is deemed, for the purpose of this Regulation, to be a drinking-water system that obtains water from a raw water supply that is surface water.

The current water treatment process starts with a pre-chlorination system, feeding chlorine into the raw water before the filtration units (FNESL 2009). Two manganese greensand filtration units are used to remove high levels of iron and manganese (April Varewyck 2010a; Clay Dockstader 2010b; FNESL 2009). Over the last 15 years the community's water treatment plant has undergone several upgrades to promote safe drinking water and address capacity issues. The original infiltration gallery was constructed in 1976, with upgrades in the 1980's during the development of the new water treatment facility. In 2003 a second infiltration gallery was constructed to address capacity issues (FNESL 2009). In 2009 the pump station was moved out of the floodplain to prevent future flooding of the mechanics and possible boil water advisories (Al Day 2010a).

4.3 ATTRIBUTES OF THE COMMUNITY

4.3.1 Uses of Water Sources

Water is highly regarded and valued as an intricate part of life in any capacity and as a basic necessity for living (Clint Cornelius 2010b). There are both physical and cultural uses of water in Oneida. Present day uses of water include drinking, bathing, watering gardens, filling swimming pools, and washing cars (Al Day, 2010b; Clay Dockstader 2010b; Chief Abram 2010b; Ida Cornelius 2010b). The principal source of water for the community is from an aquifer below the Thames River (Al Day 2010a; Lois Cornelius 2010b). Ida Cornelius (2010a),

the Director for Health and Human Services, indicated that there are approximately five to ten households in the community still using spring feed or filled well water for showering, bathing and/or drinking. Ida Cornelius (2010b) is personally aware of one individual who is solely on spring water.

Water is an intricate part of the traditional ceremonies and prayers (Clint Cornelius 2010a). As a Traditional Council member, Al Day (2010b) shared that there is not one specific ceremony that speaks to water by itself. However, at different times during the year there are ceremonies that use water, such as the strawberry ceremony (Chief Abram 2010a).

Yotwaniyohstę (2010a), a traditional knowledge holder, explained that the water drum is one of the main Haudenosaunee instruments frequently used during the ceremonies and songs and water is always present in the drum. Water is also frequently used in the preparation of traditional foods, such as corn soup and strawberry drink (Al Day 2010a; Clint Cornelius 2010a). Medicine people will also use water during a feast to sprinkle around and protect someone's home (Ida Cornelius 2010a; Lois Cornelius 2010a).

In the community there are different sources of water used for ceremonial and medicinal purposes including creeks, marshes, swamps, springs, and rainwater (Yotwaniyohstę 2010b; Joanne Summers 2010b), with specific areas where medicinal plants grow and depend on the waters (Clint Cornelius 2010b). For instance, Turkey Creek was used for collecting medicines but it has become overgrown and modified by beavers, restricting the regular flow of the creek (Clint Cornelius 2010b; Joanne Summers 2010a) and reducing areas where medicinal plants can grow. Many different plants have healing properties and water has traditionally been used to make medicines and some of the poultices (Ida Cornelius 2010a).

Poultices are used to help draw out an infection or wound and some of the poultices require more moisture to prepare (Ida Cornelius 2010).

Since the majority of the Thames watershed is located within the Carolinian Life Zone, Taylor (2004) has indicated the importance of protecting this biologically significant watershed. Joanne Summers (2010b), a traditional knowledge holder, indicated that in the past women have kept the creeks clean because water provides an environment for plants to grow. Certain plants (e.g., water cress, pepper roots, wild garlic, leeks) along the creeks have traditionally been staple foods but between the low water levels, the invasion of purple loose strife, and beavers residing in the area, Joanne Summers (2010b) has noticed that these plants do not grow along the creeks anymore.

4.3.2 Community Awareness/knowledge about Water Governance and Management

Through this research it was discovered that several of the participants interviewed were part of a small network of key individuals concerned with water issues. With personal and professional experiences this group of key individuals is aware and knowledgeable particularly about water governance practices in Oneida. Several individuals agreed that the population of Oneida is aware that the Chief and Council are the main political body for the community (Clint Cornelius 2010b; Yotwaniyohstę 2010b; Lois Cornelius 2010b; Chief Abram 2010b). However, it was suggested by Clint Cornelius (2010b) and Yotwaniyohstę (2010b) that only a small percentage of the community are aware of how water management decisions are made. Lois Cornelius (2010b), a re-elected councilor for Elected Council, indicated that while community members have limited knowledge about the decision-making process regarding water resources, community members know to call the Band office and speak to the Chief about any issues. While the Chief and Council are the main speakers in the

community and hold the accountability to its members (Clint Cornelius 2010b), Joanne Summers (2010b) thinks that community members are concerned about the level of accountability.

Clint Cornelius (2010b), past Elected Council member, believes only 10% of the community are aware about water management in Oneida. Although community members are aware there are administrative staff dealing with water, (e.g., water treatment operators and a director of operations) (Chief Abram 2010b), Al Day (2010b) suggests that the community has less knowledge about the chain of commands and the formal rules in place for managing water. During a drinking water occurrence, (e.g., coliform or E-coli occurrences), the community will understand who makes the advisories (Chief Abram 2010a). However, Clint Cornelius (2010b) and Al Day (2010b) agreed that the community has limited knowledge about how the Elected Council is promoting safe drinking water in the community, such as training requirements for water treatment operators or the details about chemical analysis to ensure safe drinking water.

That being said, the Health and Human Services Department has continued to undertake educational programs in the community to bring awareness about water management. For example, in 2009 staff developed a booklet explaining the community's water distribution system (Ida Cornelius 2010a). During advisories communiqués are distributed to the community as an opportunity to reinforce the issues around safe water and safe water practices (Ida Cornelius 2010a). When the Health and Human Services Department conducts household water sampling staff are continuously educating the community about water related issues (Ida Cornelius 2010b). On the other hand, Ida Cornelius (2010b) the Director of Health and Human Services, is unaware of the extent to which this information is transmitted to other members of the household.

Regardless of the level of awareness/knowledge community members have about water management water quality issues remain a common and persistent complaint (Clay Dockstader 2010b; Chief Abram 2010a). For example, according to Clay Dockstader (2010b) a former water treatment plant operator for Oneida, the water treatment operators provided a plant tour but members did not attend. Ida Cornelius (2010b) also indicated that the Health and Human Services Department has organized health fairs in the community, providing the opportunity for the Environmental Health Officer (EHO) to demonstrate how the water is being treated with a model of the infiltration gallery system.

4.4 RULES-IN-USE

4.4.1 Formal Institutions

4.4.1.1 *Water Governance*

In Oneida there is a clear process within the Elected Council administration regarding how decisions are made about water resources. Chief Abram (2010b) explained that daily decisions are made administratively at the technical level by the water operators, outside engineers or by the EHO in conjunction with the departments of Public Works and Health and Human Services. Technical staff assess the situation (e.g., low levels in the water tower), make decisions on how to address the issue, and inform the Public Works Administrator of these decisions (Clay Dockstader 2010a). The Public Works Administrator speaks to the Director of Operations who subsequently updates the Chief and Council (Clay Dockstader 2010a; Chief Abram 2010b).

Elected Council's role is to be informed by technical staff, ratify decisions, and lobby for funding and resources (Chief Abram 2010a; Ida Cornelius 2010b). Chief and Council provide funding and support for departmental programs (Chief Abram 2010a). Regarding

water management, technical staff will inform the Council of their concerns and requests for resources to promote safe drinking water in the community (Chief Abram 2010b). Lois Cornelius (2010a), a councilor for Elected Council, explained that Chief and Council make the larger decisions, for example, deciding about long-term expansion of the water distribution system to meet future growth in the community.

While the key informants did not discuss the influence of the *Indian Act* on water governance in Oneida, it is important to discuss its role. Within the *Indian Act* (2011, p.50), section 81 (1) provides power to the Elected Council to develop bylaws in respect to the use of water in the following situations:

- (f) The construction and maintenance of water courses, roads, bridges, ditches, fences and other local works; and
- (l) The construction and regulation of the use of public wells, cisterns, reservoirs and other water supplies.

The *Indian Act* also enables the Elected Council to request funding from federal agencies such as AANDC to undertake environmental studies and assessments to ensure safe drinking water is provided to Oneida members. Elected Council has hired several consultants to conduct water assessments of the existing water treatment plant including, Oakridge Environmental Ltd. (1998), Ontario Clean Water Agency (2001), and First Nations Engineering Services Ltd. (2009).

4.4.1.2 *Water Management*

While water management encompasses several different aspects of water, this section focuses mainly on drinking water. Water quality monitoring is conducted at both the water treatment plant and at the household level. At the water treatment plant, operators follow general maintenance procedures and guidelines for the treatment of the water. Following the

construction of the water treatment plant in the late 1980's, First Nations Engineering Services Ltd., prepared a *Standard Operation and Procedures Manual* and an *Equipment Operating and Maintenance Manual* to guide the operation of the water treatment system (OCWA 2001).

Clay Dockstader (2010b) indicated that the water treatment operators are currently following the Ontario provincial guidelines and regulations for safe drinking water. Ontario Regulation 170 specifically pertains to First Nations' communities (Clay Dockstader 2010b). The regulation is used for water testing and is based partially on the Canadian Drinking Water Quality guidelines (Ontario Nation Health Centre 2009). According to provincial regulations, the Oneida water supply system is categorized as a large municipal residential system and Schedule 10 of Ontario Regulation 170 outlines the frequency of microbiological parameters that must be tested (FNESL 2009). For this water system, Oneida water treatment operators must test for "E-coli or fecal coliform, total coliform and heterotrophic plate count on a weekly basis" (FNESL 2009, p.30). Thus, water quality is tested on a daily and weekly basis on a scata system and submitted to labs for chemical and microbiological analysis (Clay Dockstader 2010a). Should the laboratories discover any bacteria counts exceeding the limits, the treatment plant operators and Health Canada are contacted immediately (FNESL 2009). If required a boil water advisory is issued and the necessary procedures are followed, which includes increasing the chlorination concentration, flushing fire hydrants, and sampling "until two consecutive readings are within regulations" (FNESL 2009, p.29).

Despite these administrative provisions, a study conducted in 2009 indicated there was a lack of consistency in the number of reports submitted by the water treatment operators to the laboratory for analysis (FNESL 2009). For example, at the time of the report it was determined that fewer than three samples for general bacteria population were collected per

month, the parameters (E.coli, fecal coliform and total coliform) were not consistently being tested weekly, and exceedances were not regularly provided to the Ministry of the Environment (MOE) or to Health Canada (FNESL 2009). Importantly, even though the frequency of water quality monitoring at the Oneida water treatment plant did not meet provincial standards, it was still judged to be operating satisfactorily (FNESL 2009).

In the late 1980's when the new waterline was constructed there was an expectation that community members on the line would pay \$10 per month, but there was also a view in the community that it should be free and part of a service provided by Elected Council (Al Day 2010b). Lois Cornelius (2010a) explained that the Elected Council administers the monthly fee, which goes towards water treatment and the general plant maintenance. The Elected Council has a policy outlining the consequences for failing to pay the monthly water bill which permits the operators to shut off the members water until their arrears are brought up to the date (Clint Cornelius 2010b). The water treatment operators also follow a water pressure policy that indicates when the pressure falls below twenty psi (pounds per square inch) the operators will follow a boil water procedure (Clay Dockstader 2010a). Additionally, the Chief and Council have directed administrative staff to install water filters in homes with children to increase the level of water quality protection (Lois Cornelius 2010).

At the household level, the Community Health Representative (CHR) through the Health and Human Services Department undertakes microbiological testing (FNESL 2009). The collection protocol involves three water samples a week at four random households in the community (Ida Cornelius 2010a; Lois Cornelius 2010a). These samples are collected to ensure consistency in the water quality immediately leaving the water treatment plant and at the furthest point of the distribution line (Clint Cornelius 2010a; Ida Cornelius 2010a). The

CHR also collects weekly water samples at each of the Council buildings including the Standing Stone Elementary School and the Oneida Child Care Centre (Clint Cornelius 2010a). The CHR stores the sampling information on Health Canada's Water Trax Database Management System (FNESL 2009) and forwards the samples to the same labs the water treatment operators use for analysis (Ida Cornelius 2010a). The First Nations and Inuit Health Branch (FNIHB) conduct quarterly and annual chemical analysis and the results are forwarded to the community's administration and leadership (Ida Cornelius 2010b; FNESL 2009). The FNIHB compares the chemical analysis of the community distribution system against Schedule 24, Regulation 170 of the Ontario Drinking Water Standards (FNESL 2009).

The Health and Human Services Department also operates under the OSDWA's standards to ensure home distribution sampling meets the parameters within the provincial guidelines (Ida Cornelius 2010b). In the interview with Director Ida Cornelius (2010b), she reflected upon how the Health and Human Services Department deals with water-related issues in the community. Ida indicated that there is currently a process in place to deal with drinking water occurrences which includes increasing the sampling size and frequency. If household samples show the presence of microbiological contamination, the Health and Human Services Department follows the procedures outlined in the Ontario Regulations for re-sampling. Regardless of the results from household sampling, if a community member has concerns about drinking water quality, the Health and Human Services Department will conduct additional tests beyond the existing sampling regime.

FNESL's (2009, p.80) study recommended the development and implementation of an "Emergency Response Plan and include a notification protocol, water quality sampling, actions to alleviate emergencies, normal operation testing, training and a response program for adverse

test results.” Currently, there is an Emergency Plan that covers various issues or events, (e.g., boil water advisories, floods, spills, or maintenance issues) (Al Day 2010a; Ida Cornelius 2010a). The Plan outlines the normal parameters for drinking water quality (Ida Cornelius 2010a) with a list of whom and how to contact people in an emergency situation (Clay Dockstader 2010b; Ida Cornelius 2010a). The plan was updated in 2009 and 2010 (Ida Cornelius 2010a).

The Health and Human Services Department also plays a fundamental role in educating the community about water management through a number of programs. In 2008/2009 the department initiated a safe water program through Health Canada (Ida Cornelius 2010a). In 2009 the Health and Human Services Department developed a booklet for community members outlining the distribution and treatment of their drinking water along with information on well maintenance (Oneida Nation Health Centre 2009). In addition to water related projects the Health and Human Services Department provides yearly visits to all Oneida residents to share key information on measures to ensure safe drinking water, such as cooler and facet filter maintenance (Ida Cornelius 2010a). In the case of a boil water advisory the Health and Human Services Department and/or the Public Works Department will inform the community through a series of means, including door-to-door flyers, notices on the marquee board by the community centre, and announcements via the radio (Lois Cornelius 2010a; Kate Cave Observation Log).

4.4.2 Informal Institutions

4.4.2.1 Description of Water Beliefs and Customs

In section 4.3.1 *Uses of Water Sources* the different cultural uses of water were described. In addition, there are also several beliefs and values associated with water. Water is

part of a circle of life which is why the beliefs around water in the community go back to the “original instructions” (Al Day 2010a). Within the creation story there are original instructions given to all living things about their roles and responsibilities in the world (Al Day 2010a). Water was given instructions to “provide sustenance, to provide the nourishment for all living things to live on...it is a place for mammals to live in, all kinds of aquatic life” (Al Day 2010a). During the Thanksgiving Address thanks are given to all of creation for fulfilling their roles and responsibilities (Al Day 2010a).

Clint Cornelius (2010b) explained that the respect and values for water have been instilled upon community members since they were children and are passed on from generation to generation. Yotwaniyohste (2010a) expressed that “water was always here...it’s something that is to be respected...the power that it has as a natural element.” By respecting or valuing water and the health of the children and future generations, there is an intrinsic connection or value between water and the Oneida people (Ida Cornelius 2010a). Yotwaniyohste (2010b) believes that understanding the beliefs and values around water is about recognizing the core value of water itself. In government policy it would be described as a statement of environmental principles or values, but in Oneida it’s informal “it’s an internal, it’s a social conditioning, a cultural value that you have and it might not be stated but it’s there” (Yotwaniyohste 2010b).

Through medicine societies or personal rituals people learn about the different medicinal aspects and beliefs about water (Rolanda Elijah 2010a). Joanne Summers (2010b) explained that there is a belief that water provided the Oneida community with the medicinal and traditional plants for members to gather and use. Natural springs are believed to be sacred and those waters are used as a medicine (Lois Cornelius 2010b; Lo:t^t 2010). Lois Cornelius

(2010b) recalls a time when a mother used to take her child down to the spring every morning to heal the child's eyes by flushing them out with the water: "So there are beliefs in that way that you know, if there's a good spring water and it seems like it's clear and pure maybe back in them days, it probably was, but today with all the farming and everything you know that's going on so I don't believe that's so safe anymore."

4.4.2.2 *Informal Institutions to Govern Water Resources*

First Nations people tend to understand that water is cyclical (Yotwaniyohstē 2010b). With this imagery of a circle everything is interconnected and with this theory of interconnectedness decisions would be made about water (Chief Abram 2010b). Ida Cornelius (2010a), the Director of Health and Human Services, believes that there are individual and family informal institutions (e.g. beliefs and values) to protect the health of the water and in turn the health of the children and the community. So naturally, at an administration level, these values play a part in deciding on the measures to ensure there is safe drinking water in the community (Ida Cornelius 2010a).

Water has always been viewed as a feminine principle (Yotwaniyohstē 2010a). Therefore, for First Nations' communities it has traditionally been the responsibility of the women to care for the water (Clay Dockstader 2010a). The females would look after the water, informally deciding to clean and take care of the springs and ditches because that is where they got their medicines from (Joanne Summers 2010b). In the past when women came into womanhood they would go to the creeks with a pail of water and wash themselves down because it was good for the women (Joanne Summers 2010a). Yotwaniyohstē (2010a) explains how "the woman's natural biological cycles, is part of the natural cycles of within

creation. So that the woman is always more tightly bound up with creation or connected to it, so there's very little that woman have to do in order to be in tune with that."

4.4.2.3 *Informal Institutions to Manage Water Resources*

Similarly to the informal institutions to govern water resources there is the imagery of a circle and everything being connected and how this belief of interconnectedness would influence the management of water resources (Chief Abram 2010b). "When you are looking at water and its significance to life and to sustenance for your food, [for] the land...and us as [people]," taking this holistic approach means Elected Council members are already managing water resources (Ida Cornelius 2010a). When the new water treatment plant was first commissioned the Elected Council administration held an open house in the community and a small traditional ceremony (Clay Dockstader 2010b). Even though the community is not formally notified about discharges into the Thames River, Chief Abram has developed an informal relationship with a London citizen who notifies the Chief when there are discharges into the River (Chief Abram 2010b).

Clint Cornelius (2010b) explained that if community members are of a traditional mind informal institutions about how to protect, conserve, and take care of water resources are instilled in you from generation to generation (Clint Cornelius 2010b). Al Day (2010b) believes that informal institutions to manage water resources are not community-wide or to a particular group of people. Several key informants indicated that at the individual level there are informal institutions as part of everyday life to conserve water (Lois Cornelius 2010a; Joanne Summers 2010b; Clint Cornelius 2010a) and to prevent contamination of the community's water resources (Yotwaniyohste 2010b).

4.5 PERCEPTIONS ABOUT RIGHTS AND ENVIRONMENT

In Oneida it is believed that the people have rights and an obligation, a responsibility to look after Mother Earth, but Al Day (2010b) believes the Oneida people have been deficient and inadequate in fulfilling this responsibility. In terms of aboriginal rights, in Southern Ontario there is the 1701 Nanfan treaty which states First Nations people have the ability and right to hunt and fish anywhere within the treaty area (Al Day 2010b; Six Nations Elected Council 2008). In the Treaty there was an agreement between the nations to “share all the resources within this particular area known as the Beaver Hunting Grounds” (Chief Abram 2010b). The Treaty explains where Oneida people can continue to travel and sustain their livelihoods as in past generations (Clint Cornelius 2010b).

Joanne Summers (2010b) explained how “we have water rights, we have air rights, we have water you know, we have all the rights.” Oneida people have the right to hunt or harvest traditional foods or medicines along the river (Joanne Summers 2010b). These rights also fall under a basic human right, in that “all humans should have the right to have clean water to drink...you should have the right to a clean environment.” (Al Day 2010b). Lois Cornelius (2010b) expressed how “we have a right to have safe water, Oneida people or any other community. And we have a right to have clean air and a right to a clean environment.”

CHAPTER FIVE: RESULTS FROM THE INSTITUTIONAL ANALYSIS

This chapter develops a rich understanding of how the institutions in Chapter Four influence water governance and management in Oneida. In following the IAD framework, institutional analysis starts with the exogenous factors, (i.e., biophysical conditions, community attributes and rules-in-use), that were presented in Chapter Four. Chapter Five is structured according to the remaining elements of the IAD framework (Figure 2) and presents results according to the action arena, patterns of interaction, outcomes of these interactions, and an evaluation of institutional performance. Polski and Ostrom (1999) explain how the action arena includes the action situation (a specific activity) and the actors (individuals and groups) involved in the situation. Once the action arena has been determined, the patterns of interaction associated with the behaviour in the action arena and the outcomes from these interactions can be identified. During the evaluation process the institutional analyst evaluates both the patterns of interaction and the outcomes from these interactions (Polski and Ostrom 1999).

5.1 ACTION ARENA

For this research the action situation focuses on the governance and management of water resources in Oneida and the actors or participants involved in this situation, including actors outside the community, (i.e., federal government, provincial government, municipalities, conservation authorities), and actors inside the community, (i.e., Elected Council, Traditional Council, community members). In order to thoroughly understand the contextual setting, an overview of the current issues that are influencing water resources in Oneida is presented. The

actors involved in the governance and management of Oneida's water resources are then described.

5.1.1 Action Situation

As discussed in Chapter One, over the past century human activities have drastically affected the water quality and aquatic habitat of the Thames watershed and its tributaries (Taylor 2004). Studies suggest the potential threats to water quality in the Thames River include agricultural chemical/fertilizer applications in the area, upstream wastewater treatment plant discharges, road salt, and waterborne contaminants (Oakridge Environmental Ltd. 1998; FNESL 2009). Since the Thames River supplies water to the infiltration gallery, any contaminants present in the river have the potential to be captured by the infiltration gallery (Oakridge Environmental Ltd. 1998). This explains the pervasive community concern with environmental events and activities affecting the quality and supply of water.

The activities, rules, and regulations at the provincial level greatly affect what Oneida does at the community level because “of course, water flows so it's not like it's an isolated resource” (Yotwaniyohste 2010b). Clay Dockstader (2010a), a former water treatment operator in Oneida, explained that it is mostly upstream activities causing impacts to the surface water and subsequently the ground water in Oneida. In 2005, the City of London had 58 by-pass events causing 225 million litres of raw sewage to enter the Thames River (Clear Network 2006). Elected Chief Abram (2010a) and Yotwaniyohste (2010b), the past Administrator of Public Works expressed concern about the City of London discharging millions of litres of partially treated sewage into the river because they didn't receive notification of the discharge. More recently the community has been concerned with the City's proposed South Side Sewage Treatment Plant, only two km north of Oneida along the Thames

River (Chief Abram 2010a). Furthermore, the release of the Spring Break and Fanshawe Dams continue to be of concern because they have previously caused contaminant occurrences in their drinking water (Al Day 2010a). Droughts in the watershed have also influenced the supply of water available to the community. In the summer of 2010 Oneida was on its first water conservation advisory, which encouraged residents to conserve water until enough was available for distribution (Clay Dockstader 2010a; Kate Cave, Observation Log).

Throughout the Thames watershed and region, agricultural practices have had a long history as “one of the most productive agricultural regions in Canada” (UTRCA 2008). However, for the Oneida community agricultural practices, (e.g., application of fertilizers/chemicals), within the floodplain could potentially contaminate their water supply (Oakridge Environmental Ltd. 1998; FNESL 2009; Clay Dockstader 2010a; Chief Abram 2010a). Ida Cornelius (2010a) believes this issue is amplified since the community is not informed of the local farming activities or isolated incidences, such as spills. According to Chief Abram (2010a), Chief and Council are equally concerned with the agricultural activities within the community because private property owners in Oneida lease out land in the floodplain to farmers without any regulations on applying chemicals/fertilizers to the land.

Oneida is within the vicinity of the Green Lane landfill site (see Figure 1) which is located in Southwold Township in the County of Elgin, southwest of the City of London (City of Toronto 2007). Given its close proximity, Oneida has opposed the Green Lane Landfill Site from the inception in 1978 (Al Day 2010a; City of Toronto 2007). Al Day (2010a), the Elected Chief during the 1980’s, reflected on the Chief and Council’s concerns with the original landfill site. When the original landfill site was built a leachate collection system was never developed. In the late 1980’s the Ministry of Environment tested the water quality of wells

adjacent to the reserve boundary and refused to provide chemical analysis reports to Chief and Council or the land owners who had their wells declared unacceptable to drink. Chief and Council were concerned because one of these wells was also a source of water for Oneida community members.

In 2006 the City of Toronto passed the required environmental assessment and received provincial approval for the expansion of the landfill site (City of Toronto 2007). However, Chief Abram (2010a) and Clint Cornelius (2010a) expressed concern that the community is slightly downhill from the site and there are concerns the plumes could reach into the water bed. According to Al Day (2010a) and Clint Cornelius (2010a) there is a level of community awareness the expansion may impact on the community's future water supply.

5.1.2 Actors

5.1.2.1 Actors outside the Community

Several actors outside the community are influencing decision-making and management of water resources in Oneida. At the federal level, AANDC and Health Canada have different roles in influencing the governing and management of water resources in Oneida. AANDC's approach to addressing water management concerns in First Nations' communities involves providing the infrastructure for the water treatment systems and leaving the ownership and operations to the First Nation community (Yotwaniyohstę 2010b; AANDC 2011).

Over the years the Elected Council has hired several consultants to conduct water studies and assessments. In the 1980's the Elected Council hired R.J. Burnside Associates Ltd. to conduct an analysis of the existing water treatment plant (Al Day 2010a; R.J. Burnside Associates Ltd. 1987). Nearly a decade after the new water treatment system was constructed Oakridge Environmental Ltd. (1998) was hired to conduct a wellhead protection and aquifer

exploration study to evaluate the possibility of establishing a wellhead protection strategy and expanding the community's existing infiltration gallery system. In 2001 the Elected Council received funding and arranged for OCWA (Ontario Clean Water Agency) to conduct an assessment of the water treatment plant (Yotwaniyohstę 2010a). FNESL (2009) was hired about eight years later to conduct an engineering assessment of Oneida's water treatment facility including a review of their compliance with OSDWA and an assessment of the physical works. Chief Abram (2010a) explained that the Elected Council also has a good working relationship with outside organizations such as the Six Nations Eco-Centre.

In the past, from Al Day's (2010a) experience, there has been minimal dialogue between the City of London and Oneida. However, Chief Abram (2010a) explains that the City of London and Oneida are taking small steps towards building a better working relationship. Water quality in the Thames River has been monitored at the provincial level since the 1960's (Taylor et al. n.d.). As of 2003, twenty-three sites were being monitored by the Upper Thames Regional Conservation Authority and nine sites in the Lower Thames Conservation Authority (Taylor et al. n.d.). The conservation authorities collect water quality samples as partners in the Ministry of the Environment (MOE)'s Provincial Water Quality Monitoring Network (Taylor et al. n.d.). According to Yotwaniyohstę (2010b) the conservation authorities are looking at source water protection. This statement is in accordance with the source water protection process established by the Ministry of the Environment (2011).

5.1.2.2 Actors inside the Community

The community is governed by an elected Chief and up to twelve councillors (SWLHIN 2009; Chief Abram 2010b) with elections every two years (Clint Cornelius 2010b;

Chief Abram 2010b). The Elected Council includes the Departments of Public Works and Health and Human Services. Specifically under the Public Works administration there are five different areas: housing, water, roads, infrastructure, and environment (Clint Cornelius 2010b). The day-to-day decisions are made administratively by the Director of Operations and department administrators (SWLHIN 2009).

The Departments of Public Works and Health and Human Services are the main actor's involved in the management of water resources in Oneida. The Health and Human Services Department has a CHR who is responsible for collecting samples from individual households and community buildings (Al Day 2010a; Clint Cornelius 2010a). Clint Cornelius (2010a) explained that the water treatment operators are qualified, certified, and experienced to interpret the water conditions and identify system problems. Chief and Council requires a minimum grade twelve education in order to work at the water treatment plant (Yotwaniyohstę 2010a). In order to be a certified operator at a water treatment plant you are required to have at least a class three license, which is obtained from on-the-job training (Clay Dockstader 2010). Since each class of license needs to be renewed every three years, training is ongoing for the operators (Clay Dockstader 2010b). As a past councilor for Elected Council, Clint Cornelius (2010b) stated that water treatment operators also review draft policies and guidelines and provide recommendations on how the Council should proceed. Chief and Council then sanction any policies or guidelines and make any budgetary decisions (Clint Cornelius 2010b).

The Traditional Council is not involved in the decision-making process about water resources in Oneida (Clint Cornelius 2010b; Al Day 2010b). At the same time, since the Elected Council adheres to AANDC's rules the Traditional Council has chosen not to be involved in this process (Clint Cornelius 2010b; Al Day 2010b). However, the Traditional

Council does want to be kept informed for community members who come to the Council with questions or for support (Clint Cornelius 2010b).

Several key informants stated that community members are also not directly involved in the decision-making process (Clay Dockstader 2010a; Al Day 2010a; Joanne Summers 2010b; Yotwaniyohste 2010a). However, in the past the Elected Council had divisional technical committees including a Public Works Committee where the community could become aware and involved in water issues (Clay Dockstader 2010b; Al Day 2010b). In 2010 the Public Works Committee was reinstated to deal with water issues with representatives from the community, administration, and Chief and Council (Clay Dockstader 2010b). It is anticipated this committee will be drafting water related policies (Chief Abram 2010b). Chief Abram (2010b) explained that community members also have the opportunity to get involved in the election process for the Elected Chief and Council.

5.2 PATTERNS OF INTERACTION AND OUTCOMES

In following the IAD framework (see Figure 2), the next step in institutional analysis involves identifying the patterns of interaction and their outcome(s) (Polski and Ostrom 1999). In combination the three exogenous factors, (i.e., biophysical conditions, community attributes and rules-in-use), and the behavior between the actors in the action arena lead to patterns of interaction and ultimately result in outcomes (Smajgl et al. 2009). Given the purpose of this research, attention is concentrated on the patterns of interaction and outcomes related to water governance and management in Oneida.

The patterns of interaction describe the behavior between actors in the action arena (Polski and Ostrom 1999) and the influences of the exogenous factors (Smajgl et al. 2009). The patterns of interaction in this section describe the behavioural characteristics of the actors

that influence water issues and decisions as they relate to the rules-in-use and implementation through formal and informal institutions. By mapping the interactions between exogenous factors and actors, the analyst can identify and understand the outcomes of the action arena (Smajgl et al. 2009). Outcomes are the result of the interactions between participants in an action arena (Smajgl et al. 2009). Loquine (2010, p.27) explains how the “outcomes from the interactions between participants are then realigned and can be re-entered as new exogenous variables for a new action arena.” Results from the analysis follow under the category headings of ‘relationships between actors involved in formal institutions’ and ‘relationships between actors involved in informal institutions’.

5.2.1 Relationships between Actors involved in Formal Institutions

In this section the relationships between actors involved in formal water institutions are discussed and the outcomes from these interactions are illuminated. As discussed in Chapter 2, formal institutions are the rules that are observable through written documents including written codes, regulations, and binding laws that outline what may or may not be done (Nkonya 2008; Hearne 2007). Currently, there are many actors involved in implementing formal institutions and influencing the governance and management of water resources in Oneida. These actors include Elected Council and Federal Government; Elected Council and Municipalities; Elected Council and Conservation Authorities; and actors within Elected Council. Patterns of interaction among the constellation of these actors and the accompanying outcome(s) build upon Section 5.1 and were arrived at by the data collection procedures and analytical techniques outlined in Chapter Three.

5.2.1.1 *Elected Council and Federal Government*

The first pattern of interaction is the relationship between the Elected Council and the Federal Government. Within the Federal Government there are two major actors involved in implementing water institutions that are influencing water governance and management:

AANDC and Health Canada's FNIHB. Both of these actors provide financial and/or technical support implemented through different formal institutions to the Chief and Council and its administrative staff.

In Oneida, AANDC currently supports water treatment operator training by providing financial support to implement OFNTSC's Circuit Rider Training Program in Oneida (Clay Dockstader 2010b). The Circuit Rider Program is a training initiative that is commonly used in First Nations' communities to assist water treatment operators in receiving on-the-job training in the operation and management of a plant (Clay Dockstader 2010b). AANDC also created and funded the Tribal Councils to help First Nations' communities including Oneida with management and capacity issues and support for training and qualifications (Yotwaniyohste 2010b; Clay Dockstader 2010b). The Tribal Councils have professional engineers who assess the level of operator training and submit proposals for additional funding to assist with training (Yotwaniyohste 2010b).

The objectives of Health Canada's FNIHB (2007, p.44) are to "reduce the incidence of waterborne illnesses and outbreaks by increasing and improving the monitoring of and reporting on community drinking water supplies." The FNIHB's EHO provides guidance and procedures on health and water related issues to technical staff at the Oneida Health and Human Services Department and coordinates the chemical and microbiological water analysis at a Health Canada approved certified company (Ida Cornelius 2010a). The FNIHB also works

with technical staff to conduct both quarterly and annual chemical analysis while providing a database management system for Oneida's CHR to store and maintain water sampling information (FNESL 2009).

There are several outcomes from the interactions between the Elected Council and Federal Government. The funding provided by AANDC to support the Circuit Rider Training Program ensures water treatment operators are receiving on-the-job training in the operation and maintenance of the water treatment plant. According to OFTNSC (2011, p.1) the program has been very successful in First Nations' communities with improvements in "water and sewage quality...and plant operators now work as confident stakeholders in the process." Clint Cornelius (2010b) expressed it is the government's fiduciary responsibility to ensure clean drinking water is provided to First Nations' communities and providing proper training is the only area the Federal Government is not neglecting.

While the financial support from AANDC has provided opportunities for training and improvements to the community's water infrastructure, it has been expressed that an additional outcome is Oneida's dependence on outside actors for sources of funding (Al Day 2010b) and to develop community procedures (Yotwaniyohste 2010a). From Yotwaniyohste's (2010b) experience as the past Public Works Administrator, the Elected Council is paying more attention to the funders who are providing money to the community than the people they are actually servicing. For example, the Health and Human Services Department's technical staff operate under the advice and support from the EHO (Ida Cornelius 2010b) but the procedures provided by Health Canada "should have been community developed not Health Canada prescribed" (Yotwaniyohste 2010a).

The *Indian Act* provides power to the Elected Council to regulate the management and distribution of water resources in the community (Wilson-Raybould and Raybould 2011). In order to fulfill these responsibilities, it requires the federal government to provide funding to undertake various studies and assessments. Over the years, several reports have been successful in providing sufficient data and justification for the Chief and Council to lobby for financial support to improve water treatment and infrastructure (Al Day 2010a). Over the past fifteen years these studies have resulted in several upgrades to the community's water treatment infrastructure to promote safe drinking water and address capacity issues. For example, during the 1980's when the majority of community members were on wells and given the concerns about water quality, constructing an upgraded water treatment plant and waterline was a significant improvement to the community (Chief Abram 2010a).

5.2.1.2 *Elected Council and Municipalities*

The second pattern of interaction is between the Elected Council and municipalities, specifically the City of London and the City of Toronto. Throughout the Thames River watershed environmental events and land use activities have negatively influenced the hydrogeological features in the area. For the Oneida technical staff involved in the day-to-day operations, these concerns are amplified by the lack of communication from actors outside the community (Ida Cornelius 2010a).

The outcomes from the behaviour between the Elected Council and the municipalities are related to the jurisdictional division of responsibilities to manage water resources in the Thames Watershed and the lack of consultation between Elected Council and municipalities. The Chief and Council are trying to develop better working relationships with the City of London (Chief Abram 2010a). However, technical staff still have reservations concerning the

City of London's lack of acknowledgement for their concerns about activities that could be influencing Oneida's drinking water (Ida Cornelius 2010b; Yotwaniyohste 2010b). Even without a formal agreement between these two actors to notify Oneida of land use activities, the Provincial Government has a duty to consult with Oneida through the Ontario Environmental Assessment (OEA) process (MOE 2007).

In order to mediate community concerns about the Green Lane Landfill Site, the City of Toronto made changes to the expansion plan and established an agreement with the community. Firstly, the City of Toronto proposed diverting the surface water away from the Lower Thames Watershed and into the Kettle Creek Watershed (Garrod 2006). Without this diversion, about 90% of the surface water would naturally flow easterly to Turkey Creek and eventually into the Thames River (Garrod 2006). Even though the City of Toronto has assured Oneida that the uncontaminated surface water will be redirected (Clint Cornelius 2010b; Garrod 2006), Al Day (2010a) indicated that the community still has concerns about the diversion of surface water back towards Turkey Creek after the lifespan of the site. Secondly, in 2007 the City of Toronto also signed a "First Nations Community Benefits Agreement" between the Oneida, Chippewas of the Thames First Nation and the City to "offset the impact of the City's new landfill site on their communities" (Information and Privacy Commissioner Ontario 2009, p.5). This formal agreement contained financial payments to the two communities to benefit the community for impacting their rights and the surrounding environment (Information and Privacy Commissioner Ontario 2009).

5.2.1.3 *Elected Council and Conservation Authorities*

The relationship between the Elected Council and conservation authorities is the third pattern of interaction. As a result of the *Clean Water Act*, both the Upper and Lower Thames

Conservation Authorities are part of the Thames – Sydenham Region Source Protection Region and partners on a Committee to coordinate the development of a Source Water Protection Plan for their watershed (Ministry of the Environment 2011). This Committee is a good environment for Oneida representatives to learn about what is happening in the Thames watershed including future plans for the City of London (Ida Cornelius 2010b).

The Ministry of the Environment (2011) has allocated three seats to represent the eight First Nations communities within the Thames-Sydenham and Region Source Protection Region. Yotwaniyohste (2010b) expressed concern that through this process Oneida is not really involved in any of the decisions. Despite concerns regarding representation on the Committee, Chief Abram (2010a) believes that overall Oneida has a positive working relationship with the Lower and Upper Thames Conservation Authorities outside of the source water protection process. However, Chief Abram (2010a) expressed concern that unsecure funding will affect the success of outcomes from the committee meetings.

5.2.1.4 Actors within Elected Council

It is important to discuss the role the Elected Council has in relation to formal and informal institutions. Within the Elected Council there are three main actors responsible for implementing water institutions that are influencing water governance and management: the Chief and Council, the Public Works Department, and the Health and Human Services Department. Each of these actors has different roles and responsibilities applied through various formal institutions, (e.g. water policy and emergency response plan), related to water governance and management in Oneida.

As discussed in Chapter Four, the Public Works Department is responsible for the daily maintenance and operation of the water treatment plant, which includes monitoring drinking

water quality in Oneida. The Health and Human Services Department has two important roles related to water management in Oneida implemented through a series of formal institutions: household water quality monitoring and educating Oneida members on water related issues. Within each of the departments of Elected Council there are technical committees including a Public Works Committee. During the late 1990's there was an opportunity for community members to become aware and involved in water related issues through the Public Works Committee (Clay Dockstader 2010b; Al Day 2010b). However, in the opinion of Al Day (2010b), the committee should have been more advisory in nature, more of a sounding board as opposed to making decisions and directing staff. In 2002 the Chief and Council discontinued the departmental technical committees and removed the opportunity for community involvement, but the committee has recently been reinstated (Clay Dockstader 2010b).

There are several outcomes related to the behavior of actors within Elected Council and how they are influencing water issues and decisions as they relate to formal institutions. While the Elected Council has power through the *Indian Act* to develop by-laws related to water resources, Yotwaniyohste (2010a) stated that the lack of governance structure in Oneida is linked to the deficiency in legislative authority or the power for Elected Council to develop laws. While the Elected Council can make a lot of decisions in the community, those decisions are dependent on funding from AANDC (Chief Abram 2010b). Although there is a deficiency in legislative authority at the Elected Council level, the formal institutions that have been established provide direction to technical staff on how to manage water resources (Clint Cornelius 2010b). As an economic instrument, the funds generated through the levy implemented by Chief and Council supports water treatment and general plant maintenance costs (Lois Cornelius 2010a). During the research process it was discovered that access to

Elected Council documents (such as Council meeting minutes) is confidential. However, Clint Cornelius and Chief Abram reflect upon the formal institutions in Oneida. Past councilor Clint Cornelius (2010b) noted that the Council does not have any regulations to enforce water conservation advisories in the community. However, Chief Abram (2010a) explained that programs to curtail unregulated agricultural practices in Oneida are being considered, specifically to prevent the use of certain pesticides and herbicides that could harm the quality of the Thames River.

The Public Works Department has focused on providing educational opportunities for Oneida members to learn about where their drinking water comes from and how it is treated (e.g., the plant tour). However, through Joanne Summers' (2010b) experience as a community member, the water treatment operators do not provide sufficient information on why there is an advisory and what is being done to address the problem. Previous technical staff highlighted the importance of increasing the level of understanding of water management in the community (Yotwaniyohste 2010b; Clay Dockstader 2010b). For example, Yotwaniyohste (2010b) suggested increasing awareness by explaining how the distribution system works including the physical aspects and operational procedures (Yotwaniyohste 2010b). In addition to this, an interviewee suggested reinstating the Public Works Committee will provide the opportunity to involve community members and increase awareness and knowledge about water governance and management (Clay Dockstader 2010b).

While Oneida has undergone several upgrades to certain physical aspects of the water treatment plant, according to Chief Abram (2010a) Oneida does not meet the safe drinking water standards in Ontario because the water treatment plant does not have enough backup equipment in case of an emergency. Yotwaniyohste (2010a) explained that in the past there

have been maintenance related issues, (e.g., pump failures), at the water treatment plant because there wasn't a monitoring system in place to check for mechanical failures. Clay Dockstader (2010b) explained that under the provincial regulation Oneida's infiltration gallery is deemed a GUDI system that requires a different type of treatment than is currently being used. A GUDI system must include chemically assisted infiltration or equal treatment to comply with the OSDWA (FNESL 2009). Thus, the Chief and Council are in the process of undertaking a water study to address capacity and treatment process issues in order to meet the provincial regulations for a GUDI system (Clay Dockstader 2010b; Chief Abram 2010b).

The Health and Human Services Department has initiated several programs and projects to identify water related issues in the community. Key informant Ida Cornelius (2010a) reflected upon the Health and Human Services Department's 2009 well study that was funded by Health Canada's *Drinking Water Safety Program*. Through the well study it was determined there were roughly 20-25 wells in the community, approximately 10 of which were identified as potentially dangerous or hazardous. This study also highlighted that well owners are not maintaining them properly which includes regular water quality testing. Thus, for the households that have wells, the Health and Human Services Department staff started to provide well testing and additional education on well maintenance.

The departments of Public Works and Health and Human Services work collaboratively to ensure that the community is provided with safe drinking water (Ida Cornelius 2010a). When there is a drinking water occurrence, for example, high total coliform, information is shared with the emergency advisory team and a collaborative decision is made on how to address the problem and inform the community (Clint Cornelius 2010a). The advisory team consists of the Chief or a designate, the Director of Operations, and technical staff from the

departments of Public Works and Health and Human Services (Ida Cornelius 2010b).

Meanwhile, on the operational side, water treatment operators address the situation by super chlorinating (to shock the system ensuring harmful organisms are destroyed) and if necessary contacting the volunteer fire fighters to assist in distributing water to community residents (Clint Cornelius 2010a). Even though the Ida Cornelius (2010a) suggested that even though the Emergency Response Plan identifies a core emergency group that convenes to resolve water related issues that arise, management needs to be more proactive then reactive regarding water issues. Ida Cornelius (2010a) also expressed the importance of maintaining open lines of communication to ensure appropriate measures are taken by the core emergency group.

5.2.2 Relationships among Actors Involved in Informal Institutions

In this section the relationships among the actors involved in informal water institutions are discussed and the outcomes from these interactions illuminated. As discussed in Chapter Two, informal institutions are unwritten social norms and codes of conduct and include, traditions, cultural norms, beliefs, values, and accepted ways of doing things (Nkonya 2008; Leftwich 2006). Through this research the informal institutions have been created and upheld either through practical implementation or through historical values, beliefs, and cultural norms. Currently, the actors involved in informal water institutions and influencing the governance and management of water resources in Oneida are Elected Council and Provincial Government; Actors within Elected Council; Elected Council and Traditional Council; Elected Council and Women; and Elected Council and the community. Identifying the patterns of interaction among these actors and the accompanying outcome(s) also build upon Section 5.1 and were arrived at by the data collection procedures and analytical techniques outlined in Chapter Three.

5.2.2.1 *Elected Council and Provincial Government*

Even without federal drinking water regulations to monitor water quality in Oneida, Elected Council has taken the initiative to follow the provincial regulations and guidelines set out in the *Ontario Safe Drinking Water Act* to guide water quality parameters (Clay Dockstader, 2010b; Ida Cornelius 2010b). The decision to follow the provincial regulations has established an informal institution that has been practically implemented to guide the water treatment operators and ensure that safe drinking water is provided to community members. Even though the Federal government is in the process of developing new water legislation for First Nations' communities (Chief Abram 2010a; Yotwaniyohste 2010a), Chief Abram (2010a) expressed that when the new legislation is developed his community will implement whichever policy has stronger water management guidelines. Yotwaniyohste (2010b) suggested that outcomes from the new legislation could include transparency and accountability to the community by clearly identifying and formalizing what the roles and responsibilities will be concerning water management in Oneida.

5.2.2.2 *Actors within Elected Council*

The Elected Council has been involved in the practical implementation of informal institutions influencing water governance and management. Clay Dockstader (2010b) explained that when the new water treatment plant was first commissioned the Elected Council administration held an open house in the community with a small traditional ceremony. Lo:t[^]t (2010a) explained how the Director of Operations is also trying to practically implement informal institutions (traditional teachings) into the day-to-day operations as staff expressed the need to identify with their culture as Oneidas. The informal relationship Chief Abram has established with a local citizen helps limit the water quality occurrences because the water

treatment operators can be informed of discharges into the Thames River and take the appropriate measures to ensure safe drinking water is provided.

Informal institutions have also been created through the historical values, beliefs, and cultural norms passed on from generation to generation. Ida Cornelius (2010b) explained that water is significant to all forms of life and since it is viewed in a holistic way it is rooted in how members of the Elected Council are managing water resources. Ida Cornelius (2010a) believes that individual and family social norms and values about water would naturally play an important part in deciding on the measures the Elected Council would take to ensure there is safe drinking water provided to the community. Chief Abram (2010b) explained how the theory that everything is interconnected would be embedded in the decision-making and management of water resources.

5.2.2.3 Elected Council and Traditional Council

The second pattern of interaction is the relationship between the Elected Council and Traditional Council. Ever since the Elected Council was established in the 1930's there has been a division in the relationship between the Traditional and Elected Councils (Clay Dockstader 2010b; Yotwaniyohstę 2010b) and this division has impacted how informal institutions have influenced water governance and management in Oneida.

In the 1701 Nanfan Treaty the Nations agreed to “share all the resources within this particular area known as the Beaver Hunting Grounds” (Chief Abram 2010b) and it is within the treaty the forefathers wrote about the responsibilities the Traditional Council had to adhere to (Clint Cornelius 2010b). Lo:t't (2010) explained that there is an understanding the Traditional Council have title to the land and ultimately the right to make community decisions about the resources. Al Day (2010a) explained that the beliefs and values around water go

back to the original instructions. All elements of life were given instructions on their roles and responsibilities, what they are supposed to do, and how they were supposed to look at the world (Al Day 201b). Lo:t^t (2010) expressed how the original instructions have “been like our survival guide.” However, according to Clint Cornelius (2010b) and Al Day (2010b) the Traditional Council is not involved in any of the day-to-day operations or decision-making in the community. Clint Cornelius (2010b) and Al Day (2010b) both agree the Traditional Council does not want to be involved because Elected Council adheres to AANDC’s rules. The reason for this stems back to the 1930’s when the Elected Council was developed by the federal government (Chief Abram 2010b).

There are several outcomes from the behavior between the Elected Council and Traditional Council involved in informal water institutions. Chief Abram (2010b) explained that the Traditional Council is not currently involved in the decision-making process so any traditional values or beliefs (e.g., the “original instructions”) used to govern or manage water resources are not being incorporated into current practices. This division between Councils has prevented the informal institutions related to water from influencing water governance and management. For example, Yotwaniyohstē (2010b) explained that in the Thanksgiving Address “water is mentioned like as being one of our life-sustainers. So that’s the context of water as being a sustainer. And [because of the division the Thanksgiving Address] has not made its way into taking control of a resource.”

Clint Cornelius (2010a) explained the importance of the two Councils sharing information to bring awareness and knowledge on water governance and management to their constituents. Al Day (2010a) believes that in order to bring the two councils together the General Council meetings need to be re-established, where both Councils and community

members can attend to discuss community business (Al Day 2010a). This would be a consensus based process where “the people are in charge” of making decisions and providing direction for the Council (Al Day 2010a). Yet, even if the Traditional Council chose to become involved in the decision-making and management of water resources, Yotwaniyohstę (2010a) believes the Elected Council would not “share that power or control with the traditional council. No matter how unaccountable it is.”

5.2.2.4 *Elected Council and Women*

There has also been a lack of involvement from women, the traditional decision-makers and knowledge holders of water beliefs and customs, in the governance and management of water resources in Oneida (Joanne Summers 2010b). Since Oneida is a matriarchal society, the women as Clan Mothers and title holders of the land have historically been the leaders in the community (Joanne Summers 2010b). Traditionally the females would look after the water, informally deciding to clean and take care of the springs and ditches because that is where they get their medicines from (Joanne Summers 2010b). As Joanne Summers (2010a) explains, “water is a female element of life and it should be handled by women.” For example, when the water tower was built in Oneida, it was “crying for females to come near it and do something” (Joanne Summers 2010a). Suggestions were made to bring females into the water treatment plant to help clean it or to simply “touch the pipes” (Joanne Summers 2010a).

The current Elected Council system is also preventing the Clan Mothers, who are the title holders and are responsible for those decisions, from fulfilling their role (Joanne Summers 2010b). Joanne Summers (2010a) explained that while the women are not involved in the community’s water governance or management practices, there has been discussion in the

community about the development of an informal women's group to work together again in protecting the sources of water in Oneida (Joanne Summers 2010b).

5.2.2.5 Elected Council and the Community

The last pattern of interaction describes the behavior between Elected Council and the community and how this interaction is influencing water governance and management. Since the respect and values for water are instilled from generation to generation through childhood (Clint Cornelius 2010b) there is an intrinsic connection or value between the water and the Oneida people (Ida Cornelius 2010a). Al Day (2010b) believes this value is part of a cultural understanding that water is part of a circle of life and therefore the community has a natural sense of responsibility to take care of the waters. Chief Abram (2010a) supported this by illuminating that the community believes it is responsible for protecting the water because “it has a spirit and once the water gets polluted and it kind of hurts that spirit” (Chief Abram 2010a). The intrinsic values to protect and conserve water resources (Clint Cornelius 2010b) is also linked to the belief there is self regulation at the individual level to conserve water (Lois Cornelius 2010; Joanne Summers 2010b) and to prevent contamination of the community's water resources (Yotwaniyohstę 2010b). Even though there is an inherent belief the community is responsible for protecting the water, there is a view that the current way of doing things is not being done in a good way and it is not being done to the community's benefit (Yotwaniyohstę 2010b).

5.3 GENERAL OBSERVATIONS

For the past seventy-five years, several situations have illuminated the issue of trust in regards to the Elected Council's decision-making and management of water resources. This issue of trust has become institutionalized in the community's thinking and behaviour and has

influenced the effectiveness of the institutions related to water governance and management. This distrust started with the development of the Band or Elected Council by the Federal government in 1934 (Chief Abram 2010b). It resurfaced again in the mid 1980's during the extension of the water distribution system (Ida Cornelius 2010a; Chief Abram 2010b). There was a series of protests during the decision-making process to upgrade the water treatment distribution system (Ida Cornelius 2010a; Chief Abram 2010b). The majority of community members approved of the proposed water line, but a small group opposed it (Ida Cornelius 2010a) because of concerns about the source of the water (Lois Cornelius 2010b; Al Day 2010b). Even though the Chief and Council provided scientific data to demonstrate the quality differences between the water from the river and the aquifer, there remained a high degree of mistrust in the community that was difficult to overcome (Al Day 2010b). However, after several community meetings to provide clarification on the community's concerns, there was more acceptability to expansion of the waterline (Ida Cornelius 2010a; Lois Cornelius 2010b). Al Day (2010b) suggested that this mistrust "stems from the impact of Europeans on indigenous peoples in North America...and to understand this you would have to go back 400 years."

Chief Abram (2010b) explained that in spite of the ongoing attempts by technical staff to educate the community, people automatically do not trust their tap water because the water distribution system is operated by Chief and Council. As discussed in *5.2.1.5 Actors within Elected Council*, the Health and Human Services Department has developed several programs and initiatives to inform the community about water related issues (Ida Cornelius 2010a). In moving forward with building the trust, Clint Cornelius (2010b, p.15) suggests that: "the more information [the community] has, the less ammunition, the less resistance, the less questions

that they'll have to debate [Chief and Council's decisions]." Chief Abram (2010b) supported this with a suggestion of reinstating the public works committee because it could strengthen the level of awareness and knowledge community members have about water governance and management.

5.4 EVALUATION OF PATTERNS OF INTERACTION AND OUTCOMES

The following section provides a discussion on the overall performance of institutional arrangements by evaluating the patterns of interaction between actors in the action arena and the outcomes from these interactions related to water governance and management in Oneida. During the evaluation process, the institutional analyst evaluates both the patterns of interaction and the outcomes from these interactions (Polski and Ostrom 1999). Ostrom explains that: "the institutional analyst may evaluate the outcomes that are being achieved as well as the likely set of outcomes that could be achieved under alternative institutional arrangements" (Ostrom 1999, p.49). Imperial adds that the overall intent of this evaluation is to "examine the overall performance of an institutional arrangement to better understand its strengths and weaknesses" (1999, p.456).

The evaluative portion of the IAD framework is often informed by Ostrom's evaluative criteria to analyze institutional arrangements and outcomes related to policy issues. Ostrom (2005, p.66) cautions that "the number of potential evaluative criteria is large" and suggests the analyst start with criteria of (1) accountability; (2) economic efficiency; (3) equity; (4) adaptability, resilience and robustness; and (5) conformance to general morality. Supplemental criteria of fostering public trust and the access to financial and technical resources are then considered following the recent work specifically applying the IAD framework to water and Indigenous peoples in Australia by Smajgl et al. (2009).

5.4.1 Accountability and Transparency

Accountability considers that “officials should be accountable to citizens concerning the development and use of public facilities and natural resources” (Ostrom 2011, p.16).

Transparency involves explaining institutions in an accessible and clear way for the general public to understand while “increasing confidence in complex institutions” (Rogers and Hall 2003, p.27).

In Oneida there is a low degree of accountability and transparency because of the number of actors, (e.g., federal and provincial governments, municipalities, Elected Council), involved in water governance and management. Yotwaniyohstę (2010b) reflected on the impact of multiple actors involved in water governance and management in Oneida. She explained that the involvement of multiple outside organizations and levels of government is amplifying the issues of accountability and transparency. Having multiple actors is frustrating to First Nations’ communities because with “such a local resource is not managed in First Nations’ communities the same way that it is managed at a municipal level” (Yotwaniyohstę (2010b). Chief Abram (2010b) supports these concerns in explaining that the Elected Council can make a lot of decisions in the community but those decisions are dependent on funding agencies such as AANDC (Chief Abram 2010b). With several outside actors that hold the “purse strings and to keep the money flowing, the Elected Council will pay more attention to the funders than the people they are actually servicing” (Yotwaniyohstę 2010b). While Oneida technical staff are communicating with outside actors, (e.g., Health Canada, AANDC), at times there is a lack of communication between Oneida technical staff themselves to ensure appropriate measures are taken to address water related issues.

There is a medium degree of accountability and transparency between the Chief and Council and the community. Even though the community knows to call the Chief with any issues (Lois Cornelius 2010b), Joanne Summers (2010b) and Yotwaniyohste (2010b) believe there are still concerns that Chief and Council are not accountable. In Yotwaniyohste's (2010b) experience as the previous Public Works Administrator, it is unclear to community members who are responsible for making decisions and how decisions are being made. Yotwaniyohste (2010b) emphasized the importance of accountability and transparency between the Elected Council and community members for an adequate governance system. However, the educational initiatives, (e.g., plant tour, community meetings, educational materials), developed by the departments of Public Works and Health and Human Services have been effective in reporting results and information to the community about water related issues. These actions have assisted in maintaining accountability and transparency between the administrative staff and the community members about water related issues and strengthening institutional arrangements. In addition to the educational materials, the Public Works Committee has recently been re-instated and will provide the opportunity for community input (Clay Dockstader 2010b) while increasing accountability and transparency about water governance and management practices. Yotwaniyohste (2010b) believes that the development of Federal drinking water regulations could also strengthen the level of accountability and transparency in the community. Overall, the performance of institutional arrangements on the accountability and transparency criteria is low to moderate.

5.4.2 Efficiency and Effectiveness

Ostrom (2011, p.16) explains how “economic efficiency is determined by the magnitude of net benefits associated with an allocation of resources.” In order for a program

to be efficient it needs to be cost-effective for the community and internally cost-effective for the agency (Kamieniecki et al. 1999, p.113). Effectiveness “is the extent to which a policy accomplishes its intended goals” with a clearly defined purpose and a way to demonstrate success (Kamieniecki et al. 1999, p.111).

In regards to economic efficiency, key informants Lois Cornelius (2010b), Clint Cornelius (2010b) and Yotwaniyohstē (2010b) discussed the establishment of a policy to charge all community members a levy for access to the water distribution line. The funds generated through this economic instrument supports water treatment and general plant maintenance costs, thus internally cost-effective for the Elected Council. However, the extent to which this policy supports water metering for effective water management was not determined through this research.

Formal institutions have also been effective in supporting the Elected Council’s decision-making process and in providing direction to technical staff on how to manage water resources. At a basic understanding, the *Indian Act* has been effective in providing Elected Council with the funds to operate the administration, including the power to develop bylaws and hire consultants to undertake water studies. As previously discussed in section 5.2.1.4 Actors within Elected Council, funding has recently been secured to conduct a study to determine how the community can meet provincial regulations for a GUDI system. The approval for funding demonstrates the effectiveness of the *Indian Act* to accomplish its goals. The OFNSC Circuit Rider Training Program, the operational manuals prepared by First Nations Engineering Services Ltd., and Oneida’s Emergency Response Plan are effective water management institutions. Since federal First Nation drinking water regulations do not exist, several key informants (Ida Cornelius 2010b, Yotwaniyohstē 2010b, Clay Dockstader 2010b,

and Lois Cornelius 2010b) supported the success of following Ontario Regulation 288/07 of the Clean Water Act (2006) to ensure adequate drinking water is provided to the community. While existing policies have been effective in accomplishing its intent to guide the Elected Council and technical staff in governing and managing water resources, the community still has concerns about their drinking water. Therefore, the efficiency and effectiveness of institutional arrangements is considered moderate to high.

5.4.3 Equity

Evaluating institutional performance can be judged in terms of equity (Imperial 1999). Ostrom (2011, p.16) identifies two principle means for assessing equity “(i) on the basis of the equality between individuals’ contributions to an effort and the benefits they derive and (ii) on the basis of differential abilities to pay.”

While Elected Council’s institutions have been fairly strong in their effectiveness and efficiency, equity issues emerged with the establishment of the water policy. Elected Council expected community members on the water distribution line to pay the levy, but the community felt that it should be free and part of services provided by the administration (Al Day 2010b). Clint Cornelius (2010b) has also heard from members that it is a form of taxation. It was undetermined from the research if the levy applies equally to residential homes and commercial businesses, which could influence the level of equity or fairness in the community. As discussed throughout Chapters Four and Five, there is also inequity in the involvement of traditional council and women in water governance and management. This statement is supported by multiple informants who discussed the historical responsibilities Traditional Council had for example through the 1701 Nanfan Treaty and the important role women have traditionally had in taking care of water resources in the community. As Clint

Cornelius (2010b) previously mentioned, he estimated that approximately 40% of the community has maintained the traditional Haudenosaunee culture. Recognizing this percentage along with the historical roles and responsibilities of the Traditional Council and women, it emphasizes the importance of these actors in the decision-making and management of water resources. However, their lack of involvement has resulted in the exclusion and influence of informal institutions in Oneida. Overall, there is a low level of equity in the institutional arrangements employed to govern and manage water resources in Oneida.

5.4.4 Adaptability

The sustainability of certain situations will likely suffer if institutional arrangements are unable to respond to a changing environment (Ostrom 2011). According to Imperial (1999) a lack of adaptability can influence institutional performance.

One of the strengths of the institutional arrangements in Oneida is the ability of water treatment operators to maintain performance even under unpredictable circumstances, for example, sewage discharges or agricultural runoff into the Thames River. Maintaining formal institutions such as the Emergency Response Plan, programs to install water filters in community homes, and following a water pressure policy have strengthened the capacity of technical staff to adapt and deal with water related issues. Several key informants (past and present members of Elected Council) have also explained that Oneida technical staff have adapted to using provincial regulations to ensure adequate drinking water is provided to its members.

Currently, there is not a match or fit between the existing formal institutions and the biophysical conditions influencing water management in Oneida and this is a major challenge because of two important issues. Firstly, with multiple actors managing water resources in the

Thames watershed, unclear jurisdictional boundaries have influenced the biophysical and material conditions, (i.e., infrastructure, water sources, and water use), in Oneida. Chief Abram (2010a) explained that they are constantly in a jurisdictional battle because the community is under federal jurisdiction. Simeone (2010) supports this by stating that the federal government has exclusive jurisdiction over First Nation reserves and thus the provincial water regulations do not apply on-reserve. The jurisdictional boundaries have created a lack of consultation between Oneida and provincial actors, (i.e., City of London and Upper and Lower Thames Conservation Authorities), who are influencing the community's source of drinking water. As discussed in Chapter Five, key informants have expressed concern about the lack of notification from actors who are responsible for releasing the dams and discharging waste water into the Thames River without proper notification to the community. Thus, it impacts the quality of water that is withdrawn from the Thames River into the Oneida Water Treatment system and how it should be treated for distribution. However, the City of Toronto did follow the consultation requirements set out under the Environmental Assessment Process (MOE 2007) for the expansion of the Green Lane Landfill Site. While jurisdictional issues are a perpetual challenge, the Elected Council is seeking to develop better working relationships with outside actors to reduce the number of unpredictable circumstances and increase the community's adaptability to deal with these situations.

Secondly, the lack of federal regulations has also affected the fit between formal institutions and the biophysical conditions influencing water management in Oneida. Yotwaniyohste (2010b) has indicated that federal regulations would set out clear roles and responsibilities for drinking water in First Nations' communities. At the Proceedings of the Standing Senate Committee Meeting on Aboriginal Peoples, Jason Henry the Senior Circuit

Rider Trainer, Ontario First Nations Technical Services Corporation, supported this by indicating that the proposed Bill S-11 will define the roles and responsibilities of both First Nations and government to ensure safe drinking water is delivered (Parliament of Canada, 2011). Overall in Oneida there is a moderate level of adaptability with the implementation of Elected Council policies, employing provincial drinking water regulations, and increasing relations with the surrounding municipalities.

5.4.5 Conformance to general morality

Ostrom (2011) explains how the institutional analyst may decide to evaluate the conformance to general morality or how the outcomes fit the values of the actors involved. In the context of Oneida and this research, conformance to general morality encompasses the values, meanings, and norms about water. Water plays a fundamental role in the Oneida culture and understanding the cultural values of water is important to identifying the overall performance of institutional arrangements.

A reoccurring theme throughout the evaluation process is the inherent beliefs and values to protect the health of the waters and the community in Oneida. These beliefs and values strengthen institutional performance because they are an inherent part of the measures the Elected Council are taking in water management practices. More recently, staff have expressed the need to identify with their cultural practices, so the Director of Operations has tried to incorporate traditional teachings into the daily operations.

Despite the positive contributions of these beliefs and values, persistent challenges are confronting their continuation and uptake. Community members have traditionally used water sources (including the Thames River and its tributaries) for ceremonial purposes and to harvest medicinal plants (Clint Cornelius 2010a; Yotwaniyohstę 2010b). As water sources are being

affected the community is losing the ability to maintain traditional activities and the opportunities to pass on the cultural norms and values related to water. The division between the Elected Council and the Traditional Council has weakened institutions for water governance and management because traditions, beliefs, and values related to water are somewhat disconnected from water governance and management. Without the involvement of women, who are the traditional decision-makers, care takers, and knowledge holders of water resources, institutional arrangements are not as strong as they could be. Overall the low degree of conformance to general morality is weakening the institutional arrangements employed to govern and manage water resources.

5.4.6 Fostering Public Trust

Mignone (2003, p.4) explains that “higher levels of trust allow people to learn from each other, share information and enjoy more positive relations.” Trust is important in formal and informal rules in order to have an “efficiently functioning society” (Daut 2006, p.7). Fostering public trust in the governing body and its institutions is an important criterion for identifying the overall performance of institutional arrangements in Oneida.

The issue of trust has been institutionalized in the way that community members behave and think. For the past seventy-five years there has been a deep-rooted mistrust of the Elected Council by the community leading to a low level of public trust for the governing body. Chief Abram (2010b) believes it started with the development of the Elected Council in 1934. Through the *Indian Act* the federal government established the Elected Council in order to control and political and administrative systems. As discussed in Chapters Four and Five, the departments of Public Works and Health and Human services have implemented several water programs and initiatives to increase the degree of transparency and accountability

between technical staff and community members. Yet, there is still an issue of public trust because the water treatment plant is operated by Elected Council. Several years ago when the Elected Council reorganized the administration it was divided into departments, (e.g., Public Works or Health and Human Services), and there was limited involvement from the community in the departmental committees (Al Day 2010b). As Clint Cornelius (2010b) suggests, the community needs more information to reduce the resistance with Chief and Council's decisions. Overall, the low level of trust between community actors has weakened the formal institutional arrangements guiding the Elected Council.

5.4.7 Access to Financial and Technical Resources

In order to evaluate the performance of institutional arrangements it is important to assess the access to financial and technical resources. Adger et al. (2004, p.80) defines technical capacity as the "...capacity to exploit science and technology in order to facilitate adaptation." Financial capacity refers to "the ability to meet the financial obligations required for operating and maintaining a water system at or above a level that enables it to meet all government water standards and regulations and to provide clean consumable drinking water to users" (Brown et al. 2005, p.3).

The access that Elected Council has to financial and technical resources has strengthened the institutions for water governance and management in several ways. Through the *Indian Act* financial support from the federal government has enabled the Oneida Elected Council to undertake several environmental assessments and studies to ensure safe drinking water is provided to Oneida members. While there are concerns that Oneida has become dependent on outside actors for funding, these studies/assessments have resulted in several upgrades to the community's water treatment infrastructure. More recently, the Chief and

Council have secured funding to conduct a water study to address capacity and treatment issues in order to meet provincial regulations for a GUDI system. AANDC has provided financial support to the Circuit Rider Training Program, strengthening the technical capacity in the community to ensure water treatment operators are receiving on-the-job training. Health Canada has contributed to strengthening institutional arrangements by providing technical support to the Department of Health and Human Services staff on health and water related issues. Through *Ontario Regulation 288/07* under the *Clean Water Act* (2006), the provincial government is required to appoint seats to represent any First Nations' communities within the source protection region. Phare (2010) indicated that First Nations' communities in Ontario are not decision-makers in the source water protection planning process. However, community representation on this committee would provide the opportunity for Oneida to learn about activities within the Thames watershed and build potential relationships with other actors.

There was one weakness associated with the Elected Council's access to financial and technical resources to develop and implement formal institutions. In the past there wasn't a proper monitoring system to check for mechanical failures, resulting in technical related issues, (e.g., pump failures), at the water treatment plant. Overall there is a high degree of access to financial and technical resources for institutional arrangements related to water governance and management.

CHAPTER SIX: DISCUSSION AND CONCLUSION

Safe drinking water is important to all Canadians. However, for many First Nations' communities "unsafe drinking water is a persistent reality of their daily lives" (Simeon 2009, p.1). Several alarming statistics and events have revealed the deplorable drinking water conditions in First Nations' communities (Harden and Levalliant 2008) and the impact these conditions are having on the community's economic, social, and cultural well-being (Mascarenhas 2007). The situation of water in First Nations' communities illuminates the necessity to identify alternative approaches to water governance and management. By exploring the institutional context in which water is governed and managed, it offers a way to address the issues of source water protection and determine how to enhance water strategies in First Nations' communities.

The purpose of this research was to explore institutions associated with water in a First Nations context and understand how institutions influence water governance and management. This was accomplished by employing a case study approach. The IAD framework was employed to understand the water institutions and how they are influencing decision-making and management of water resources in Oneida. This chapter provides a summary of the key findings and discusses them in relation to the literature, describes the scholarly and practical contributions of the research, and identifies limitations and research opportunities.

6.1 SUMMARY AND DISCUSSION OF KEY FINDINGS

Through the analysis process, several key findings were generated on the formal and informal water institutions and how they are influencing water governance and management in

Oneida. The following section identifies those key findings and provides a discussion as it relates back to the literature on institutions, water governance, and management. Pivotal factors (i.e., fragmented jurisdictional issues, Aboriginal title, Aboriginal Rights, and treaty rights) contributing to water issues and shaping water governance and management will also be discussed.

6.1.1 Formal and Informal Water Institutions in Oneida

Based on the results presented in Chapter Four, a rich understanding of the formal and informal institutions related to water governance and management was revealed. The Elected Council has developed several formal water institutions to guide the water treatment operators including a water levy policy and a water pressure policy. The water treatment operators are currently following the *Ontario Safe Drinking Water Standards*, with water quality monitoring conducted at both the water treatment plant and at the household level. The Health and Human Services Department also operates under the same provincial regulations to ensure home distribution sampling meets the parameters within the guidelines. Community educational programs about water management are delivered primarily by the Health and Human Services Department. As discussed in section 5.2.2 *Relationships among Actors Involved in Informal Institutions*, several informal institutions related to water also emerged. The informal institutions have been created and upheld either through practical implementation or through historical values, beliefs, and cultural norms. For example, through practical implementation, the water treatment operators have informally decided to follow the provincial regulations to ensure the distribution of safe drinking water. Beliefs and values to protect the health of the water and the members of the community are also part of the Elected Council's decision-making process.

In the literature, Wilson (2004) explained how various formal water policies, strategies, and management frameworks have been developed to shape or influence actors involved in governing and managing water resources. Formal water institutions are important for several reasons such as to ensure drinking water quality standards are maintained, to identify who is responsible for surface and groundwater management, and for controlling pollution (Corkal et al. 2007). In a First Nations context, there currently is no federal legislation governing the requirements of safe drinking water on reserves. This means neither the Federal government nor First Nations are legally empowered to ensure that First Nations' communities are adequately managing water resources. Even though federal drinking water regulations do not exist, there is an informal system in place for managing water resources. Oneida water treatment operators are informally following the provincial regulations to ensure adequate drinking water is provided to the community. While the Elected Council has developed two formal institutions to guide the actors involved in protecting drinking water sources, there are no regulations to enforce water conservation advisories or programs to curtail unregulated agricultural practices in Oneida.

As Diaz et al. (2006) states, informal rules define people's behaviour related to water resources and are common at the community or household level. This research illuminated that community members are self-regulating to conserve and protect water resources. In Oneida, informal institutions are preserved in oral traditions shared through stories and ceremonies and passed down from generation to generation. From time immemorial, First Nations have viewed water as sacred, intricately tied to the land and its water (Harden and Levalliant 2008). Through this research, a rich understanding of the informal water institutions in Oneida was

discovered, confirming with the literature the deep connection First Nations' communities have with the land and its water.

6.1.2 How institutions influence water governance and management in Oneida

In following the IAD framework, there are several key findings on the relationship between actors in formal and informal institutions and how they are influencing water governance and management in Oneida (Chapter Five). Outside actors, such as the federal government, have provided financial and technical support implemented through different formal institutions to the Chief and Council and its administrative staff. However, with several outside actors involved in implementing water institutions in Oneida, it is amplifying the issues of accountability and transparency in the community. The actors within the community have strengthened water management practices by developing several educational initiatives that have been effective in maintaining transparency between the administrative staff and community members about water related issues. As discussed above, the Elected Council has developed water policies that have positively influenced water governance and management but there are still deficiencies in certain enforcement regulations.

6.1.2.1 *Water Governance*

Effective governance is a requirement to solving the serious water challenges and problems global societies are dealing with today (de Loë et al. 2009). Rogers and Hall (2003) highlight key essential principles for effective water governance including, communication among actors, transparency, accountability, equitability, and a view towards long-term sustainability (Rogers and Hall 2003). The principles found in the water governance literature were applied through the evaluation process (Chapter Five) to analyze the institutions related to water governance and management. Through the evaluation process several criteria, (i.e.,

accountability and transparency, efficiency and effectiveness, equity, adaptability, conformance to general morality, fostering public trust, access to financial and technical resources), were used to analyze institutional arrangements and outcomes related to policy issues. Thus, several of these criteria also match the key essential principles for effective water governance discussed in the literature.

In regards to water governance and management in Oneida, it is clear from the evaluation process there are issues with the communication among actors, accountability, transparency, and equitability. Water governance requires various actors, (i.e., government, civil society, private sector), to work together to determine the roles and responsibilities of different interests in water management and development (Roger and Hall 2003). de Loë et al. (2009, p.31) state that: “identifying actors, clarifying their roles, determining how they will be engaged and ensuring that they have adequate capacity to participate effectively are necessary first steps in water governance processes.” However, in Oneida the jurisdictional division of responsibilities to manage water resources in the Thames River has resulted in insufficient communication between the Elected Council and the actors, (e.g., City of London, conservation authorities), influencing the community’s water governance and management practices. Sanderson (2008) also stresses the importance of involving Indigenous Peoples who are knowledgeable about traditional values, as it would contribute to developing strategies such as reforming water institutions that do not currently recognize the sacred importance of water. However, it was discovered in Oneida that the Traditional Council and the women who are knowledgeable about the informal institutions are not involved in the decision-making, limiting the incorporation for these institutions in water governance.

6.1.2.2 *Water Management*

An effective governance system should enable practical water management tools to be implemented correctly (WWAP 2003). In water management, direct action is taken with respects to water quantity and quality (Hoover et al. 2007; Ferragina et al. 2002) and decisions that affect society and the environment are required in an effective and timely manner (Hoover et al. 2007). Hearne (2007, p.842) explains how “managing water resources, requires institutions capable of monitoring and enforcing land-use practices which maintain water quality.” In a First Nations context, communities are dealing with core drinking water issues including the absence of a regulatory framework; lack of funds for the operation and maintenance; and clarity regarding roles and responsibilities in water management (Simeone 2009).

In Oneida, there is a mismatch between the current formal institutions and the biophysical conditions influencing water management in Oneida. Again, the multiple actors involved in managing water resources in the Thames watershed have influenced the biophysical conditions. The lack of communication between the actors inside and outside the community has impacted the Oneida water treatment operator’s ability to respond to watershed activities in a timely manner and ensure safe drinking water is provided to the community.

The institutional framework for managing water resources in Oneida is not robust enough to monitor and maintain water quality in the community. While the Elected Council has developed two policies for managing water resources in Oneida, there are deficiencies in the regulations to enforce water conservation and land use practices. Water managers are informally following the provincial drinking water regulations because federal regulations do not exist. This system is not enabling water managers to implement the proper procedures to

ensure adequate drinking water is supplied to its members. As a result it is leaving the Elected Council to depend on the Indian Act to guide what the Council may or may not do in regards to the local distribution of water in the community.

6.1.3 Water Rights

Oneida people believe they have inherent and basic human rights related to water. Treaty rights such as the 1701 Nanfan treaty gave First Nations people the ability and right to hunt and fish anywhere within the treaty area. Through this treaty Oneida people believe they have rights to hunt or harvest traditional foods or medicines along the rivers. Their rights also fall under a basic human right to a clean environment including access to clean water.

Aboriginal rights and treaty rights were identified in the literature as a factor that shapes institutional performance relating to water in First Nations' communities. Wilson (2004) states how First Nations continue to struggle for the recognition of their rights in an effort to protect their territories and continue the use of traditional water management laws. Through settlement and development First Nations people have been "deprived of their water rights by changing the quality, quantity, and flow of rivers and lakes in Canada, resulting in damage to habitat, flooding of traditional land, and loss of control over a vital resource" (Nowlan 2004, p.4). The provincial government primarily regulates water off reserve but Aboriginal rights cross jurisdictional boundaries (Nowlan 2004), illuminating the importance of understanding where First Nations needs and rights fit among the demands for water (Phare 2009). While there is an understanding of what these rights are in Oneida, further research is required on how these rights influence the effectiveness of institutions related to water governance and management in Oneida and in a broader First Nations context.

6.2 RESEARCH CONTRIBUTIONS

6.2.1 Scholarly Contributions

This research has a number of implications that contribute to the scholarship on water institutions and the influences on water governance and management. Academically, it will contribute to existing knowledge on water institutions and the influences on water governance and management in a broader context and specifically in a First Nations context. This research contributes to the limited work on understanding water challenges in First Nations' communities with the intention that descriptive and analytical insights will help enhance water institutions and the manner they are influencing decision-making and management.

Ostrom's IAD framework is one of the most widely used institutional frameworks to strategically analyze institutions. While it has previously been applied to analyzing the institutional performances related to water and Indigenous peoples in Australia, the IAD framework has not been previously applied to a First Nations context. For this research the IAD framework was used to examine the institutions that affect human behaviour and the impacts of this behaviour on water governance and management in Oneida. The use of Ostrom's IAD framework and evaluative criteria in a First Nations context represents a contribution to knowledge which is explained below.

The IAD framework contributed to the analysis of First Nations' water institutions. It illuminated the exogenous factors that can affect the institutional performance, the various actors involved in implementing the institutions, the relationships between actors, and the outcomes from these interactions. The analysis process highlighted common complexities First Nation's communities are dealing with in regards to water governance and management practices. Specifically, this case study research draws attention to the informal institutions in a First Nations context and how they might be influencing or not influencing water governance

and management. Since informal institutions are preserved in oral traditions, this research represents a significant contribution to this emerging body of literature. It provided the opportunity to explore the unwritten codes of conduct, cultural values, and norms related to water that are guiding how people are governing and manage water resources in First Nations' communities.

Ostrom's evaluative criteria were employed to evaluate the institutional arrangements. Supplemental criteria, (i.e., fostering public trust and gaining access to financial and technical resources), specific to a First Nations context were also considered. The evaluation process revealed the strengths and weaknesses of the institutional arrangements and brought to the light the areas that require further attention in enhancing water governance and management practices in a First Nations' context. For example, in Oneida it was revealed that there is a low level of equity in the institutional arrangements due in partly by the lack of the Traditional Council and women in the decision-making and management of water resources. As of a result of the *Indian Act*, most First Nations' communities have imposed Elected Chief and Council's alongside Traditional Councils (Coates 2008), and thereby facing similar challenges to those revealed in Oneida. Even though the supplemental criteria were illuminated through a case study research approach, trust and access to resources are common issues in First Nations' communities across Canada. Therefore, the additional criteria could be beneficial in analyzing institutional arrangements in other First Nations case studies.

This research also contributes to the existing literature on First Nations water issues. The cultural importance of water to First Nations people is frequently discussed in the literature (Lavalley 2006; Walkem 2007; McGregor 2009). The focus on informal institutions in Oneida provided a rich narrative on the First Nations cultural norms and values related to

water, contributing to this field of knowledge. Fragmented jurisdictions over First Nations reserves (Wilson 2004; Simeone 2009) contributing to water management issues is also frequently discussed in the literature. This research confirms the persistent jurisdictional issues influencing water governance and management in First Nations' communities and contributes specifically to understanding the challenges First Nations' communities face within multi-jurisdictional watersheds.

6.2.2 Practical Contributions

The practical contributions from this research are both broader in orientation as well as specific to Oneida. Broadly, this research has provided insight into the on-the-ground formal and informal water institutions in First Nations' communities. Understanding formal and informal institutions in First Nations' communities and how they are influencing existing water management strategies brings a new perspective to exploring how communities can deal with source water protection issues and enhance water governance. It provides the opportunity to move towards enhancing water governance and management practices and address the deplorable drinking water conditions in First Nations' communities.

This research is relevant for outside actors, for example, water management policymakers and practitioners. In terms of watershed management policy implications, understanding the cultural connection and uses of water is an important aspect for future source water protection plans. This research also highlights the importance of understanding jurisdictional issues and the value in relationship building between First Nations and outside actors in order to enhance adaptability and reduce the risks to drinking water. For water management practitioners, understanding the informal institutions could also have an important role in future water management strategies. For example, understanding the cultural

importance of water sources for ceremonial and medicinal purposes may lead to future restoration projects between First Nations' communities and water practitioners.

Specifically to Oneida this research illuminated three main messages with regards to institutions and how they influence water governance and management practices. Firstly, it provides a comprehensive and exploratory description of formal and informal institutions in the community. This research highlighted the water policies and educational tools water and health managers are employing to provide safe drinking water to the community and bring awareness of water governance and management practices to its members. It revealed policy and regulatory gaps, for example, the suggestion for regulations to enforce water conservation advisories in the community and a program to curtail unregulated agricultural practices. Through the interview process, informal institutions related to water governance and management were also discovered. Understanding the informal institutions could influence and guide how the Elected Council decides to move forward in strengthening institutional arrangements and enhancing water governance and management practices in Oneida. Secondly, this research provides insight on the relationships between the actors involved in water governance and management and the outcomes of these interactions. These insights are valuable to Elected Council in moving towards developing new water strategies to address their current drinking water conditions. Thirdly, it offered the opportunity to evaluate the institutional performance. Through the evaluation process it highlighted the areas that require future work towards strengthening institutional arrangements in the community.

6.3. LIMITATIONS AND RESEARCH OPPORTUNITIES

Every study in all research has limitations and future research opportunities. By identifying the limitations while collecting and analyzing data it provides the opportunity to

understand how the researcher arrived at their findings. The following is a discussion of the particular limitations of this research and recommendations for future research opportunities.

6.3.1 Limitations

Research limitations related to the qualitative methods used for data collection were identified. The first limitation is related to the cross-cultural nature of the research. Since the researcher is not a community member participants may have been reluctant to share knowledge on water governance and management in Oneida. Furthermore, the researcher's personal background and experience could influence the interpretation of the study results. Personal observations were employed to gain insight into the water institutions in Oneida and how they these institutions are influencing water governance and management. This research would have benefited from additional time in the community to witness and deepen the understanding of social norms or accepted ways of doing things in the community as it relates to water management and governance.

There was one significant research limitation identified while analyzing the data. During data analysis, the lack of federal regulations to ensure safe drinking water in the community was frequently voiced by the participants. The Federal government is currently in the process of developing federal regulations to govern the provisions of safe drinking water on reserves. Since Bill S-11 is before the senate, it is unknown how this formal institution will influence water governance and management in Oneida. For example, the legislation might clearly identify the roles and responsibilities of actors involved in influencing water institutions and thus change (positive or negative) the effectiveness of these institutions in influencing water governance and management.

6.3.2 Research Opportunities

The research limitations identified point to a need for further investigation to address the shortcomings of this research. It provides the opportunity to illuminate future research directions.

Conducting a similar study in another First Nations community would provide the opportunity to confirm the usefulness of the IAD framework in a First Nations context in understanding institutional arrangements (as discussed in section 6.2.1 *Theoretical Contributions*). It would offer the chance to assess the effectiveness of using Ostrom's evaluative criteria and supplemental criteria in a First Nations context to evaluate the overall institutional performance. An additional case study would also help in drawing conclusions and identifying distinctions about formal and informal institutions and the influences on water governance and management in a First Nations context.

As discussed in section 6.2.1 *Scholarly Contributions*, the use of Ostrom's IAD framework and evaluative criteria in a First Nations context is an original contribution from this research. While Ostrom's evaluative criteria was effective in evaluating the performance of institutional arrangements related to water governance and management in Oneida, an equally valid approach would be to have the participants involved in the evaluation process. This approach would follow the characteristics of the decolonizing methodologies discussed in Chapter Three. For example, by providing the opportunity for participants to critique Ostrom's evaluative criteria and develop a culturally appropriate set of criteria to evaluate the performance of institutional arrangements would respect cultural integrity and further empower the community. While the IAD framework was used to evaluate the institutional arrangements related to water governance and management, involvement by participants in this process

could also provide the opportunity to establish appropriate criteria that link to the broader interconnected issues (e.g., health, social, political) and their relationship to power.

Once regulations have been established through Bill S-11, further research opportunities will evolve to assess how these regulations will influence water governance and management in First Nations' communities. Until that time this research warrants further investigation on the results from the evaluative criteria and how to strengthen the overall institutional performance. There is an opportunity to explore and recommend a robust and effective institutional framework for water governance and management in a First Nations context. Finally, an opportunity is afforded to explore Aboriginal rights and treaty rights as they relate to water and the influences of these rights on water governance and management in First Nations' communities.

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APPENDIX A – FIELD RESEARCH GUIDE

Objective	Boxes from Figure 1		Questions	Data Collection Source
Objective 1: Describe the formal and informal water institutions in Oneida of the Thames.	Biophysical/ Material Conditions	<ul style="list-style-type: none"> Hydro geological features in the region 	<ul style="list-style-type: none"> What are the sources of water in your community (e.g. deep wells, springs, rivers, dams, ponds)? What are these sources of water used for (e.g. drinking, ceremonial purposes)? 	<ul style="list-style-type: none"> Document analysis Interviews Participant observation
		<ul style="list-style-type: none"> Water Management Infrastructure 	<ul style="list-style-type: none"> How is water distributed in Oneida? <ul style="list-style-type: none"> What is the current water distribution system? How many households are on the main water distribution? What is the condition of the main water distribution system? What are the challenges with establishing the water distribution system? What training is required to operate the water distribution system? How is the water distribution system operated? How many households are on wells? 	
	Community Attributes	<ul style="list-style-type: none"> Demographic Socio- 	<ul style="list-style-type: none"> Demographic features of the 	<ul style="list-style-type: none"> Document analysis

		economic characteristics	<p>community (population, education levels)</p> <ul style="list-style-type: none"> • Historical background, culture • What is the awareness/knowledge of community members about water governance (decision-making) in Oneida? • What is the awareness/knowledge of community members about water management (operational approaches) in Oneida? 	<ul style="list-style-type: none"> • Interviews • Participant Observation
	Rules-in-use	<ul style="list-style-type: none"> • Formal 	<ul style="list-style-type: none"> • How is water managed in your community? <ul style="list-style-type: none"> ○ What formal institutions (e.g. rules, laws, policies and regulations) exist to manage water resources? ○ What are the operational approaches to managing water in Oneida? • How is water governed in your community? <ul style="list-style-type: none"> ○ How are decisions made in your community regarding water? • What are your 	<ul style="list-style-type: none"> • Document analysis • Interviews • Participant observation

			<p>perceptions about your rights and the environment?</p> <ul style="list-style-type: none"> ○ What are your perceptions about your water rights? ○ What institutions (e.g., legislation, treaties, customary rights), do you have in place to deal with those rights? 	
		<ul style="list-style-type: none"> • Informal 	<ul style="list-style-type: none"> • Can you please share with me the beliefs and/or customs pertaining to water in your community? <ul style="list-style-type: none"> ○ Are there particular beliefs and customs about certain water sources in your community? • What informal institutions (e.g. norms, values, customs, beliefs) exist to manage water resources in your community? • What informal institutions (e.g. norms, values, customs, beliefs) exist for decision-making about water resources in your 	

			community?	
Objective 2: Examine how these formal and informal institutions influence water governance and management in Oneida of the Thames	Action Arena	<ul style="list-style-type: none"> Action Situation 	Examinining water institutions and how they are influencing water governance and management in Oneida Nation of the Thames. <ul style="list-style-type: none"> How are current rules and regulations influencing the decision-making about water and the operational approaches to managing water in Oneida? How are beliefs and customs influencing the decision-making about water and the operational approaches to managing water in Oneida? Is there a relationship between the formal (rules and regulations) and the informal (beliefs and customs) that influence decision-making about water? <ul style="list-style-type: none"> How could the rules and regulations and the beliefs and customs about water come together to influence decision-making about water? Is there a relationship between the formal (rules and regulations) and the 	<ul style="list-style-type: none"> Interviews Participant Observation

			<p>informal (beliefs and customs) that influence the operational approaches to managing water?</p> <ul style="list-style-type: none"> ○ How could the rules and regulations and the beliefs and customs about water come together to influence the operational approaches to managing water? 	
		<ul style="list-style-type: none"> • Actors 	<ul style="list-style-type: none"> • Who are the actors (individuals, organizations) that are involved in decision-making regarding water resources? <ul style="list-style-type: none"> ○ Who is eligible to participate in the decision making process? ○ How are the individuals involved chosen to participate in making decisions about water? • Who are the actors (individuals, organizations) that are involved in the operational approaches to managing water 	

			<p>resources?</p> <ul style="list-style-type: none"> ○ Who is eligible to participate in the operational approaches to managing water resources? ○ How are the individuals involved chosen to participate in managing water resources? ○ Are there any informal community groups who are managing water resources (e.g. local water resource user groups)? ● Are there actors located outside of the community that affect the decision-making process and the operational approaches to managing water in Oneida? 	
	Patterns of Interaction		Through the process of axial coding common concepts and categories related to the patterns of interaction between the three exogenous factors and the actors will emerge and be refined.	
	Outcomes		The insights about outcomes will flow logically from patterns of interaction.	
	Objective 3: Facilitate	Evaluative Criteria	The patterns of interaction and outcomes will be evaluated through by employing	

critical reflections by stakeholders regarding the patterns of interaction and outcomes of the institutional analysis of water governance and management in Oneida of the Thames		Ostrom's IAD Framework.
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APPENDIX B – LIST OF DOCUMENTS

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APPENDIX C – INFORMAL INTERVIEW GUIDE

Exploring the Influences of Institutions on Water Governance and Management: A First Nation Community Case Study

Attributes of the Biophysical World

1. What are the sources of water in your community (e.g. deep wells, springs, rivers, dams, ponds)?
2. What are these sources of water used for (e.g. drinking, ceremonial purposes)?

Describing Formal Institutions

3. How is water managed in Oneida?
4. Who are the actors (individuals, organizations) that are involved in managing water resources in Oneida?
5. How is water governed (decision-making) in Oneida?
6. Who are the individuals, organizations involved in decision-making regarding water resources?
7. Are there individuals and organizations located outside of the community that affect decision-making and the management of water resources in Oneida?

Describing Informal Institutions

8. Are there beliefs and customs used to manage water resources? If so, what are they?
9. Are there beliefs and customs used to making decisions about water resources in Oneida?
10. What is the awareness/knowledge of community members about the management of water resources in Oneida?
11. What is the awareness/knowledge of community members about decision-making regarding water resources in Oneida?
12. In your opinion, can you tell me about your Aboriginal rights and the environment?

Influence of Institutions on Water Governance and Management

13. How are current rules and regulations influencing the decision-making process and the management of water resources in Oneida?

14. How are beliefs and customs influencing the decision-making process about water and the management of water resources in Oneida?
15. Is there a relationship between the formal rules and regulations and the beliefs and customs about water that are influencing the decision-making about water resources?
16. Is there a relationship between the formal rules and regulations and the beliefs and customs about water that are influencing the management of water resources?

APPENDIX D – VERBAL SCRIPT

Exploring the Influences of Institutions on Water Governance and Management: A First Nation Community Case Study

Hello, my name is April Varewyck and I am the Environmental Coordinator for Oneida of the Thames and the community researcher for a multi-year collaborative project (First Nations and Source Waters: Understanding Vulnerabilities and Building Capacity for Environmental Governance). As part of the project, Kate Cave, a Master's student in the Department of Environment and Resource Studies at the University of Waterloo, is conducting her thesis research. The purpose of Kate's research is to describe the formal and informal water institutions in Oneida of the Thames and examine how these institutions influence water governance and management in the community. This research will hopefully lead to a better understanding of how water is governed and managed in Oneida of the Thames.

If you volunteer as a participant in this study, you will be asked to participate in an interview with Kate, where she will ask several semi-structured interview questions related to formal and informal water institutions and how these institutions influence water governance and management in your community. The session should take approximately 1 – 1½ hours of your time.

I would like to assure you that this study has been reviewed and received ethics clearance through the Office of Research Ethics at the University of Waterloo and the Oneida of the Thames Environment Working Group. However, the final decision about participation is yours. If you are interested in participating, please call me at (519) 652-6922 or Kate at (905) 393-6873. Alternatively, you can come to the Public Works Building and see me. Thank you.

APPENDIX E – LIST OF KEY INFORMANTS

Al Day	Traditional Council
April Varewyck	Environmental Coordinator
Chief Abram	Elected Chief
Clay Dockstader	Previous Water Treatment Operator
Clint Cornelius	Past Councillor for Elected Council
Ida Cornelius	Health and Services Department
Joanne Summers	Community member
Lo:t^t	Traditional Council
Lois Cornelius	Current Councillor for Elected Council
Yotwaniyohste	Community member

APPENDIX F – VERBAL CONSENT FOR INTERVIEW INFORMANTS

(Date)

Dear (*participant*):

This letter is an invitation to consider participating in a study I am conducting as part of my Master's degree in the Department of Environment and Resource Studies at the University of Waterloo. My faculty supervisors are Dr. Rob de Loë from the University of Waterloo and Dr. Ryan Plummer from Brock University. I would like to provide you with more information about this project and what your involvement would entail if you decide to take part.

Drinking water is critical to the lives of First Nations people. Many First Nations' communities in Ontario depend on a healthy natural environment for sustenance, and as a result, are closely connected to their environment. For First Nations' people, water quantity and quality are part of a much broader holistic view, recognizing that all aspects of Creation are interrelated. Alarming statistics and events illustrate the unacceptable drinking water conditions in First Nations' communities and the impact on the community's social, cultural and economic well being. These conditions stress the importance of looking at other approaches to water governance and management in First Nations' communities.

The purpose of this interview is to gather information about formal and informal water institutions and how these institutions influence water governance and management in Oneida of the Thames. Participation in this study is voluntary. It should take approximately 1 to 1.5 hours to complete. I will ask you a number of questions about formal institutions such as water policies and laws and informal institutions such as social norms, beliefs and customs associated with water and how these institutions affect water governance and management. The interview will take place in a mutually agreeable location, which we can arrange in a conversation by phone or e-mail, whichever you prefer. In appreciation of your time, you will be provided a \$50 financial remuneration for completion of the semi-structured interview.

The information that I am collecting is for research purposes. The findings will be reported in my Masters thesis, journal articles, and conference presentations. This research is in conjunction with and will contribute to a multi-year collaborative project (First Nations and Source Waters: Understanding Vulnerabilities and Building Capacity for Environmental Governance). Oneida of the Thames is one of the First Nations community partners in this Social Sciences Humanities Research Council of Canada grant. The investigators have ethics clearance for the project from Oneida of the Thames. Results of this research will also be provided to Oneida of the Thames Chief and Council and Environment Department. Once the research is complete, I intend to send you a summary of results.

Your insights into different First Nations formal and informal institutions and how they influence water governance and management in your community will be an important source of data in my study. Therefore, with your permission, I would like to record the interview and to take notes to capture your responses accurately. Shortly after the interview has been

completed, I will send you a copy of the transcript to give you an opportunity to confirm the accuracy of our conversation and to add or clarify any points that you wish. Please note that transcripts will be used if you do not respond to three attempts to verify your transcript.

The tape-recordings, notes and transcripts will be kept in secure storage files and viewed only by the researchers and community partner. They will be kept for two years or until one year after the last publication of research findings (whichever is longer) and then destroyed. With your permission I would like to be able to cite your name and information that you provide during the interview in publications, where appropriate, and to list you as a participant in this research. Alternatively, we can use a descriptor in place of your name (e.g. Participant #1 or “an elder in the community”).

If you agree to participate in this interview, you are welcome to withdraw at any time. You may also decline to answer any question you do not feel comfortable answering. Furthermore, if after the interview is over you decide that you do not want me to use the information that you have provided, please notify me. I will immediately delete the recording, destroy my notes, and, of course, not use any of the information that you provided during the interview. Your decision not to participate in this research or to decline to answer any question(s) will remain confidential.

If you have any questions regarding this study, or would like additional information to assist you in reaching a decision about participation, please contact me by email at kcave@uwaterloo.ca or you can call me at (905) 393-6873. You can also contact Dr. Rob de Loë, at 519-888-4567 ext. 38648 or by email (rdeloe@uwaterloo.ca) or Dr. Ryan Plummer, at 905-688-5550 ext. 4782 or by email (rplummer@brocku.ca).

I would like to assure you that this study has been reviewed and received ethics clearance through the Oneida of the Thames Environment Group, the Office of Research Ethics at the University of Waterloo and the Research Ethics Board at Brock University. If you have any comments or concerns resulting from your participation in this study, please contact April Vareyweck, Environmental Coordinator for Oneida of the Thames at (519) 652-6922 or Dr. Susan Sykes, Director, Office of Research Ethics at 519-888-4567 ext. 36005 or by email at ssykes@uwaterloo.ca.

I very much look forward to speaking with you and thank you in advance for your assistance in this project.

Yours Sincerely,

Kate Cave, Masters Candidate
Water Policy and Governance Group
Department of Environment and Resource Studies
University of Waterloo
Waterloo, Ontario, Canada

APPENDIX G – PARTICIPANT FEEDBACK LETTER

University of Waterloo

Date

Dear *(Insert Name of Participant)*,

I would like to thank you for your participation in this study. As a reminder, the purpose of this study is to describe the institutional framework within which First Nations' communities govern and manage water. By describing both the formal and informal water institutions, an opportunity is afforded to enhance the understanding of how these institutions influence water governance and management. The data collected during interviews will contribute to a better understanding of the water institutions in your community and how they are influencing water governance and management.

Please remember that any data pertaining to you as an individual participant will be kept confidential. Once all the data are collected and analyzed for this project, I plan on sharing this information with the research community through seminars, conferences, presentations, and journal articles. If you are interested in receiving more information regarding the results of this study, or if you have any questions or concerns, please contact me at the email address listed at the bottom of the page. When the study is completed, I will provide a copy to the Oneida Environmental Coordinator. The study is expected to be completed by August 31, 2011.

As with all University of Waterloo projects involving human participants, this project was reviewed by, and received ethics clearance through, the Office of Research Ethics at the University of Waterloo. Should you have any comments or concerns resulting from your participation in this study, please contact Dr. Susan Sykes in the Office of Research Ethics at 519-888-4567, Ext., 36005 or ssykes@uwaterloo.ca.

Kate Cave
University of Waterloo
Department of Environmental and Resources
kcave@uwaterloo.ca