Stakeholder Perspectives on Water Conservation Practices and Asymmetrical Power Relations in Southwestern Ontario

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. I understand that my thesis may be made electronically available to the public.

Abstract

This thesis focuses on the politics of freshwater conservation and its impacts on water access, distribution, and management in Southwestern Ontario, focusing on Waterloo Moraine. It examines the role of various stakeholders involved in water governance in Southwestern Ontario and investigates whether and how the stakeholders' perspectives and their activities impact water use, conservation efforts, and policymaking in the region's water governance. Therefore, this study specifically asks whether and how the various socio-political and economic factors in the region shape stakeholder' attitudes and inform their role in shaping social movement, public perception and policymaking in the water governance of Southwestern Ontario. The Waterloo Moraine, a significant natural drinking water resource in the region, has been impacted adversely due to the growing technological advancement, industrial and economic growth. The environmental hazard represented by this industrial growth has been a great concern of various activists, community members and environmentalists. In this study, I have applied a political-ecological approach to investigate the relationship among the stakeholders shaping the interaction between the environment and human beings while considering the socio-political understandings of water conservation and power politics involved in decision-making. I have engaged ten community members in this study and conducted semi-structured interviews asking for their experiences, opinions, attitudes, and recommendations for water conservation of the region. Then, I have used a thematic analysis approach to analyze the narratives and identified three major stories: Bill 66, aggregate extractions, and Nestlé related to water conservation in the region. Moreover, these three stories have represented two major overlapping themes: the asymmetrical power relationship among the stakeholders and the environmental degradations caused by the region's politics of development and economic growth. This research has found some suggestions from the local experts and community members that could set a path for further research investigating a balanced approach to the relationship among the stakeholders, ensuring their equal involvement in decision-making both economic growth and environmental well-being.

Keywords: water-governance; stakeholder; political ecology; environmental degradation; decision-making; Waterloo Moraine.

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Chapter 1

As a Bangladeshi- Canadian citizen, I have firsthand experience with the abundance of water in both Canada and Bangladesh. Both countries face political struggles regarding freshwater conservation, water preservation, and hygiene. However, Canada is different geographically and has a more developed socio-economic infrastructure. Canada is a freshwater-rich country possessing almost 7% of the world's freshwater (Renzetti & Dupont, 2017). I seek to understand the politics regarding freshwater conservation and its impacts on water access, distribution, and management in Southwestern Ontario, with a special focus on the Waterloo region. This query takes place in the context of rapid urbanization and as drastic climate change creates more pressure on water conservation. While living in Waterloo as an anthropology student, I have observed how this Southwestern Ontario, especially Waterloo Moraine is a naturally sensitive area being affected by the rapid growth of urbanization and how various political and stakeholder perspectives have been impacting water conservation policies.

The misconception that many Canadians hold about the abundant, adequate, renewable and secured freshwater supply in Canada is often termed as the "myth of superabundance" (Jordaan, Stevens & Brooks, 2009) and often leads to overlooking the necessity of water conservation efforts (Biro, 2007; Brandes & Ferguson, 2004; Sprague, 2007; as cited in Patch, 2010). The rapid growth of population along with urbanization, climate change and drastic changes in demand for water in Canadian cities have given rise to water conservation concerns. To be specific, Waterloo faces a growing concern over adequate drinking water supply due to its rapid technological advancement, population, and economic growth (Frind, Russell, Rudolph, & Sharpe, 2014). The Waterloo Moraine (WM) is one of the most significant water resources in this region and provides nearly 45% of the municipal drinking water supply. The rest comes from other sources, such as

groundwater (35%) and surface water (20%) (Frind & Middleton, 2014, p. 88). The WM provides clean drinking water to many rural and urban areas to different kinds of residences and institutions. (Waterloo Hydrogeologic Inc., 2000; as cited in Blackport, Meyer & Martin, 2014).

Many local citizens are concerned about the ongoing development project in WM causing deforestation, and urban sprawl and affecting agricultural land, aggregate resource areas[1] and water recharge areas[2] (Sousa, Rudolph & Frind, 2014). Fast-paced development, residential and industrial, represent a significant threat to water conservation. Significant water recharge areas in close proximity to the development projects and other attributes create challenges for this region's water conservation. Furthermore, various industrial activities have been contaminating freshwater and posing a significant threat to water conservation in this region. For example, aggregate mining and blasting below the water level can easily create cracks in the stone layers protecting water at the ground level, from where water is usually being collected and the risk of water contamination.

Most of the Waterloo region lands have been used for agricultural purposes, thereby often affecting the groundwater in the region. The development project, especially industrialization and commercialization of agricultural production, are interconnected; the former leads to population growth as well as high food demand necessitating more agricultural production. Also, industrialization has introduced the vast use of chemical fertilizer (Dixon, 2018) to the land that does not have a positive impact on the soil in the long run. The Waterloo region uses most of its land for farming and cultivation (Sousa et al., 2014). The present-day agriculture that often necessitates the over-use of chemical fertilizer to increase production has also threatened the

[1] Aggregate resources are sand, gravel, limestone rocks, and concretes. These are significant components used for structural construction purposes.

[2] Recharge area- when surface water such as rain, melting snow water moves down through the loose soils, sand and gravel to the aquifer is called recharge area (www.grandriver.ca/en/our-watershed/Aquifers-recharge-and-discharge.aspx)

region's soil quality. Eventually, this excessive use of fertilizer in agricultural land to meet the growing demand for food, thereby contributing to groundwater risk because surface water seeps down to the recharge area (Simpson & Loe, 2014). So, it has a possible threat to groundwater and surface water quality (Sousa et al., 2014). Though often ignored, these factors also create a significant environmental threat.

Additionally, there is an ongoing risk of contamination from one source to another because the WM has interconnections with the Grand River watershed, where groundwater, surface water and the WM act as a single system. As this region has been grappling with many challenges of sustainable freshwater management, it is essential to develop technical solutions as well socio-political solutions by evaluating different kinds of stakeholder attitudes towards conservation efforts to find the gap through socio, political and ecological analysis of conservation practices. Therefore, to understand these multiple factors and various stakeholders' role and their beliefs, knowledge, and values involved in the region's water governance, I have applied a political-ecology framework. This framework has been used to identify the power structure in policymaking that shapes human-environment interactions (Whiteford, Cairns, Zarger, & Larsen, 2016; Watts, 2015). Drawing upon the work of Wehn, Collins, Anema, Basco-Carrera, & Lerebours (2018) that illustrated the roles of stakeholders in the policymaking of water governance, this research investigates what role they play in the water management system in the region and also from the participant narratives; I identified several relevant stakeholders: provincial government, policymakers, provincial and regional hydrologists, conservation authorities, water activists, NGOs, developers, people in business, and local residents have been identified. This is where the political ecology framework can also play a significant role in understanding the relationship among the stakeholders by identifying their roles and interaction with the environment.

Anthropological approaches to water governance have shown that stakeholder engagement, attitudes and perceptions should be prioritized in water conservation. Johnston (1995) believed that anthropologists should address human-environment relationships and complex environmental issues using a holistic approach that considers multiple arenas, history, politics, cultural attributes, social, economic, and ecological factors. In 2000, Wingard employed ethnographic methods to address and understand scientific knowledge of aquifer recharge and water quality of source water protection in Memphis, Tennessee's community dynamics. Furthermore, his research is significant in dealing with the cultural practice of water conservation and its use. In this study, he focused on three different actors: politicians (bureaucrats), scientists and environmentalists. His study highlighted how the diverse community groups' different beliefs and values could undermine efforts to protect source water. He found that politicians prioritize short-term problems and business growth, whereas scientists focus on technical difficulties, and environmentalists are concerned about groundwater issues. There are growing environmental and anthropological research trends to analyze ecological risk assessment using a political-ecological approach to advocate for human rights (Ervin, 2000). Ervin analyzed Fitchen's (1988) anthropological study of groundwater contamination, where he investigated how anthropological knowledge can address issues beyond technical and cultural settings (as cited in Ervin, 2000). Fitchen's work in New York state addressed environmental issues responsible for technical challenges intensified by institutional legislation and its surroundings' complexity. In his study, the anthropological approach contributes to creating transparent interaction among the institutional stakeholder and the public through policy implementation and recommendations for efficient use of limited water (Ervin, 2000). Moreover, anthropologists applied a holistic approach to resolving the various

historical, economic, cultural, political, and social issues to address complex environmental and public issues.

My study aims to contribute to this conversation with a broader audience, including hydrologists, water scientists, social activists, and residents. Thus, this research examines the attitudes, beliefs, movements, and interactions of the multiple stakeholders involved in the development, preservation, and conservation efforts of the Waterloo Moraine as well as Southwestern Ontario. This study also explores how the stakeholders' attitudes influence local perceptions and social activism regarding water conservation in Southwestern Ontario. The dynamics of stakeholder relations can create mutual understanding and required action to improve water governance. Here, an anthropological perspective is not solely interested in discussing technical aspects of water conservation. Instead, it is also concerned with understanding how political decisions and policies have negatively been impacting human-environment relationships.

This study was initially designed as an ethnographic study; however, due to the Covid-19 pandemic, I could not embed myself in the community. Instead, I had to conduct online interviews. Also, I need to acknowledge that the collected interviews have changed the scope of the study to some extent. While this investigation started as a study on the WM, the interviews led me to consider Nestlé's case. Thus, my study has eventually addressed Southwestern Ontario, with a specific focus on WM.

This study investigates whether and how the stakeholder's attitudes and socio-political and economic factors play a role in shaping the social movements or public perceptions regarding water conservation and protection. In order to address the conservation efforts in this region and provide a comprehensive review of how water conservation is known and understood by stakeholders, this study has multiple objectives. First, this study identifies the various stakeholders'

involvement in water governance regarding protecting the water conservation in southern Ontario; it investigates their roles and contributions. Secondly, this study assesses the state of public knowledge, perception, and concern regarding water conservation. Thirdly, this study reviews regional and provincial policies impacting different kinds of social movements to achieve sustainable water solutions for Southwestern Ontario. Finally, this study assesses the interactions among various stakeholders regarding planning, designing, and implementing water policy.

Most importantly, I believe this study will help to develop a critical understanding of politics' role in shaping water conservation policies and public perception. This critical discussion can lead to better interactions among the multiple stakeholders and can increase shared awareness of water issues. I plan to disseminate my research findings among the region's community members, especially the research participants, and present it at different platforms such as seminars and conferences. I also hope to publish the major part of this thesis, the second chapter, in a renowned peer-reviewed and open access journal, such as the *Canadian Water Resource Journal.*

Chapter-2

2.1. Introduction

Southwestern Ontario's Waterloo Region is known for its technological advancement endeavours. These cause concomitant population, industrial and economic growth. While these forms of development ventures often represent a kind of progress in the region, related processes have given rise to some environmental challenges. Ongoing residential and industrial development and related rises in industrial hazardous waste production can create challenges for both the quality and quality of groundwater (Sousa et al., 2014). This region is characterized by hummocky and rolling hills with a combination of upland and lowland forests (Markvert, 2007), and the Waterloo Moraine is an especially susceptible area. However, this region has been bulldozed for residential development, making this environmentally sensitive area more vulnerable. As a result, the whole area is under severe threat due to various developmental projects, such as industrial and residential construction, population growth, and economic growth.

Furthermore, Waterloo's rapid expansion as a techno-hub city has given rise to substantial industrial development that requires deforestation and usurpation of agricultural lands and has stimulated the growth of subsequent mineral and aggregate industries. The Waterloo region has also seen an increase in population, creating additional pressure on the community's natural resources. According to the Census bulletin (2016), the population growth has increased by 5.5% from 2011 to 2016 in this region. This population growth drives technological and industrial development to improve living standards and create economic opportunities. The WM is a significant source of drinking water, which supplies 45% of the region's clean water supply (Frind

& Middleton, 2014). It is also recognized as a significant recharge area[3]; it maintains central water flow to the system that helps filter, recharge, and stores the groundwater that provides clean and drinking water for the region. Moreover, this significant source of the clean water supply is under severe threat due to residential and industrial development, population growth and related political decisions made at higher government levels (Sousa et al., 2014). In recent years, the increase in population has created enormous pressure on this community's natural resources. My interview participants suggest that provincial policymakers, as well as developers, prioritize economic growth over water conservation, thereby causing threats to existing water resources. Participants' narratives also express their concerns about the politics involved in water resource protection in the region (June- October 2020).

Here, I focus on the politics of freshwater conservation and its impacts on water access, distribution, and management in the Waterloo region. This study identifies various stakeholders involved in water governance, assesses their attitudes, beliefs, and movements in developing conservation efforts and investigates how these stakeholders' perspectives impact the water use, conservation efforts, and policymaking in the region. This research also investigates the relationship among the stakeholders in constructing public perceptions about WM. It intends to ask whether and how the stakeholder's attitudes and socio-political factors play a role in shaping the social movements or the public perceptions regarding water conservation practice.

This study investigates the role of various stakeholders in water governance and asks how the relationship and interaction among various stakeholder's shape decision-making. First, I give a brief background of water conservation practices in this region. Second, using the lens of political

[3] "A recharge area is defined as that portion of the drainage basin in which the net saturated flow of groundwater is directed away from the water table" (Freeze and Cherry, 1979, p.194)

ecology, I investigate the interaction between the environment and human beings while also considering the interactions of socio-political understandings of water conservation and political power as they relate to decision-making. Third, I discuss the methods of how this research has been conducted. Fourth, in the finding section, I discuss the themes that I have found by analyzing the interviews' narratives. The narratives identify different stakeholders and their roles. Fifth, I analyze the power relationship among the stakeholders, their roles and the environmental degradation posed by the political decisions prioritizing economic growth. I identify three major stories in the narratives: Bill-66, aggregates, and Nestlé, showing how the power relationship, various stakeholders' role, and environmental degradations affect the community peoples. Though Bill-66 was annulled as a result of the activists' strong protest, this story illustrates how the profit-making objective of the policymakers and their decision-making politics often fail to consider the environmental protection issues. Finally, I discuss the major findings and address the recommendations made by the community members.

2.2. Background

The WM is a significant water resource for multiple reasons. This natural aquifer[4] is a major source of drinking water for the Waterloo region; it supplies 45% of the region's drinking water, with the rest of the water supplied from groundwater (35%) and surface water (20%) sources (Frind & Middleton, 2014). The WM is designated as an environmentally sensitive landscape because the glacial activity has formed a unique landscape composition with many hydrological components, such as mixed gravels, sand, tills, clay and stone, which helps to filter the water (Sousa et al., 2014). The WM is also recognized as a significant recharge area as it holds half of

[4] Aquifer is a layer of rock, gravel, sand and tilts. It helps to keep safe, clean and store water in the ground.

the municipal wells; approximately 25 of the 50 municipal well fields are located in this region (Bajc, Russell, & Sharpe, 2014). Thus, the WM helps filter, recharge, store the groundwater, provide clean drinking water for the region, and ensure support for the ecological well-being of wetlands and streams in the Waterloo region (Bajc, Russell & Sharpe, 2014). All these issues present the reasons why WM is a significant water resource in Southwestern Ontario.

Moreover, the WM bears high significance in protecting other water resources from threats and contamination that could risk lives. It is interconnected with the Grand River watershed, where groundwater and surface water act as a single or shared system, so if one water source gets contaminated, the other can also be easily contaminated as well. Many research on water hydrology indicates that the WM that is a prime aquifer is susceptible to groundwater contamination (Sanderson, Karrow, Greenhouse, Paloschi, Schneider, Mulamoottil, Mason, McBeana, Fitzpatricka, Mitchells, Shrubsoleo, & Childo, 1995). The history of water conservation in Southwestern Ontario shows how a shared water system can risk groundwater in different regions (Bsajc, Russell, & Sharpe, 2014). For example, an incident of water contamination in the Uniroyal chemical company in Elmira, Ontario, caused by the chemical waste incinerator of the plant has often been attributed to two factors: the technical failure of the plant while handling chemicals and the lack of coordination among the stakeholders of water management of the plant. During 1989-1990, Elmira[5] was forced to shut down two well fields due to this chemical contamination (NDMA-Nitroso-dimethylamine), which is highly water-soluble and was linked to the construction of a pipeline to supply water at considerable cost from Waterloo to Elmira (Sanderson et al.,1995; Simpson & Loe, 2014). However, disagreements existed among various stakeholders, such as the Ministry of the Environment, Waterloo region and Uniroyal chemical company

[5] Elmira is the largest town in Woolwich township in the Waterloo region

(Sanderson et al., 1995). Due to the high dependency of the community people on the groundwater for their drinking water supply, many people suffered from this chemical contamination. Substantial community-based activism raised concern regarding the severity of this contamination and called for implementing environmental protection measures (Case, 2014). This incident shows, the risk of a shared water system increases the groundwater vulnerability to contamination in the area that depends on the groundwater for drinking purposes. Considering this past incident, as an environmentally sensitive area, WM is also assumed to bear a similar vulnerability to contaminate the groundwater. Due to the region's exposure to various industrial chemicals (Frind & Middleton, 2014). Thus, this region needs protection (Frind & Middleton, 2014).

The residential and industrial construction necessitated by the region's ongoing development projects has been creating pressure on the water supply and causing water contamination. The WM aquifer meets the present water demand, but it is limited to meet future water needs, especially if development continues at its current pace (Frind & Middleton, 2014). The Waterloo region has been recognized as a future growth centre by the Ontario Government, and the population growth in this region is noteworthy (Sousa et al., 2014). For example, from 1976 to 2001, the population and the household growth in this region are 50% and 75% respectively, while the number of people increased from ~290,000 to ~440,000. Moreover, the region's predicted number is 742,000 by 2031 (Ontario Ministry of Infrastructure as cited Sousa et al., 2014). This rapid growth of population and residential demand may affect the groundwater resources in WM. Such growth has been identified as a threat to the environmental balance causing floods, and droughts, thereby hampering groundwater availability as well as quality (Sousa et al., 2014).

Instead of controlling these growing demands, a large number of industrial and residential constructions have been violating the regional restrictions and exploiting political power, thereby causing environmental hazards. For example, case reports no. 6, *Waterloo: Environmental Assessment and Planning Project* (Markvert, 2007), detailed the situation of five property owners who applied political power to change the land designation and properties. The regional restrictions on residential and industrial constructions were implemented in 1985 in order to minimize the growing demand for household needs until 2011. However, the political amendment in 1992 altered these restrictions after receiving huge pressure from the property owners and developers (Markvert, 2007). This amendment was mostly to re-designate the land of west Waterloo for constructing a subdivision through residential development[6] though there was resistance from regional groups. Besides, these acts have been creating huge risks of groundwater resource contamination primarily. Urban expansion has increased the possible risk of hindering the natural infiltration process in many areas, such as roads, parking lots, and roofs (Sousa et al., 2014), thereby accelerating surface runoff of anthropogenic contaminants into the surface water system. This process poses threats to both groundwater and surface water quality (Sousa et al., 2014).

This industrial and residential construction has also been threatening the protection of this water resource as it is an environmentally sensitive landscape. These environmentally sensitive areas are designated to protect landscape elements and maintain a variety of biodiversity, land, soil, water, and other natural resources (Ndubisi, DeMeo, & Ditto, 2000); these constructions could create additional risks. The construction projects for residential developments are extremely destructive to this environmentally sensitive region. Thereby, such construction near the recharge

[6] These residential subdivisions are Clair Creek Meadows, Greyer-biehl, and Vista Hills (Markvert, 2007)

area poses a high risk of groundwater contamination (Frind & Middleton, 2014). As a result, environmentalists, community members, and local media are concerned about this region's safety and water resources.

Industrialization and urbanization have also instigated the extraction of aggregate resources, such as sand, gravel, limestone rocks, and concrete, significant means for residential, commercial, and industrial infrastructure construction, creating groundwater challenges in WM. Since this region is an excellent source of aggregate resources, recent economic growth has increased the demand for these resources for construction and supplies most aggregates to the other parts of the province (Winfield & Taylor, 2005). This kind of industry presents enhanced challenges for groundwater when located in the wellhead area. The high volume of aggregate extraction also has negatively impacted groundwater levels and the water quality in the region (Winfield & Taylor, 2005). This situation has been creating a huge risk to the environmental balance of the Waterloo region.

The above discussion on the environmental and geographical significance of the WM and the threats caused by the ongoing industrialization and urbanization process poses a question on the roles of the actors involved in this system (Philpot, Johnson, & Hipel, 2020). Whereas the community members, social activists, environmentalists, and regional stakeholders are extremely concerned about this region's safety, the provincial government seems to play a contradictory role. These challenges to sustainable freshwater management make it essential to develop technical solutions and evaluate different stakeholders' attitudes and perceptions. Research is done by Brown, Webber, Zonneveld, Carless, Jackson, Artioli, and Tyler (2020) indicated that stakeholders' perspectives could help to minimize conflicts between different water users by identifying a problem and effective solutions from diverse knowledge and influence on developing

and implementing effective policy for sustainable water. Therefore, using stakeholders' perspectives, I intend to explain what roles different involved individuals have been playing and how they impact the environment and local peoples and shape their interactions.

2.3.1. Theoretical framework: political ecology approach

In this study, I employ the political-ecological framework for addressing the major investigation. It helps to analyze the human-environment interaction of water conservation in the region of Waterloo and to understand the political issues, stakeholder engagement, organization and attitudes that create complexity surrounding water resource management. This framework investigates the unequal power relations between different stakeholders, which play an influential role in water governance. It is a transdisciplinary approach that engages a diverse range of scholars from various disciplines, such as anthropology, geography, history, and environmental studies (Robbins, 2012). It focuses on the power practices between various actors, categorizing "winners" and "losers" of the actions associated with natural resources (Krings & Muller, 2001; Swyngedouw, 1999; Reuber, 2005; Beckedorf, 2010; as cited in Acheampong, 2020). It provides scope for explaining socio, political, and cultural understanding of water resources by analyzing different factors and influential determinants related to water conservation practices.

Moreover, political ecology has applications in different disciplines, such as influence within environmental anthropology, geography, and other social science fields, asking questions of how humans influence the environment and how the environment influences (Karlsson, 2015). This approach is methodically embedded in exhaustive ecological analysis of specific cases related to human ecology and the environment. The application of the political-ecological approach to anthropological work emphasizes the political, economic, and ecological aspects. However, it also

differs in various contexts; for example, Michael Watts has applied the political ecology approach to analyze the impacts of accessing environmental resources to understand the environmental effect of social marginalization (Watts, 2015; Paulson Gezon, & Watts, 2003). However, some scholars also criticized this approach; anthropologists Andrew Vayda and Bradley Walters argue that this approach focuses more on the political lens of viewing the human responses to ecological events that might make some political assumptions (Vayda & Walters, 1999). This approach has the risk of clouding the objective investigation of human reactions.

2.3.2. Political ecology framework in water conservation

Political ecology developed from Marxist tradition and has significantly influenced many fields (Khan, 2013). The term political ecology is broadly defined as "political economy and ecology" (Blaikie and Brookfield 1987; Escobar, 1996; as cited in Khan, 2013). So, political ecology primarily focuses on the ecological concern and the political economy that represent the "tension between ecological and human change, and between diverse groups within society at scales from the local individual to the Earth as a whole" (Peterson, 2000, p. 324). This has been used as a framework for analyzing various interconnected issues between humans and the environment (Acheampong, 2020). Eric Wolf first introduced the term political ecology in 1972, in association with Julian Steward's cultural ecology perspective (Khan, 2013). The latter approach analyzes small-scale societies' cultural attributes based on material and environmental endowments (Butzer, 1989; as cited in Khan, 2013). This was followed by the political-ecological approach, which analyzes the actions of political organizations, the interaction of humans and the environment, and environmental change (Biersack, 2006; Robbins, 2012; Khan, 2013). To summarize, the political-ecology framework shows how political actions and practices shape human-environment interactions.

Political-ecological perspectives have mostly been employed in the context of developing countries, where underdevelopment and poverty result in the depletion of natural resources (Khan, 2013). However, they also have relevance in developed countries like Canada. Bryant's literature review, *The Historical Evolvement of Political Ecology Framework in the Third World,* aimed to explain how developing countries' politicized environment is a colonial inheritance that is highly connected to the unequal access and use of environmental resources. The unequal power relationship that exists due to policymakers wielding control over the environment for their own benefits marginalizes the masses, making them the victims of environmental degradation (Bryant, 1998) in both developing countries and Canada. For example, the impact of aggregate extraction in Canada is linked to environmental degradation and environmental changes, and it produced conflict among different stakeholder groups, such as the municipality, affected citizens, provincial agencies, and water activists.

In Canada, the policymaking structure of water governance has been designed in such a way that the provincial government exercises the highest power in decision-making and often influences the regional decisions. The provincial government often ignores the local concerns regarding environmental protection and water supply; instead, they give more attention to the profit maximization of the province as well as industrial allies (Pross, 1992; Scarfone, 2019). This decision-making process negatively impacts the regional environment and water supply. For example, the province's prioritization of capital maximization affects the region by allowing sand and gravel mining in the wellhead protected area, resulting in the depletion of natural resources (Frind et al., 2014). For example, Bill-66, a policy proposed by the province, tried to promote industrial growth by opening up the greenbelt protection, thereby supporting businesses and industries (McGrath, 2019). This bill posed a big threat to the water system as well as the overall

ecological balance of the region (Scultz, 2019). This proposed Bill-66 became a great concern for the community members for its potential environmental threat to WM's sensitive landscape, thereby affecting overall groundwater resources (Kapoor, 2019). Though this bill was not passed, proposing such a bill indicates a profit maximization goal of the provincial government by ignoring environmental protection. A political ecology framework will be able to address such capitalist purposes of the political elites as well as their power manipulation in policymaking of water governance.

So, the growing concern of the political ecology research in water conservation is to identify the socio-political structure of water resource management and the role of the stakeholders. Identifying various actors involved directly or indirectly with water conservation management and the power relationship among themselves are also part of this research. Khan (2013) has identified various kinds of actors in the water conservation system.

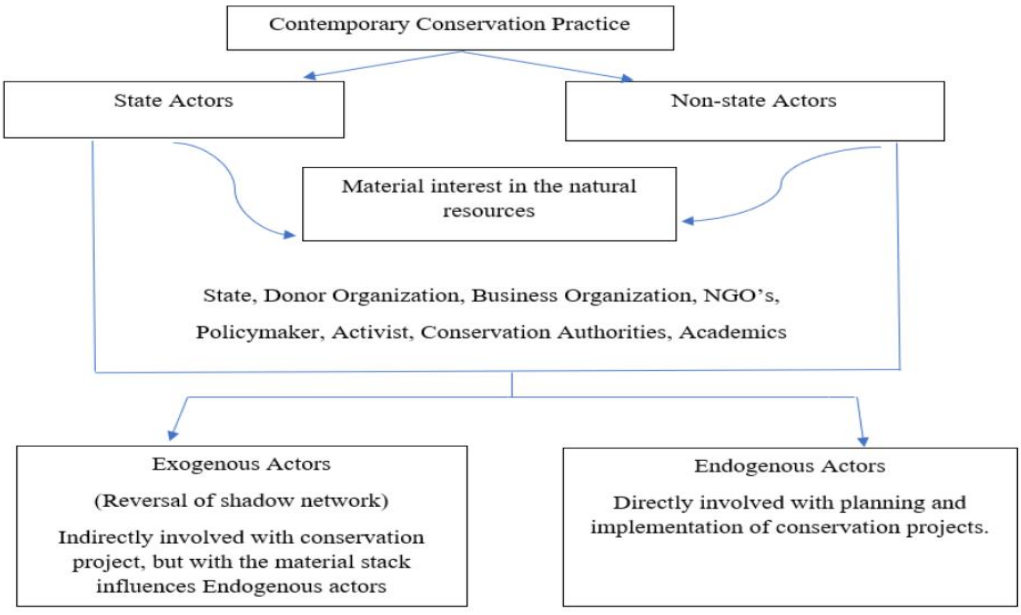

Figure 1: Contemporary conservation practice adopted from Khan (2013)

While differentiating between the state actors and non-state actors, Khan (2013) investigates the involvement level of these actors. Khan indicates the necessity of collaboration between state and non-state actors and suggests it is imperative to understand different stakeholders' roles that shape water politics and redefines human-environment relations (Khan, 2013). Apart from this clear distinction among the stakeholders (Whiteford, Cairns, Zarger, & Larsen, 2016), this study has identified a group of businessmen who have the power to influence the political elites in shaping decisions on resource management and benefits (Whiteford et al., 2016). Using the political ecology framework, I want to show the roles these stakeholders play in water governance and the level of power they exercise here. Identifying different stakeholders and their power role is essential to understand water management by using a political-ecological framework.

The political-ecology framework helps to explain the human-environment interactions shaped by the socio-political system. This framework addresses a broader aspect of environmental reactions, such as ecological change or environmental degradation and their impact on human life. Gezon & Paulson (2005) used this framework to understand ecological changes. Similarly, Swyngedou (2009) has shown how the "transformation of water and its hydrological cycle" is also connected to power practice at local, regional, and provincial levels (p. 56). This approach is often employed in collaborative work with local people and NGOs or local institutions to understand the ecological changes (Gezon and Paulson, 2005).

Moreover, the water environment is no longer considered as "natural"; instead, it is viewed as "historically produced" (Swyngedou, 2009, p. 56). Water scarcity is a man-made problem in many parts of the world caused by socio-political factors. In other words, artificially created water demand may affect natural water supply causing environmental conflicts (Johnston, 2003;

Whiteford et al., 2016). For example, in the case of Baixada Fluminense in Brazil, water management is highly shaped by the connection between the historico- geographical reasons of water problems and the politics of institutional arrangements. This case is a typical example of how water management issues are intertwined with "politics between state, nature and people" (Ioris, 2012). Unplanned urbanization, imbalanced human migration and inadequate state policies and practices have intensified the existing water problem giving rise to the artificial water scarcity in Baixada (Ioris, 2012). So, water scarcity can mostly be socio-politically constructed, thereby producing a "life-threatening" impact in many contexts (Johnston, 2003, p. 75). So, identifying the politics of decision-making and power relations in water management is important to understand the water conservation system.

Paul Robbins (2012), a political ecologist, has proposed five dominant narratives to address the linkage between unequal power relations and control over resources in various contexts. These are i) degradation and marginalization, ii) conservation and control, iii) environmental conflicts and exclusion, iv) environmental subjects and identity, and v) political objects and actors (Robbins, 2012, p. 21). The first thesis explains how local people may be marginalized due to pressure on available resources, such as land and water, and also by multi-stakeholders, such as state authority, politicians, private companies, and elite groups (Robbins, 2004). The second thesis on conservation and control analyses the conservation failures that create challenges for political and economic exclusion. The third thesis demonstrates the conflicts between state authorities, local groups, and private companies who have access to water resources in such environmental conditions to create an opportunity for local people and groups to raise their voices for equal justice. The fourth and fifth thesis demonstrates that environmental conditions create opportunities for the local community, tying them together for a social movement to raise awareness for an

environment-friendly policy. Together, these social movements have political and economic forces that can change policy (Robbins, 2004; Patrick, 2008). These narratives are thorough and accurate in providing a clear insight into how water governance is shaped by different stakeholders, showing interconnected relations with human health, the environment, and overall well-being.

2.4. Methods

2.4.1. Data Collection

This research is a qualitative study. This study involves the community members and collects their narratives through semi-structured interviews. It is also partly bibliographical research, using both primary and secondary sources, including online databases, blog posts, discussion forum print materials, and government documents.

In this study, I want to view stakeholders as those who are active in water conservation, and their insights can help to shape the water conservation practices. This study includes a diverse range of participants from different groups of stakeholders, who are experts, activists, and local people. They all represent a different group of stakeholders, such as the provincial government, municipal government, activists, hydrologists, and local community members. They are knowledgeable in water conservation in this region. This participant diversity helps me to understand their various perspectives and community concerns related to water conservation.

At the beginning, I had a hard time finding potential participants. However, I was able to connect with ten participants. In this study, I have circulated email blasts sending an invitation to participate in a semi-structured interview of my research among the people in my university and personal network in Waterloo. Based on those emails, I was able to get connected to a couple of community members who showed eagerness to participate in my research. These community

members connected me to more participants. Using a snowball sampling technique, I was able to recruit the rest of the potential participants of my research.

Due to the COVID-19 pandemic, I had to contact people online, through email and social media. During the recruitment process, the consent of each participant was collected. To participate in the study, the participant (see table 1) had to be an adult living in the region of Waterloo and/or be knowledgeable of water conservation efforts and directly or indirectly involved in this region's conservation practice.

In this study, I conducted ten in-depth semi-structured interviews with individual stakeholders during the time between June and October 2020. I have interviewed various stakeholders, including water hydrologists, water experts, policymakers, environmentalists, local community members and water activists. These semi-structured interviews were purposeful, conversational, open-ended, and guided through provided topics/questions when necessary (Appendix 1). I prepared a tentative questionnaire that contains some probable questions to direct the conversation. However, these were not fixed; rather, they varied in different conversations. I often edited my queries based on the direction the conversation took.

Table 1: participant and categories

Respondent Categories	Interviewee Numbers
1. Activist	8
2. Academics	4
3. Professional Water Experts	3
4. NGO Members	5
5. Policy Maker	1
6. Local Residents	10

Table (1) shows the 10 participants of this research can be divided into six categories based on their social roles. However, each participant has more than one social role to play. For example, a participant may be an academic, an NGO worker and an activist at the same time. Considering their overlapping roles, I have identified eight activists, four academics, three professional experts, five NGO workers and one policymaker. They were all local residents of the region playing different roles in water governance.

Moreover, the structure of semi-structured interviews has allowed me, as a researcher, to exercise flexibility, and spontaneity, give freedom to the participants and gain some insider-insight into the scenario from the participants. This method gave me and the participant flexibility and autonomy; I became able to edit and shape my set of tentative questions when necessary, and the participants found the queries more relevant. Moreover, this method allowed the participants to share their views and experiences spontaneously as these involved the least interruptions from me, (Dearnley, 2005). The flexibility of semi-structured interviews helped me to get more meaningful insights

from the stakeholders. It also created a comfortable environment for sharing their knowledge regarding conservation practices (Dearnley, 2005). So, semi-structured interviews allowed me to have conversations that were necessary and relevant for this study without intervening unnecessarily; whenever I need to direct the conversation, only that time I interrupt so that interviewee stays focused on the topic and questions.

2.4.2. Data analysis

Each semi-structured interview was recorded with the consent of the participant. The interviews were transcribed verbatim. I used Otter transcription apps that automatically record and transcribe the interviews for systematic data analysis. This data was compared with original voice recordings during the transcription for accuracy.

For examining the data, I have applied a thematic analysis approach that explains various data or interviews and identifies some themes in the narratives (Braun and Clarke, 2006; Boyatzis, 1998; Holloway and Todres, 2003; Ryan & Bernard, 2000 as cited in Nowell, Norris, White & Moules, 2017). First, the transcriptions were coded thematically. So, I have tried to identify some recurring themes in the narratives and grouped those in some stories. Using the political ecology framework, I have looked for the themes connected to power politics in decision-making in water governance.

2.4.3 Limitations

This research has some limitations. First, the COVID-19 pandemic has created a significant challenge for conducting this research as having in-person contact became impossible. I had to conduct all the semi-structured interviews through phone, skype, and zoom meetings. I found this medium of conversation has made it challenging to build the rapport with participants that are necessary for interview-based research. Due to difficulties with video conferencing, two of the

interviews were conducted over email in written form. Email interviews were slightly different from the video interviews as I did not have any face-to-face communication with the participants. As a result, as a researcher, I felt I have not become able to build rapport with the participants the way I could do with video interviews. The communication was very mechanical and ambivalent as I did not become able to identify the tone and facial expression that obviously would have added more meaning to the interview. One positive thing was, I did not have to prepare any transcript for these email interviews, and I became able to use those directly in my study.

Due to time constraints and pandemic restrictions, I had to rely heavily on online databases and journal articles on conservation efforts relating to water conservation instead of personal contacts and physical visits to organizations. These constraints made participant recruitment more challenging.

Another limitation of this study is, I was unable to validate the themes and information identified through the participants' narratives. I mainly relied on the participants' narratives rather than any presumptive ideas. Thus, this study adds to the literature on water conservation but is not generalizable without validation. However, I tried to include the findings of other research done in similar contexts and opinions of the researchers and scholars to validate the findings of this research. I also acknowledge the technological limitations of the transcription software used to record and transcribe the narratives. This might have produced some inadvertent errors.

2.5. Data Analysis: Results and Discussion

2.5.1. Different stakeholders' access to power

The semi-structured interviews included questions asking all the participants to discuss stakeholders' roles in the Waterloo region's water-governance. This includes whom they see as

stakeholders who are involved in water resource management and the impact of the various roles played by different stakeholder groups.

Stakeholder engagement is essential for improving water governance for sustainable water resource management, where water governance refers to the policy and practice of managing water resources in various contexts (Wehn et al., 2018). Researchers have defined the term ‘stakeholder’ distinctly depending on the various contexts. This study has identified different stakeholders and categorized them into five different groups regarding the power they exercise in decision-making in water governance. These stakeholders are 1) the provincial government, 2) lobby groups, 3) regional government bodies, 4) water activists, and 4) the local community peoples, who are the user and sufferers of political decisions. I have shown these stakeholders’ positions in the power structure of water governance in the following diagram:

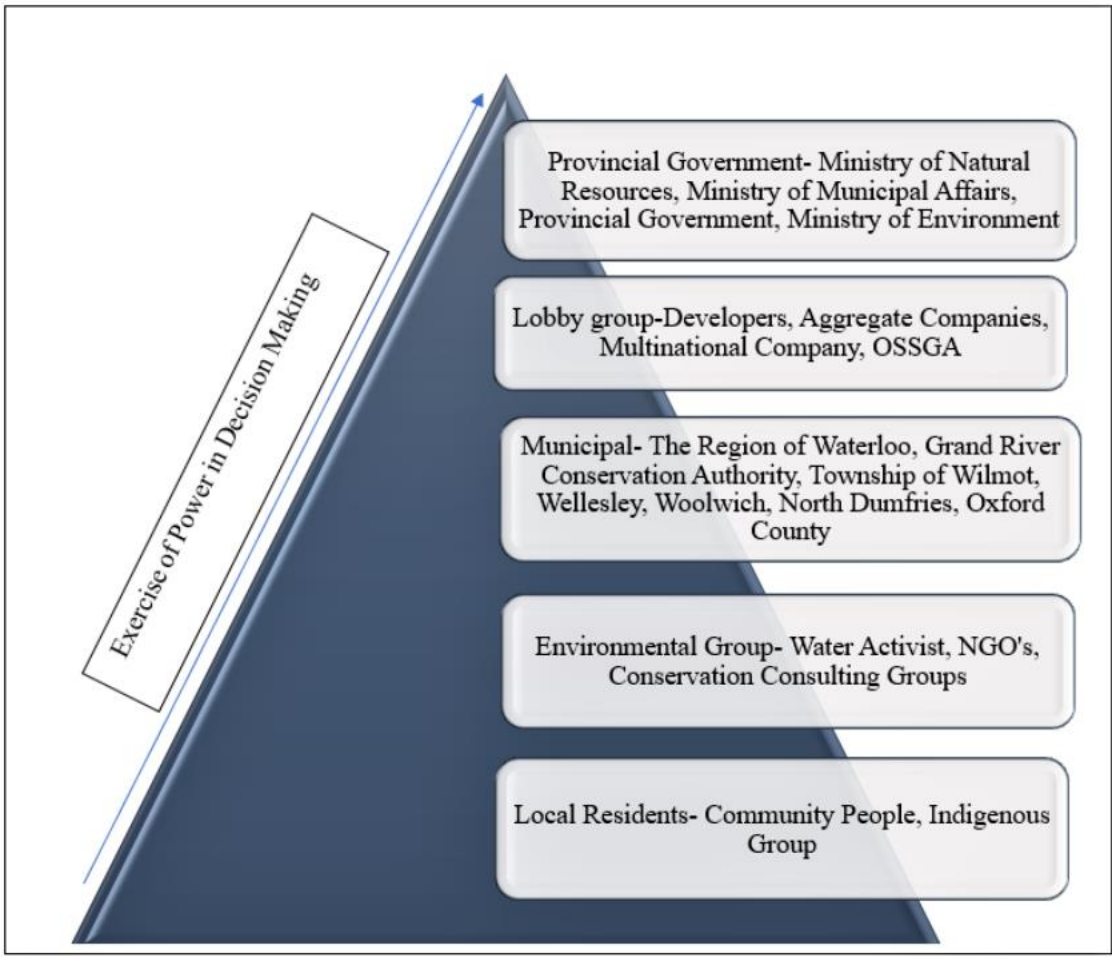

Figure 2: Stakeholders and relative power in Water Resource Management

This diagram shows power relations among different stakeholders, as indicated in participant interviews. The provincial government occupies the top position in this power structure, ultimately determining water governance policies and practices. They exercise the highest level of power in decision-making. This group includes policymakers and several provincial departments, such as the Ministry of Natural Resources and Forestry, Ministry of Municipal Affairs, provincial Government and Ministry of Environment.

After that, the lobby groups comprise developers, aggregate companies, multinational companies, and OSSGA (The Ontario Stone, Sand & Gravel Association). The interviews disclose

their presence in water governance. For example, participant #10, who is a regional hydrologist and water expert, states that,

> Many private aggregate-pit operators and businessmen have formed an industry-lobby group OSSGA, which constantly pushes for loosened regulations and faster approval of their project to improve profitability (October 16, 2020).

They do not take the decision directly, but they have the power to create pressure on the provincial government that eventually transmits to the local government to shape decisions in favour of big industries, businesses, and multinational companies (Pross, 2017).

The regional government is the third group of stakeholders that consists of Municipal government bodies. The region of Waterloo, Grand River Conservation Authorities, Township of Wilmot, Wellesley, Woolwich, North Dumfries, Oxford County. They apparently have the power of taking decisions locally, but in practice, the province directs the governance according to their benefits. André Côté and Michael Fenn argued that the relationship between local government and the provincial government is approaching an inflection point, which indicates the complexity surrounding their relationship and responsibilities in political and economic, urban growth and development (2014, p. 2). In this light, my study participant (2) also states-

> Our region already has good rules for groundwater protection and to protect water from pollution. But in many ways, the province overrides regional rules. So, they have just removed a lot of the Conservation Authority's role and taken away all their powers. They cut all the budgets for the Ministry of Environment, Ministry of natural resources; they fired all the staff; they got rid of all the planners at Municipal Affairs and planning. They are basically doing everything to destroy our natural world (June 17, 2020).

The fourth group includes the local NGOs, water, and environmental activists. They create awareness among the local peoples and raise the issues to the government. They have some sort of agency to resist the decisions coming from the top and often influence water governance. For example, the participant-2, an environmentalist and activist, states how he played a significant role in the movement of stopping Bill-66:

> Suddenly one day, wetlands started being bulldozed, trees and forests were being cut down. I was the one who pulled together all the citizens to work towards a common goal; we went out, met with all the politicians, and made sure that politicians also acknowledged. Moreover, we involved media-reporters and environmental journalists in writing articles and news stories, putting the news on television, and educated everyone. So, we protested and pressured the government to change their decisions and successfully and stopped Bill-66 (June 17, 2020).

The participant above statement explains that these activists and social workers often can influence the decision-making of water governance though they do not have enough power or direct role in policymaking. So, I have found them in the power structure's middle position, creating some pressure or impact on the policymakers.

At the bottom of this power structure, I have found a group of local community members who are the most marginalized. Agrawal and Gibson have argued for a political lens to consider these local community members as a heterogeneous group of actors instead of a homogenous community having similar interests and perspectives (1999). However, the local community members have been mostly ignored in water governance. Multiple interview participants expressed how they have been ignored and suffered by the policymaking provincial government's policymaking. Though these local peoples are the ones who have to go through any environmental

hazard or water scarcity, they have the least authority to be represented in water governance. The activists and NGO workers consider the local community members as a significant part of their activism, shaping their views and concerns. However, these community members hardly have any direct influence on policymaking. A participant (5) has mentioned how these local people share their views and concerns:

> Apart from water conservation authorities in water networks, some middle-class community people, retirees, students, and rural farming communities are interested in taking part in social and environmental justice. Many NGOs are also proactive in engaging a diverse range of people to build a network (September 3, 20).

In this statement, the participant perceived that some local peoples are actively working as activists with NGOs' collaboration in the water network. These local people, having diversified socio-economic backgrounds, share the same sufferings due to the political decisions though they may not participate in the activism directly.

2.5.2. Bill-66

Through the story of Bill-66, this section discusses two major issues connected to the proposition and annulment of the Bill: the severity of Bill-66 in terms of environmental hazard and the process of decision-making in water governance. The most controversial Bill-66, Restoring Ontario's Competitiveness Act, 2018, was introduced at the end of 2018. On schedule 10, Bill-66 proposed to remove environmental protection (Ontario greenbelt) and to support business and developmental progress (McGrath, 2019). This Bill promotes the industrial growth in the region that could be threatening to the Ontario Greenbelt, farmland and, overall, the ecological balance of this region (Schultz, 2019). To elaborate, on the one hand, this section discusses the concern of community members as well as local environmentalists regarding the potential environmental

impact of Bill-66. On the other hand, it shows how provincial legislative activities restrict the decision-making power of local stakeholders and causes environmental conflict, economic and political exclusions. A participant (2) states the dreadfulness of Bill 66:

> Provincial government announcements are going to be very disruptive that can destroy years of the environment. The provincial government proposed Bill-66[7]; if approved, the wetland will be bulldozed, and the water aquifer will be destroyed. They allow the developers to destroy wetlands, destroy critical habitats and all just for profit and money, which should never be permitted. The provincial policies overruled regional policies and took away power from the conservation authorities and municipalities (June 17, 2020).

In the above statement,the participant perceived that provincial policies like Bill-66 could negatively impact the environment by opening the region for residential growth and industrial development. In this view, if Bill-66 was passed and environmental protection was taken out from the designated sensitive landscape, industrial development could affect groundwater resources and also be harmful to environmental health. As a result, accessing safe drinking water could be significantly threatened. In a blog post on the *environmental defence* website, Kevin Thomson, who is a pioneer of the protest against Bill-66, writes that the region of Waterloo is continuously growing, and it needs local environmental protection in order to save the wetland, river creeks, groundwater recharge areas, and endangered species' habitats (Kapoor, 2019). Bill-66 represents a considerable threat to the environment. So, it is crucial to expand the provincial Greenbelt to protect essential groundwater resources, such as WM, the Paris Galt Moraine, and other water and riparian features within the Grand River watershed.

[7] Bill-66, Restoring Ontario's Competitiveness Act, 2018, on schedule 10, proposed for removing environmental protection (Ontario greenbelt) and open for business and development purposes.

Through Bill-66, the provincial government sought to override regional policies of source protection plans intended to protect municipal drinking water sources from threats of possible contamination from landfills, sewage systems, manure, and pesticides (Schultz, 2019). These plans have been a significant obstacle to the industrialization and the profit-making process of the developers and the equity firms who own development companies. Though the regional government apparently possesses the power to impose restrictions and decide on the municipality's environmental protection, Bill-66 could have been a significant threat to that authority. My interview participants perceived that Bill-66 indicates the provincial government's exploitation and intervention in the regional matter. However, this proposition has faced many criticisms from the public media and protests from the environmentalists and social and water activists (Kapoor, 2019). As a result, Bill-66 was not a success; it was annulled in the face of strong protest from the community activists.

The interviews illustrate how various social activists and residents worked together as a force to sign the petition, submitted it, and pushed the government to withdraw Bill-66. They combined to create an alliance and ensure local participation through different campaigns and public meetings. Participant-7 shared how they engaged community members in water and conservation activism:

> We have worked together to educate and engage the people locally and politically with our local municipality, County, and province and negotiate with allies to advocate for water protection. We engage the local people through many public meetings in our local restaurants and local legions. We have done speaking for Rotary Clubs, schools, neighbourhood groups, churches, and assigned campaigns (September 09, 2020).

This participant suggests that social activist groups are among the first to raise their voices against policymakers and engage local people in protests to raise awareness. The Bill-66 movement also shows the role of social activism and its impact on the legislative process. The interviews above state how the social activists work as great negotiators and apply pressure to the different actors: the provincial government, the regional office, and the local community members. This story of Bill 66 shows that this is a successful way for activist groups to influence policy. Activism is very significant in this regard as it provides the local people with a chance to raise their concerns, though it does not always ensure a change in policy making. This study identifies some sort of power in social activism as it became able to stop Bill-66 and thus, save the wetland from being bulldozed, the water aquifer from being destroyed, and the environment from being degraded.

This story of Bill-66 illustrates a major finding of this study. This story shows social activism's role in structuring water governance in the Waterloo region and demonstrates the conflicts between state authorities, private interests, corporations, activists, and a large group of community members. It also shows how a large group of community members, social activists, and environmentalists came together to create a social movement for environmental conservation.

2.5.3. Aggregates- a tension between economic growth and environmental degradation

Aggregate resources, such as sand, gravel, limestone, rocks, and concretes, are essential for residential, industrial, and non-industrial construction; however, the extraction of these resources adversely affects the environment (Winfield & Taylor, 2005). Any construction-based structural development is not possible without these resources. The interviews highlight the role of aggregate extraction and the related tension between economic growth and environmental degradation. Such tensions are also visible in the conflicts between the interests of the provincial and regional government and the lobby groups existence in the decision-making processes.

For ecological well-being, the region has restricted few activities, such as aggregate extraction, but the province has been allowing these activities for economic development purposes. Aggregate extraction in the Waterloo region makes the region's groundwater and the environment extremely vulnerable. According to the Grand River Source Protection Plan (2015), there is a list of activities that are restricted in the wellhead protection area. These include applying diesel fuel storage salts, nitrogen application for farming, and aggregate extraction. However, the participants disclose that the province hardly wants to follow the regional restrictions and often intervene in regional matters. A participant (5) depicts local municipalities as relatively powerless in the face of provincial rules and interference in regional matters (September 03, 2020). He mentioned that although municipalities technically have the right to control how deep aggregate companies could go in terms of blasting below the water table, the province nonetheless took this power away from municipalities (September 03, 2020). This interview shows how the province may not allow the municipalities to make decisions regionally. An interview with another participant clarifies how the region is equipped enough to deal with the local water system's issues. Accordingly, the study participant (10), a regional hydrologist, stated that the region has well-managed water resources, where dedicated staff ensures long-term sustainable water that can reasonably accommodate this region's projected population growth. The provincial government that is highly focused on resource development intervenes in regional decision-making. Such provincial interventions impact conservation and local water resources (October 16, 2020). So, the participants perceived that the provincial government intervened in local matters restricting the regional government's right and authority in water governance.

Consequently, there is a lack of coordination and cooperation among the processes of inter-government decision-making, monitoring, and policy enforcement that also cause problems (Dunn

& Bakker, 2011; Dunn, Harris & Bakker, 2017). Though the provincial government interferes with the aggregate issues by rejecting regional restrictions for economic development purposes, both parts of the government are not in agreement with each other considering restrictions on aggregate extraction. Scarfone (2019) demonstrates that water governance has also identified the interference of the provincial government in the regional matter and denies the restrictions imposed by the local municipalities for environmental protection. For example, Bill-132 exposed economic growth and prosperity by interfering in regional matters and denying the regions restrictions. Accordingly, a participant (5) has added,

> Last fall, our current Ontario government introduced the omnibus Bill-132,[8] which exposed many economic growth and prosperity things. It also includes some deregulation of the aggregate industry. Municipalities have the right to control how deep aggregate companies could go in terms of blasting below the water table. This government took away some of those protection measures. I think that was precisely the opposite direction of where we needed to go environmentally (September 03, 2020).

This statement indicates that the participant perceived two significant issues: first, how the provincial government prioritizes economic growth and prosperity over ecological protection, showing less concern for the local ecology and resource conservation, and second, how the provincial interference denies municipalities the right to decide on what appropriate protections are. To explain the provincial priority, this statement shows, the provincial government is more invested in resource development that benefits economic growth but ignores the fact that these economic growth decisions impact conservation and local water resources adversely (Scarfone,

[8] Bill-132, Better for People, Smarter for Business Act 2019, in schedule 9, this bill introduces changes for loosening restriction from aggregate extraction and use of the pesticide for industrial growth and development.

2019). As a result, they work with big industries and lobby groups who operate this so-called development process in this region and often ignore the usual process of investigating these industrial extractions' environmental hazards. With the provincial government's help, private companies control the local resources causing environmental degradation (Robbins, 2014). Thus, the regional government may lose their authority to deal with local protection.

This analysis through the political ecology framework shows how the province and region have asymmetrical power relationships while making decisions in water governance. While the provincial government considers the profit maximization with the help of the industrial allies, the community people face the blow of this power relationship causing the environmental hazard.

Several participants of this study suggest that the safety measures are often not the provincial government's concern. This statement above indicates that if the local municipality loses the authority to control the level of explosive blasting in the quarry for the aggregate industry, it may cause a disastrous impact on the water ecology (Philpot, Johnson, & Hipel, 2020). For example, this uncontrolled blasting can cause a crack in the aquifer's stone layers that protect and keep the groundwater clean. It is crucial that the provincial government follows the local restrictions so that the local water remains safe. However, this research has found quite the opposite scenario. Multiple interview participants believe that the big industries greatly influence the provincial decisions of aggregate extraction favouring power and economic growth, and the provincial government rejects the local restrictions for benefits (Interview, 2020).While indicating the role of big industries in decision-making, the regional hydrologist states that-

> Big industries with a vast power connection can influence and pressure the provincial government to interfere with the regional issues. Industries want the provinces to input their proposed pits, effectively muzzling the local scientists who are more familiar with the

> local geology and landscape than the provincial scientists, who are sitting far away from the locations (October 16, 2020).

In this statement, the participant perceived that the provincial hydrologists also exercise power to undermine the local hydrologist's opinions by overriding regional rules in order to forward the economy. Adding to the conflict between central and local governments, lobby groups[9] significantly influence the provincial government's decision-making (Pross, 2017). Also, a couple of community members (participants 5 and 10) expressed their concern regarding these groups, suggesting the lobby groups – specifically the industrial lobby group Ontario Stone, Sand and Gravel (OSSGA) put constant pressure on the provincial government to loosen the regional rules and regulations in order to expedite the approval of their proposed projects (September 09, 2020, and October 16, 2020).

This type of lobbying may have exploited all kinds of provincial resources for the benefits of industrial and economic growth that might cloud the scientific investigations at the provincial level. This situation has severe ecological consequences if the provincial government is persuaded to approve dangerous industrial projects without proper investigation. These participants' statements suggest that the provincial government, along with industrial lobbyists, dominate the operations of regional municipalities and create challenges surrounding water resource management. Thus, the provincial government develops policies to benefit their benefactors and political friends and instigate so-called economic growth and industrial prosperity but less care about the local ecology and natural resources.

[9] "Lobbing is a process through a individuals and groups articulate their interests and press to federal, provincial or municipal governments in order to influence the public policy" and some of the professional lobby groups have been paid by third party for pressing government (Pross, 2017).

The above discussion on aggregate extraction and the conflict between provincial and regional offices shows how the provincial government intervenes in regional water governance issues despite the pretense Canada operates within a decentralized approach at a federal level: "Canada is a decentralized, federated state in environmental governance, where fisheries, land, and international waters are the federal responsibilities, and water resources and water supply are provincial responsibility" (Bakker & Cook, 2011, p.277). Moreover, the narratives above indicate that the local members and environmentalists may also contribute to understand the environmental and local needs. The decentralization should also go down to local peoples, experts, and activists to have a better practice. In contrast, this theme also illustrates how various government actors exercise different power levels in decision-making and how this uneven power relation creates complexity in regional water management.

The framework of political ecology provides a lens through which the concentration of power in the central government and the adverse pressure it places on local resource management can be studied (Quandt, 2016). The aggregate extraction encompasses the community members' concerns and regarding industrial extraction, which is supported by the provincial legislative activities that restrict the power of decision-making of local actors. As a result, this causes environmental conflict, also economic and political exclusions. It is also clear that there is enormous pressure from multiple sources, such as developers and industrialized business groups, for economic growth and prosperity. However, this economic growth may caused environmental degradation and threatened the protection of the conservation area. Thus, this theme contributes to the discussion of the water environment and environmental degradation, including the concern about water scarcity and its impact on the people.

2.5.4. Nestlé: Bottled water politics

Though most narratives disclose their experiences based on water conservation efforts, a couple of participants spontaneously connect and bring similar issues of conservation activities of Nestlé. Nestlé is a Swiss-based multinational company criticized in the news media for restricting water access to locals and profiting from selling Canadian drinking water (Gerber, 2020). In this section, I want to illustrate how Nestlé has been working as a significant political ally to marginalize the local community members affecting the water environment.

The expansion of Nestlé's water extraction project in Wellington county, a dominant region of southeastern Ontario, has created concern among the community members regarding the region's existing problem with water scarcity issues (Jaffee & Case, 20018). Due to the growth of industrial, agricultural, and domestic demand for water, this region has been creating huge pressure on groundwater resources, the only source of water supply; severe environmental hazards have been identified as its consequences. Though these consequences have raised concerns among the environmentalists and initiated several water use restrictions, they did not restrict industrial and industrial usages (Jaffee & Case, 2018). What may add more stress to the problem is the growth of any water extraction projects in the region. As a result, Nestlé has intensified the concern of the environmentalists, water activists, and local community members. Nestlé has bought multiple wells in Wellington county that expanded their water extractions project in the region. In 2000, Nestlé bought its first new facilities in Aberfoyle, in the southern part of the county, named Aberfoyle Springs bottled water, and in 2005, it purchased the second one in Hillsburgh, the eastern part of the county. Nestlé extracted 3.6 million litres of water per day from the former well and 1.1 million litres from the latter, respectively (Jaffee & Case, 2018). The community became more concerned with this purchase as Nestlé was trying to take more control over community resources (Jaffee & Case, 2018; Gerber, 2020). The community members expressed their strong

opposition to this growth of Nestlé. The residents and non-profit organizations want Nestlé to step back with their business with water and return these wells to the community. According to the participant-5

> Nestlé has a permit for extracting nearly 3.6 million litres of groundwater per day, and 11 million litres are extracted at Dolime Quarry, compared to Nestlé's 3.4. Though it is less than other companies, it is an extra added extraction (September 3, 2020).

This statement shows the region is already under a huge extraction process; Nestlé 's project has been a new addition to this pressure. This water extraction for business purposes creates environmental degradation and threatens groundwater protection (Cruickshank, 2016). Moreover, Nestlé has contradicted its own policy of environmental safety and climate change. Nestlé has mentioned that they care about the environment and want to build a positive relationship with the community. In contrast, their activities are quite the opposite. Nestlé has claimed on its company website[10] that they are committed to reduce water extraction and carbon emission, but plastic bolted and carbon emission is connected to the company's activities (saveourwater.ca, n.d.). They have been working on reducing their water extraction gradually; however, any kind of newly added extraction seems to be significant pressure on the groundwater in the region. It appears that their concern is more connected to business and profit rather than safe water access and community benefits.

Nestlé also seems to play a huge role in transforming water into a market product, increasing natural water resource scarcity. Griswold (2017) said, Nestlé, bottled water is a market product created for production and consumption; this activity is part of a highly complex political

[10] https://www.Nestlé.com/media/pressreleases/allpressreleases/Nestlé-efforts-combat-climate-change

practice that involves different government officials. This process not only has restricted the natural consumption of water but also has increased more involvement of the market and bureaucracy in water conservation. This capitalization of water has increased the involvement of the industries and companies, the lobbyists, in water conservation efforts through their power of money and profits. Besides, there is no doubt that bottled water is a significant profitable global business. It has been making billions of dollars every year (Winner, 1980). According to Transparency Market Research (2015), the estimated bottled water market in 2014 was nearly $158 billion, which is projected to double in 2020 (Jaffee & Case, 2018). As a result, the government has a lack of willingness to extend running tap water to the peri-urban community. In this aspect, bottled water has been increasing their consumers as well as their actual scarcity of safe drinking water (Hawkins, 2017 as cited in Jaffee & Case, 2018). It is questionable how a scarce resource becomes a profitable business while the community is experiencing water scarcity. It highlights how the provincial government promotes economic growth but fails to ensure basic human rights for safe drinking water to the community. Accordingly, a participant-7 says the Nestlé group created a massive conflict when the local community members wanted to control the resource. Local communities wanted a well for their communities' growth, but Nestlé bought those wells and renewal permits of water-taking at Aberfoyle plant in Guelph, Ontario. They extracted an excessive amount of water from the ground that created water scarcity in the local communities (September 09, 2020). As a result, the water that was naturally free to them has become a rare product that needs to be purchased. Another participant (5) has said,

> Nestlé is taking water from within the Haldimand Tract, only 9% of households in six nations have running water, and people are annoyed by Nestlé's water taking, but Nestlé is not the cause of the water crisis there (September 3, 2020).

As a result, in spite of having access to an abundant natural water supply in the community, the local people (Indigenous community) often may feel forced to choose bottled water when they do not find enough running tap water supply (Shimo, 2018). In a way, this dynamic indicates how scarcity is socially and historically produced, troubling the implications of basic human rights for clean drinking water.

This water scarcity is worse in the Six Nations reserve, where ninety percent of homes do not have adequate water supply or running tape water (Shimo, 2018)[11]. According to some articles published in theguardian.com, six Nations did not approve Nestlé's water extractions as the communities have been suffering from water scarcity. This lack of water supply persuaded them to use rainwater or purchase water that caused both health problems and suffering (Shimo, 2018). In 2018, a heart-breaking story published in the news media (*theguardian.com)* showed that people living on the six nations of the Grand River Indigenous reserve suffer from water scarcity. Many do not have running tap water into their houses and drive more than 8 km for water. Sometimes, this water is not even drinkable. They have to buy bottled water for drinking purposes. It is hard for women to collect water from long distances every day. During the summer, water is scarce, and they have to collect rainwater through the roof's shingles that cause many skin diseases and bacterial infections. Historically, Indigenous peoples in this area have been marginalized through socio-political and economic oppression and forced to live in the reserve areas. Nestlé has intensified their water scarcity and added more sufferings, denying their opinions regarding Nestlé's water pumping project (Shimo, 2018). This story also demonstrates six nations' situation

[11] *theguardian.com (https://www.theguardian.com/global/2018/oct/04/ontario-six-nations-nestle-running-water)*
https://www.business-humanrights.org/en/latest-news/while-nestl%C3%A9-extracts-millions-of-litres-from-their-land-residents-have-no-drinking-water/

indicating colonialism and less power in decision-making in water governance. They are being marginalized and neglected historically, years after years.

From socio-cultural and political understanding, participants' narratives also illustrate how the notion of development marginalizes the local people and their relationship with the land and water resources. This displays the influential role of the developer. The anthropological discussion on water resources includes attention to the institutionalization of water management (Trawick, 2003; Wutich, 2011), the social, cultural and political understandings of water management (Strang, 2004), and the connection between access to water and human well-being (Ennis & McMillan, 2006; Whiteford & Whiteford, 2005 as cited in Whiteford et al., 2016). Though water resources' socio-political understanding can be included in water governance, Nestlé's business and politics with water seem to threaten that relationship and replace it with a capitalist approach to water management.

The water activists have highly been opposing Nestlé for their water extractions. However, the Nestlé narrative provides a clear example of how the provincial government and Nestlé pay little attention to it. This creates a conflict among the provincial government, and activists, indicating the asymmetric power relations in the different levels of stakeholders that shape water governance in Southern Ontario. Politics in water governance is analytically powerful with the combination of power and conflict (Warren, 1999). Through Warren's lens, this study reflects how Nestlé bottled water articulates conflicts of interest, the conflict between different stakeholders (1999). Many activists have raised concerns against Nestlé for reinforcing water scarcity to create awareness among the public regarding groundwater threats. Participant -7 discussed,

> Nestlé owns three sites in Wellington County. Aberfoyle, where they have an expired permit to take 3.6 million litres of water per day, Hillsburgh, where they have an expired permit to take 1.1 million litres per day and Middlebrook, where they have No permit at all. Centre Wellington needs at least four new municipal wells, and the area west of Elora is the best place to take water according to the Water Supply Master Plan for the township. It is in the same area as the Middlebrook well, and so Nestlé taking water there would impact the municipal wells. Therefore, the people do not want Nestlé to take water there.

In this statement, the participant perceived how community activism indicates the water crisis and raises the problems. As a result, activists were successful in capturing the attention of government officials. The provincial government imposed a moratorium for two-year in December 2016 on new or expanded permits on the water taking for bottling purposes in Ontario for conducting a full review on the water taking regulations (Leslie, 2016 as cited Jaffe & Case, 2018). Participant -7 perceived that they pressured the provincial government to pass new policies and regulations concerning water taking. Therefore, the non-profit organization Saveourwater.ca has been working to educate and engage the public and various government levels on this problem of water permits. The same Participant has added that they are still a concern because the moratorium was delayed until January 2021 but not denied. They want to step back from Nestlé from the community. As they believe, the vast amount of water withdrawal can cause environmental degradation.

In this light, news media criticizes that ‘Premier Ford and the federal government could use this as an opportunity to look at this with a fresh lens of reconciliation and watershed-level governance’ (Gerber, 2020). That means the overpowering provincial water governance needs to retheorize their policy-making strategies and coordinate among the inter-governmental rules,

decision-making and proper enforcement. It supports my point that there needs to be more respect and more decision-making power at the local level, considering the community needs.

2.6. Conclusion

Through a political-ecology lens, this study identifies the power relationship among various stakeholders involved in informing the decision-making process in water governance in the region. This study has also found how this power relationship shapes the human-environment interaction by degrading the environmental balance and affecting the community members. While reinforcing the power politics of water resource management in the political ecology framework, this study has identified various stakeholders who directly and indirectly influence the decision-making process. The followings are the issues that I want to stress for further research:

First, this study's themes indicate the stakeholder perceived that the asymmetrical power relationship exists among the various stakeholders identified at a different level of water resource management. It shows how the provincial government exercises massive control over the regional issues. This study discloses the top-down process of decision making, where the actors at the top exercise the highest level of power in making the decisions that negatively affect the people at the bottom. This finding on the uneven power relationship contributes to understanding the political ecology framework in water governance research (Côté and Fenn, 2014; Quandt, 2016).

Second, this study has identified the role of the lobbyist groups as well as multinational companies that are directly and indirectly involved with the decision-making process of water governance of the Waterloo region. In the name of the economic development of the region, these lobbyist groups promote industrial projects in the regions for their own benefits (Pross, 2017). Moreover, multinational companies like Nestlé promote the capitalist production of water in the name of benevolent activities such as supplying clean water to the community. This also benefits

a particular group that has the power to operate such a system. In both of the activities, the provincial government gains support from these groups that benefit the political elites more than the community people. These stakeholders' roles are not easily perceived as they are not directly involved in provincial and regional managements or community movements. Very little research has been done on identifying this lobbyist group's role, although they may create a great influence in policymaking at the provincial and regional levels. This research can be a great ground for future research on this stakeholder issue.

Third, this study also contributes to the work on political ecology by indicating the human-environment interactions shaped by water politics in the region. (Whiteford et al., 2016). The environmental degradation caused by various policies for economic development directly affects the local community peoples who use the water for their daily needs and consumption. Further research is required to establish a holistic approach to understand water access rights and human-environment relations with the social, political, and ecological aspects.

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Appendix-1

Semi-structured interview question set (some tentative questions)

I would like to ask some questions about the WM. I will use this information to understand stakeholder attitudes regarding the Moraine as part of my master's thesis.

Any information or experiences that you would like to share related to the Waterloo Moraine(WM) would be appreciated.

This should take about 20-30 minutes. Please feel free to stop me at any point if you would like a break or to end the interview. Are you ready to get started?

- As a scholar who works in this field, can you please share how you perceive water resource management in the region (notably, the WM)?
- Why is WM, as a geological feature, considered to be a susceptible or sensitive area? Not sure you need this question
- How are developments such as aggregate operations, oil industries, sand, and gravel industries) responsible for making Moraine vulnerable?
- What kind of threats do you see in groundwater resource management when it comes to considering urbanizing watersheds?
- How can we integrate the socio-political and political-ecological aspects of water governance with a science-based understanding of WM?
- Do you see any communication gap/ research gap regarding science-based policymaking in water resource management?

- Who (People/ group of people) do you see as responsible for water resource management in the Region of Waterloo? (Different kind of bodies in water governance)
- How does recent policy, such as bill-66 and bill 132, impact water resource management? What do you see as the major issues with these bills (and their implementation or non-implementation) [if this is appropriate – you know better]
- Are there any factors (i.e. social, economic, or political) that create an opportunity or challenges in Moraine's water resource management?
- What kind of environmental conflict do you see here? Do you see any marginalization or land degradation that is creating opportunities for water resource management?
- Do you think there is any community activism that is underway regarding the Waterloo Moraine? Or any other activism or conservation efforts for saving groundwater, do you think these efforts can help to build awareness in the community for sustainable water solutions?
- Do you think policymakers should consider the interaction between local people and policy subsystems when they plan to design and implement the water policy?
    - If yes, how can they involve? Can you please explain?
    - If no, why not, can you explain?

- Do you see any communication gap between different levels of water governance in this Region? Some local people think they have been overlooked in the policy or decision-making process of water resource management. Do you agree or disagree? If you agree, how can we engage them?

- Moreover, during one of my interviews, one activist said, people do not understand the scientific term, we need to find easily accessible or understandable data to engage local stakeholders; what do you think about it? Please explain?
- Do you want to share your thoughts, how we should ensure better policy for the sustainable water solution for this Region?

Is there anything else that you feel might be relevant, and you would like me to know? Moreover, if you know anyone else, who might be willing to discuss this, could you refer any name and their contacts, and could you please forward the flyer to potential participants on behalf of me so that they can get the sense of this study?

Thank you for participating in the interview. If you have any questions or concerns, please contact me at **s33paul@uwaterloo.ca**