# ENVIRONMENTAL JUSTICE AND DAM MANAGEMENT: A CASE STUDY IN THE SASKATCHEWAN RIVER DELTA

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## ABSTRACT

This thesis explores whether environmental justice can attenuate the burdens attributed to the operation of the E.B. Campbell Dam experienced by downstream Indigenous communities in the Saskatchewan River Delta. Environmental justice for Indigenous people who are affected by dam management is important for three reasons. First, Indigenous people often experience environmental burdens of dam management disproportionately. Second, Indigenous people are often excluded from dam decision-making. Third, when Indigenous people are included in dam decision-making, their rights and values are sometimes misrecognized within decision-making processes.

While exploring environmental justice for Indigenous people in the context of dam management, this thesis contributes to a recommendation that empirical studies of environmental justice should describe the underlying causes of environmental injustice. This thesis contributes to this recommendation by documenting how power relations challenge environmental justice for Indigenous people in dam decision-making. A place-based, interdisciplinary methodology was taken to clarify an environmental justice pathway for downstream Indigenous communities in the Saskatchewan River Delta. This methodology involved analyses of hydrometric data, interview data and legal and policy documents. The findings of this thesis include that Indigenous people, through their meaningful participation in dam decision-making, could help government representatives recognize the environmental burdens of dam management. However, imbalances in power between Indigenous people and government representatives could constrain Indigenous people's meaningful participation. The implication of these findings is that if power relations are accounted for in decision-making, the meaningful participation of Indigenous people can

facilitate the recognition and remediation of environmental burdens attributed to dam management.

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## TABLE OF CONTENTS

## LIST OF TABLES AND FIGURES

## LIST OF ABBREVIATIONS

SKRD ……Saskatchewan River Delta

EBCD ……..E.B. Campbell Dam

NVCH ……...Northern Village of Cumberland House

CHCN …….....Cumberland House Cree Nation

EJ ……...Environmental Justice

# CHAPTER 1: INTRODUCING THE DILEMMA OF A REGULATED RIVER AND THE NEED FOR ENVIRONMENTAL JUSTICE

## 1.0 Introduction

This thesis explores how water decision-making can involve Indigenous people meaningfully to address the complex and uncertain ways environmental benefits and burdens are distributed.[1] Complexity refers to the multiple interactions between people and their environment across time and geographical space (Helbing 2009). Uncertainty refers to what is not known and difficult to predict about these relationships (Milly et al. 2008). Through their meaningful participation in decision making, Indigenous people can inform the complex ways people relate to the environment and help identify uncertainties in human-nature relationships (Barrett 2013).

Environmental justice (EJ) is a pathway to understand *why* and *how* meaningful participation is needed for Indigenous people in water decision-making. EJ refers to three inter-related goals: (a) the equitable distribution of environmental benefits and burdens; (b) the equal opportunity to participate in fair decision-making; and (c) the accurate recognition of the rights, values and demands of participants within decision-making (Schlosberg 2004). This thesis uses an EJ framework to better understand how Indigenous people experience environmental burdens, how they can have an equal opportunity to participate in water decision-making and how their values can be recognized in decision-making. In short, this thesis explores an overarching hypothesis that *attention to the meaningful participation of Indigenous people can help*

[1] While Aboriginal is a term used by the federal government of Canada and Canadian scholars encompassing First Nations, Métis and Inuit in Canada, Indigenous is used throughout to represent the political implications of Indigenous assertions for collective self-governing rights at the international level (Wilson 2008). While Indigenous does not accurately represent the diversity of Indigeneity in Canada, it is an umbrella term that encompasses First Nation, Métis and Inuit (Wilson 2008).

*government representatives recognize Indigenous values to lead to a more equitable distribution of environmental benefits and burdens*. I adopt three separate, but inter-related, concepts that allow me to link the findings of this thesis to EJ: meaningful participation, recognition and power.

Participatory approaches are not necessarily inherently meaningful (Arnstein 1969). Sherry Arnstein's (1969) original ladder of citizen participation identified eight rungs of increasing influence. She classified the first five rungs as degrees of tokenism and non-participation and the last three rungs as participation that afforded citizen's authentic influence over decision-making. I adopt Senecah's (2004) Trinity of Voice theory to identify what constitutes meaningful participation. Senecah (2004) explains that meaningful participation has three dimensions: access, standing and influence. *Access* refers to the opportunity to express opinions and choices (Senecah 2004). *Standing* refers to the recognition of participants' rights and perspectives (Senecah 2004). *Influence* refers to the respectful consideration of these perspectives (Senecah 2004). Meaningful participation and recognition inter-relate when meaningful participation can enhance the recognition of Indigenous values and demands in environmental decision-making (see Dale and Armitage 2011).

Unequal power relations can prevent or constrain meaningful participation in collaborative water decision-making (Akbulut and Soylu 2012; Brisbois 2015; Raik et al. 2008; Reed and McIlveen 2006). Some power relations can be both explicitly and easily understood. Power relations can also be less explicit, expressed in rules, language and symbols that privilege certain ways of understanding a problem over others (Lukes 2005). Meaningful participation, recognition and power can inter-relate when power relations limit meaningful participation and, thus, recognition (Black 2001; Boyd 2003).

This study uses a case of dam management in the Saskatchewan River Delta (SKRD) to build a rich empirical understanding of the ways meaningful participation, recognition, and power relate to Indigenous people. For 50 years, Indigenous communities in the SKRD have experienced land-use changes attributed to dam management in Saskatchewan (Waldram 1988; Waldram 1989, Gober and Wheater 2014). James Waldram (1988; 1989) provided the original western empirical evidence that described how dam management in Saskatchewan had adversely affected the capacities of Indigenous community members in the SKRD to hunt, fish and trap. Given that Indigenous people and their perspectives are often excluded from water decision-making (Adkin 2009; Wilson 2004), an empirical understanding of meaningful participation, recognition, and power in water decision making is important.

The four chapters in this thesis provide insight into the overarching hypothesis within the context of dam management in Saskatchewan. Chapter 1 applies the concept of EJ to the existing literature on dam management. An EJ framework helps to identify a dilemma experienced by Indigenous populations who live downstream on regulated rivers. This regulated river dilemma results when Indigenous people share the benefits for hydroelectric power but experience environmental burdens disproportionately. Chapter 2 uses a place-based, two-eyed seeing approach to guide an empirical investigation of the environmental burdens associated with dam management. These burdens can be reconceived as losses to Indigenous identity. Meaningful participation in decision-making may help recognize and remediate these potential losses. Chapter 3 explores how power relations have affected Indigenous people's meaningful participation in dam management. Chapter 4 addresses the overarching hypothesis in this thesis by weaving together the empirical findings from Chapters 2 and 3 about the relationships

between meaningful participation, recognition, and power and by considering their implications for advancing EJ for Indigenous people affected by dam management.

### 1.1 Research Context

In 2003, the United Nations World Water Assessment Programme identified the global water crisis as a crisis in governance (The United Nations World Water Assessment Programme [WWAP] 2003). Governance refers to decision-making processes, and the public and private agency structures and policies that determine who makes decisions (Bakker 2007). Crises in governance stem from existing governance arrangements' inabilities to account for complex, uncertain and regional changing conditions. Persistent fundamental drivers of change related to water availability and governance are economic development and human population growth (Vörösmarty et al. 2000). Conventional water governance typically uses centralized, top-down, technical solution-focused decision-making (Brunner et al. 2005; Brunner 2010). However, the complexity of inter-related and increasing human demands undermines these conventional approaches (Armitage 2008; Brunner et al. 2005; Brunner 2010).

Crises in water governance are further complicated by climate change (Hurlbert et al. 2009). For instance, human-driven changes to the earth's climate unpredictably alter the means and extremes of precipitation rates and resultant river discharge rates (Milly et al. 2008). This uncertainty plagues water management systems that are built on the assumption that natural change and variability can be predicted in a probabilistic framework (Milly et al. 2008). Conventional water management approaches typically fail to account for complexity and uncertainty in regional, place-based water problems. As Cash (2000: 242) describes, the "heterogeneity of local impacts and vulnerabilities, the interactions of multiple environmental

stresses, and large geographic variance in [burdens] and benefits highlight the potential pitfalls of centralized assessment systems which are poorly linked to decision-makers at multiple levels."

In Canada, water governance is fragmented (Bakker 2007; Gober and Wheater 2014; Saunders and Wenig 2007). Gober and Wheater (2014: 1418) suggest "[f]ragmentation begins with the fact that watershed boundaries rarely coincide with political boundaries; myriad levels of government have overlapping, and sometimes conflicting responsibilities for water management." For instance, in the Saskatchewan River Basin, freshwater ecosystems and their goods and services in Saskatchewan are threatened by upstream decision-making in Alberta (Gober and Wheater 2014; Statistics Canada 2010) (See Figure 1.0). In the Alberta portion of the Saskatchewan River Basin, particularly in the South Saskatchewan sub-basin, the over-allocation of water licenses threatens water availability (Gober and Wheater 2014; Statistics Canada 2010). When licensed withdraws are taken fully taken advantage, this decreases water availability and increases the vulnerability of those populations living downstream from Alberta (Gober and Wheater 2014; Statistics Canada 2010).[2] In both the Saskatchewan and Alberta portions of the Saskatchewan River Basin, increased economic development, higher demand for irrigation for agriculture and hydroelectric development further exacerbate the vulnerability of downstream human populations (Gober and Wheater 2014; Statistics Canada 2010).

[2] The Master Agreement on Apportionment of 1969 dictates that Alberta must pass 50% of its water flow on to Saskatchewan. Similarly, Saskatchewan must pass 50% of their water flow on to Manitoba.

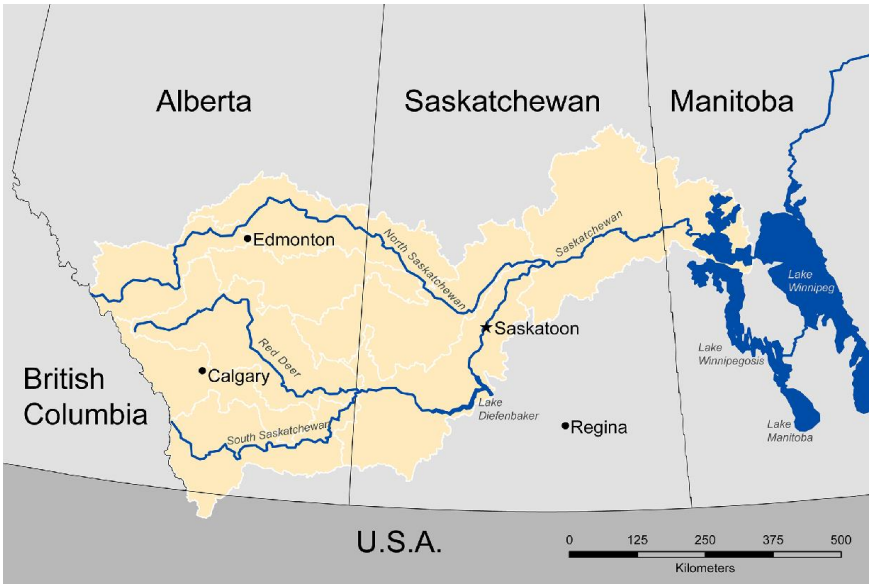


**Figure 1.0 – Saskatchewan River Basin (Gober and Wheater 2014)**

A number of climate change impacts have been observed and predicted in the Saskatchewan River Basin (Wheater and Gober 2013). For example, warming temperatures alter snowpack in the Rocky Mountains (Wheater and Gober 2013). The alteration of snowpack influences the magnitude and timing of river discharges down through the system (Wheater and Gober 2013). Climate change impacts in the form of more intense and variable extreme weather events have led to vulnerability for populations and infrastructure across the basin (Hurlbert et al. 2009). For example, in the last 10 years, flooding has caused significant damage to infrastructure (Gober and Wheater 2014). In the future, water availability will continue to be influenced by climate change: Tanzeeba and Yew Gan (2012) predict a decreasing trend for runoff in the Saskatchewan River Basin.

In the SKRD, located in the downstream end of the Saskatchewan River Basin (Figure 1.1), hydro-development and operation led by the provincial government have been controversial. At the centre of this controversy is the E.B. Campbell Dam (EBCD), built between 1963 and 1966, approximately 100kms upstream from the Northern Village of Cumberland House (NVCH) and the Cumberland House Cree Nation (CHCN). Since the

completion of the EBCD, these downstream communities have identified altered water flow patterns and subsequent land-use changes (Waldram 1988; Waldram 1989). Originally named the Squaw Rapids Dam, the EBCD was constructed by the Saskatchewan Power Corporation [hereafter SaskPower], a provincial crown utility, to supply additional power during times of peak power demand (Bartlett 1989).[3] The EBCD was granted a 50 year license by the provincial government in 1985 to be retroactively applied to 1966 (Province of Saskatchewan 1985). The Tobin Reservoir was created to store water for the EBCD. Consequently, the impoundment of water to fill the Tobin Reservoir significantly dropped water levels in the SKRD (Massie and Reed 2013).


**Figure 1.1 – Drainage Basins of the South Saskatchewan and Saskatchewan Rivers and Hydroelectric Dams (South Saskatchewan River Stewards 2015)**

[3] A provincial crown corporation is a hybrid public and private institution that is wholly owned by the public but at arms-length of the government. In Saskatchewan, SaskPower is a provincial crown structured institution that has the role of a power utility.

Since the construction of the EBCD, two more dams have been built: the Government of Saskatchewan's Gardiner Dam, constructed on the South Saskatchewan River in 1966, and SaskPower's Francois Finlay Dam, constructed near the Town of Nipawin in 1985. The Gardiner Dam stores significantly more water in its reservoir, Lake Diefenbaker, than the Francois Finlay Dam and EBCD store in their reservoirs. However, the EBCD's hydropeaking function has been associated with declining wildlife populations including muskrat and moose, both culturally critical species for residents in the SKRD (Waldram 1989; Goulet 2013). Hydropeaking refers to the fluctuation of downstream water availability caused by the rapid increase or decrease in the release of water from hydroelectric dams in response to varying power demand. When SaskPower opened the EBCD, it operated without minimum flow requirements, allowing the crown corporation to completely shut off water flows when there was no power demand. In 1989, SaskPower reached a settlement with the NVCH for $20 million to compensate for the dam's adverse impact to trapping and fishing. In 2004, the Canadian Government's Department of Fisheries and Oceans implemented a minimum flow requirement of 75 cubic metres per second for the EBCD. While residents observed positive changes associated with these minimal flow requirements, such as increased muskrat populations, tensions over hydropeaking continued. In 2016, SaskPower will seek relicensing of the EBCD through an application to the Saskatchewan Water Security Agency. If successful, SaskPower will be licensed to operate the EBCD for an additional either 25 or 50 years.[4]

Despite the adverse impacts of hydropeaking from EBCD operations, hydroelectric power has many benefits for Saskatchewan residents. In their 2014 annual report, SaskPower indicated that their hydroelectric dams supplied power to over 500,000 Saskatchewan customers

[4] At the time of writing, the length of a potential renewal was under discussion.

(2014: 140). The provincial utility also reported that Saskatchewan hydroelectric operations supplied an average of approximately 21.6% of net power supply to the province over 2009-2014 (SaskPower 2014: 141). In addition to power supply as a benefit of hydroelectric generation, dams in Saskatchewan mitigate flooding. The operation of the dams, in particular the Gardiner Dam can mitigate flooding impacts downstream due to Lake Diefenbaker's large storage capacity.

Thus, hydroelectric dams on the Saskatchewan River present a dilemma for the NVCH and CHCN. On one hand, dam operations provide reliable power and contribute to flood mitigation for these communities. On the other, hydropeaking alters water flow patterns that affect the NVCH and CHCN residents' capacity to use the delta to hunt, fish and trap (Gober and Wheater 2014, Massie and Reed 2013; Waldram 1988, Waldram 1989). Solutions to this dilemma, beyond conventional technical and legal responses, have not been documented or implemented. In addition, technical modifications beyond the 2004 minimum flow requirement have been suggested by NVCH and CHCN residents, but not implemented. While the 1989 settlement compensated for the dam construction, impacts from hydropeaking remain.

Rather than being viewed as a purely technical or legal issue, the challenge of regulating flows in the SKRD may also be seen as a governance problem. Pahl-Wostl et al. (2013) argue that issues like altered flow regimes cannot be understood through a purely technical or legal lens and require solutions that are more broadly understood. A broad understanding of altered flow regimes could include input from scientists, policy-makers, environmental managers and local populations (Pahl-Wostl et al. 2013), which would build a more comprehensive social and environmental context for water governance (Pahl-Wostl et al. 2013). Flexible freshwater decision-making can account for more diverse needs and adapt to complexity and uncertainty in

changing socio-ecological conditions (Brunner et al. 2005; Brunner 2010; Hurlbert et al. 2009). Pahl-Wostl et al. (2013) and Hurlbert et al. (2009) argue that the remediation of environmental burdens of altered flow regimes requires a greater range of tools and participants to reduce unintended consequences and address a wider range of interests. Importantly, a broader understanding of altered flow regimes may not preclude technical solutions (see Richter and Thomas 2007).

The concept of EJ has the potential to help government representatives understand the regulated river dilemma for NVCH and CHCN communities and guide the meaningful inclusion of more participants in decision-making. EJ refers to fairer and more equitable environmental decision-making processes that can lead to more fair and equitable environmental outcomes (Schlosberg 2004). An assumption in EJ is that the inequalities that exist among individuals and groups are socially constructed and persist through decision-making processes (Schlosberg 2004; e.g. Walker and Bulkeley 2006). For Schlosberg (2004) there are three areas of concern in EJ: equity, participation and recognition. *Equity* means how environmental burdens are distributed among individuals and groups (Schlosberg 2004). In other words, who gets what? *Participation* refers to the extent to which decisions about who gets what include the people who are affected by those decisions. In other words, who's included? *Recognition* refers to how decision-making processes respond to or *recognize* the identity and values of participants (Schlosberg 2004). In other words, what do they value? A person can participate, but, if the outcome misconstrues or misrepresents that person's interests and values, that person would not have been effectively recognized. By contrast, meaningful participation includes both recognition and participation because meaningful participation refers to the ability of participants to access decision-making, to be recognized within decision-making processes and to influence decisions (Senecah 2004).

There are potential equity, participation and recognition problems in the dilemma of a regulated river, and Schlosberg's (2004) EJ framing provides a pathway for investigating problems with, and suggesting solutions that will respond to, environmental inequity. However, a critique of EJ is that, while EJ literature attempts to investigate problems and solutions related to environmental equity, EJ literature has a limited capacity for addressing underlying cause of inequity, misrecognition and limited participation (Neimanis et al. 2012; Pellow and Brulle 2006).

The concept of EJ can have a greater potential to help understand a regulated river dilemma and guide the meaningful inclusion of more participants when imbalances in power relations are addressed. One potential underlying cause of inequity, misrecognition and limited participation is an imbalance in power relations between decision-makers and members of the public (Pellow and Brulle 2006). Power relations refer to the explicit ways that individuals and groups can influence others' behaviour and the less explicit ways, such as rules, language and symbols, which allow certain ways of understanding a problem to be privileged over others (Brisbois 2015).

### 1.2 Purpose and Objectives

The purpose of this research is to explore how EJ can attenuate the range of burdens that communities in the SKRD experience because of EBCD operations. To meet this purpose, this research has three objectives:

1) To identify the range of environmental burdens that SKRD communities experience from hydrological alteration;
2) To understand how power affects equity, participation and recognition in environmental decision making; and

3) To propose a solution for advancing equity, participation and recognition in environmental decision making.

## 1.3 Literature Review

This literature review identifies existing scholarship on the following concepts: EJ, hydrological alteration, and adaptive co-management. First, this literature review defines EJ and its relationship to hydrological alteration. Hydrological alteration is a process that describes human-induced changes to the natural *timing and quantity* of a river's flow (Rosenberg et al. 2000). Second, adaptive co-management is defined and introduced as a potential solution to advance EJ. In addition to synthesizing literature on EJ, hydrological alteration and adaptive co-management, this review links these concepts to what is known about the downstream impacts of dam operation on the SKRD.

### 1.3.1 What is Environmental Justice?

There are many ways to define EJ (Walker and Bulkeley 2006). Definitions of EJ can be broken up into three categories, each driven by a different goal: just decision-making processes, just environment outcomes or just processes and outcomes. The first definition, in which EJ is process-driven, refers to decision-making designed to allow the public to participate equitably (e.g. Burger et al. 2007). Process-driven definitions of EJ are often employed in social activism (Agyeman and Evans 2004) because EJ provides the language to describe opportunities for people to participate politically by mobilizing them to action (Agyeman and Evans 2004). The second definition, in which EJ is outcome-driven, can be found as a policy principle (e.g. Bullard and Johnson 2000). EJ as a policy principle focuses on the ideal that "no public action will disproportionately disadvantage any particular group" (Agyeman and Evans 2004: 156).

The third definition of EJ includes components related to both process and outcome. One definition of EJ that is well-cited in academic literature (see Neimanis et al. 2012) was written by the United States' Environmental Protection Agency (EPA):

> Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision- making process to have a healthy environment in which to live, learn, and work (para. 1). (EPA 1994 in Neimanis et al. 2012: 349).

The EPA's definition of EJ includes both process and outcome definitions. For example, the process components of the EPA's definition refer to the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income" and "equal access to the decision- making process to have a healthy environment in which to live, learn, and work." The outcome component in the EPA's definition refers to the "same degree of protection from environmental and health hazards." The multiple orientations of EJ can complicate a clear operationalization of EJ in research (Walker and Bulkeley 2006). Moreover, this lack of clarity can fail to address the underlying causes in driving unjust outcomes (Neimanis et al. 2012). Addressing the underlying causes that drive unjust outcomes is important because marginalized populations often disproportionately experience environmental burdens. Marginalized populations that often bear the brunt of these burdens are typically found in Indigenous, racialized or lower-income communities (or communities where all three descriptors intersect) (Cutter 1995; Mohai et al. 2009; Shrader-Frechette 2002). Terms like environmental inequality or environmental racism have been used to describe this phenomenon in many studies (see Mohai et al. 2009 for a review). In their review of EJ, Mohai et al. (2009: 406) state that, no matter which term a researcher is using, "hundreds of studies conclude that, in general, ethnic

minorities, [I]ndigenous persons, people of color, and low-income communities confront a higher burden of environmental exposure" to hazards and pollution.

Some empirical and theoretical studies that address EJ, water and Indigenous populations (e.g. Mascarenhas 2007; McLean 2007; Schlosberg and Carruthers 2010) argue that Indigenous populations are often systematically affected by environmental injustice. Mascarenhas (2007) empirically studied Indigenous people's access to drinking water in Ontario. He found that neoliberal policy interventions in that province limited the recognition and participation of Ontario Indigenous populations in environmental governance (Mascarenhas 2007). In an empirical study of rural Indigenous populations in Australia, McLean (2007) found that water governance failed to recognize Indigenous water rights and cultural needs. This failure led to inequitable access to sanitation and water supply (McLean 2007). In a review of several empirical cases in the United States and Chile, Schlosberg and Carruthers (2010) identified that industrial development has limited Indigenous populations' ability to practice cultural traditions.

Nonetheless, significant gaps in EJ literature remain. Schlosberg (2004) provides a clear definition of EJ, noting that EJ refers to fairer and more equitable environmental decision-making processes that can lead to more fair and equitable environmental outcomes (Schlosberg 2004). Schlosberg (2004) argues that with EJ there are three areas of concern: the provision of widely beneficial outcomes of equity (who gets what?), participation (who is included?) and recognition (who are they and what do they value?). However, Schlosberg (2004) argues that EJ literature needs to pay more attention to the underlying causes of environmental injustice. While EJ literature focused on just processes and outcomes has been explored in a number of contexts, less attention has been paid to the underlying causes that lead to unjust processes and outcomes (Schlosberg 2004).

### 1.3.2 Equity, Participation and Recognition in Dam Management

Dam management includes equity, participation and recognition dimensions. Equity issues described below often refer to the equitable distribution of benefits of dam management, as well as the inequitable distribution of burdens of ecosystems and downstream Indigenous populations. This is referred to in this thesis as the *dilemma of a regulated river*. Participation issues described below relate to the *exclusion of Indigenous people* from water decision-making. Recognition issues described below refer to the *misrecognition of Indigenous identity*. This chapter then moves to briefly describe whether adaptive co-management could be a solution to advance EJ.

#### 1.3.2.1 Equity – Who Gets What?

*Equity* refers to how environmental burdens are distributed among individuals and groups (Schlosberg 2004). Equity issues involve the dilemma of a regulated river: the widely shared benefits of dams, but often disproportionate share of burdens. Dams have many positive impacts for Canadians. Utility companies that use hydroelectric dams provide relatively clean (Frey and Linke 2002), reliable power to these companies' customers (SaskPower 2014). Dams represent clean energy and economic viability in Saskatchewan's energy portfolio (SaskPower 2014). They can encourage riverine fish spawning (Jackson and Marmulla 2001), create recreational fisheries within reservoirs and shave off peaks of high and low water events to offer flood protection (Altinbilek 2002). Dams' reservoirs store water for upstream recreation, support industry including irrigated agriculture (Altinbilek 2002), and provide additional socio-economic benefits through support for secondary industry during construction (Jackson and Marmulla 2001).

Although benefits may be shared broadly, the environmental burdens associated with dam management are unequally distributed. Hydroelectric generating stations significantly alter the natural flow regime, which results in ecological changes clustered downstream. Alterations to flow regimes are considered to be serious threats to river ecosystem health and major drivers of biodiversity loss (Bunn and Arthington, 2002; Haxton and Findlay 2008). Dam construction can change the flow of sediment and water, which can significantly change riverine ecology (Ligon, Deitrich and Trush, 1995). Rosenberg et al. (2000) describe how dams greatly contribute to the destruction of aquatic habitats and, in turn, significantly impact the local economies that rely on the persistence of natural flow regimes.

The unequal distribution of burdens is worsened by natural changes to the river and by climate change. Impacts from hydrological alteration and geomorphic adjustment are speeding up natural processes like avulsions – the natural opening up and abandonment of river channels – and intensifying climate change effects in the Saskatchewan River Basin (Gober and Wheater 2014; Smith et al. 1989; Smith et al. 1998). The significant storage capacity of Lake Diefenbaker, created by the Gardiner Dam, and additional sediment loss due to the Francois Finlay and E.B. Campbell Dams (Ashmore and Day 1988) compound problems relating to nutrient replenishment in the SKRD (Gober and Wheater 2014; MacKinnon et al. 2015). Climate change is also impacting flows in the SKRD (Schindler and Donahue 2006). The net results of hydrological alteration, climate change and accelerated natural process are the drying of the SKRD, modified seasonal patterns and intensive daily fluctuations from peak power generation, and observable adverse impacts to wetlands and wildlife of the area that are important to local communities (Gober and Wheater 2014). Though these impacts are also felt upstream, they are more concentrated in the SKRD.

Downstream communities deeply connected to ecosystem services derived from water flows in the SKRD bear environmental, social and economic burdens inequitably. Changes to physical habitats can reduce overall biodiversity (Rosenberg et al. 2000). Hydrological alteration affects local economies by changing access to and use of water and land resources (Tilt et al. 2009). The impacts of hydrological alteration on downstream communities can lead to their cultural displacement (Tilt et al. 2009) because of their changing ability to interact with the land in traditional ways (Tilt et al. 2009). Communities downstream from the EBCD – the NVCH and CHCN – have identified that changes to hydrology affects their ability to practice traditional subsistence activities (Saskatchewan Power Corporation 1972; Waldram 1988, Waldram 1989). Waldram's (1989) 1953 to 1983 study found that, prior to dam construction, hunting, fishing, guiding and trapping were the predominant economic activities. After the dam was constructed, a smaller proportion of individuals participated in traditional subsistence activities (Waldram 1989). Hydrological alteration also impacted local commercial fishing economies (Waldram 1989). Adverse social impacts from hydrological alteration have spurred conflict among community members and decision-makers such as the Government of Saskatchewan and SaskPower (Bartlett 1989; Waldram 1988). In 2015, SaskPower began seeking authority for continued operations through a renewal of the licence they obtained in 1966. Hence, a contemporary empirical study of how hydrological alteration impacts downstream communities is needed to attain a greater understanding of how burdens and benefits are perceived downstream in the SKRD.

#### 1.3.2.2 Participation – Who Is Included (or Not)?

*Participation* refers to the extent to which decisions about equity can include the people who are affected by those decisions (Schlosberg 2004). This body of literature describes

participation as a desired process in dam management, but current participatory methods may have a limited capacity for meaningful participation. Participation is important to advance EJ in dam construction and operation. The World Commission on Dams Report (2000) states that public participation is a key component in decision-making before a dam is constructed. Public participation has the potential to mitigate adverse burdens and build better relationships between decision-makers and the public (Berkes 2009; Black 2001). When well executed, engaging the public allows for decision-makers to better understand the range of potential benefits and burdens from those who may experience them (Dusyk 2011; Philipson et al. 2012). In addition, engaging the public can allow decision-makers to acquire local knowledge about the ecological systems' capacity to support the changes dam construction may cause (Dusyk 2011; Philipson et al. 2012). Public participation can also potentially legitimize dam decision-making for both the broader public and those who bear the brunt of burdens of dam management (Goulet 2005) and can build trust among key participants (Berkes 2009).

Two aspects of environmental injustice related to participation in water decision-making are especially relevant for Indigenous populations in the context of dam relicensing. First, Indigenous populations are often excluded from decision-making in many natural resource contexts (Adkin 2009; Wilson 2004). Second, participatory processes that do include Indigenous populations have a limited capacity to advance Indigenous interests and values (Adkin 2009; Black 2001; Boyd 2003) because such methods are often not designed to provide Indigenous people with influence or are designed in such a way that they misrecognize Indigenous demands and values (Boyd 2003).

In the context of this research, two participatory approaches have been used by SaskPower to involve NVCH and CHCN communities. First, SaskPower holds quarterly

meetings with local fishers, hunters and trappers. Second, the provincial government will likely begin a public hearing process, commonly referred to as consultation, which operationalizes a legal principle known as the Constitutional duty to consult, during the dam relicensing process. A Constitutional duty to consult with Indigenous peoples exists when federal and provincial governments move forward on projects that may affect or possibly infringe on Indigenous rights holders' relationship with their lands (Sanderson et al. 2012). A duty to consult is a legal principle designed to recognize demands and reconcile relationships between governments and Indigenous people (Newman 2011). The duty to consult is "not a means to dictate a particular substantive outcome" (Sanderson et al. 2012: 830). As a result, when duty to consult is practiced, it is not necessarily designed to advance the interests of those who participate in these processes, but rather to provide the opportunity for those participating to have their voices heard.

Participatory methods, like consultations, involve information-sharing, but may have a limited capacity to afford the participant any power. Diduck et al. (2015) identify a trade-off associated with different participatory approaches between the number of people that can participate and the level of power afforded to the public when used. Information-sharing participation methods employed in consultation typically afford participants relatively low levels of power in decision-making, but can include more participants (Diduck et al. 2015). This suggests that consultation may be unsatisfactory for participants expecting to influence the decision-making process.

#### 1.3.2.3 Recognition – What Do They Value?

When Indigenous participants are involved in consultation and are not afforded influence over the decision-making process, they may see their participation as disingenuous or not meaningful. Using Senecah's (2004) Trinity of Voice theory, meaningful participation for

Indigenous participants is comprised of three parts — the access to decision-making, the ability to influence the decision-making, and the accurate recognition of Indigenous rights, values and demands. When Indigenous people do participate, this participation does not guarantee their rights, culture and ways of knowing are recognized (see Schlosberg and Carruthers 2010). Their culture and identity as Indigenous people may be misrecognized (e.g. Mascarenhas 2007). Authentic recognition is a practical endeavour because recognition can inform the complex and uncertain ways people value and relate their environment (Barrett 2013).

Recognition is an important concern for Indigenous people seeking EJ because, as Mascarenhas (2007) argues, many Indigenous people have cultural and spiritual connections with the land and water. This human-nature connection associated with Indigenous people's identity is often not as prevalent in non-Indigenous people's identity (Barrett 2013).[5] Empirical work is needed to understand Indigenous participants' values to help design or evaluate participatory methods that can accurately recognize people's values and practices. Indigenous identities may differ from non-Indigenous identities; specific participatory approaches may be required to recognize these differences. However, these differences do not mean that Indigenous and non-Indigenous people cannot have similar goals. For instance, in the Yorta Yorta region of the Murray-Darling Basin, Australia, Lynch et al. (2013) found that the Yorta Yorta people and the broader community within the region shared a similar goal: the regional, sustainable management of the Yorta Yorta region.

### 1.3.3 Can Adaptive Co-Management Help Advance Environmental Justice?

An EJ framing suggests NVCH and CHCN residents are experiencing a disproportionate number of environmental burdens (addressed in Objective 1) and are unable to participate

[5] Indigeneity is expressed in many different ways (Berkes 1999; Houde 2007). Indigenous identities do not always include a unique relationship to the land (Berkes 1999; Houde 2007)

meaningfully in current and future participatory process (addressed in Objective 2). This research sets out to assess whether their identity and values could be accurately recognized in a solution that would advance EJ (addressed in Objective 3). One possibility for such a solution is adaptive co-management.

Adaptive co-management is a collaborative decision-making approach whereby government agencies share knowledge, power and resources to manage the environment with communities by learning from one another and being flexible to changing conditions (Armitage et al. 2009; Berkes 2009; Olsson et al. 2004; Plummer et al. 2013). Participants in adaptive co-management work together by sharing knowledge, power and resources (Armitage et al. 2009; Berkes 2009; Olsson et al. 2004; Plummer et al. 2013). This type of co-management is adaptive because it allows its participants to learn from each other, experiment with policies and adjust decision-making when social, cultural and ecological conditions change (Armitage et al. 2009; Berkes 2009; Olsson et al. 2004; Plummer et al. 2013). EJ's areas of concern — equity, participation and recognition — align with the purpose of adaptive co-management. Ideally adaptive co-management would afford residents of NVCH and CHCN meaningful participation to help shape the distribution of burdens from hydrological alteration. This research will explore the barriers to and opportunities for accurate recognition of the identity and values of NVCH and CHCN residents and how this insight could inform the implementation of adaptive co-management in this context.

## 1.4 Methods

### 1.4.1 Study Area

The SKRD was formed from the retreat of an ancient glacial lake, Lake Agassiz. The SKRD spans 9200 $km^2$ and straddles the Saskatchewan-Manitoba border. It contains rich

wetland-dependant flora and fauna that have driven human settlement and interaction since time immemorial (Goulet 2013). Several pre-contact Swampy Cree aggregating centres situated within and around the SKRD centred on harvesting patterns of moose, beaver, and muskrat (Dorian and Paquin 2005; Meyer and Thistle 1995). In 1774, Hudson Bay explorer Samuel Hearne arrived at the SKRD at *Ministikominuhikosak* (Pine Island) and established a Hudson Bay Company fur trade post that was referred to by local Cree as *Waskukikun* and by the English as Cumberland House (Dorian and Paquin 2005). Since the establishment of *Waskukikun* or Cumberland House, human populations were shaped by *Métissage,* an acculturation of trader and Cree cultures (Dorian and Paquin 2005). Cumberland House is considered the first settlement in Western Canada and now consists of two administratively separate communities: NVCH and CHCN (Massie and Reed 2013). Both communities are predominantly Cree and Métis (Massie and Reed 2013).

### 1.4.2 Elements of a Community-Based Participatory Approach

In the context of EJ research involving Indigenous people, a community-based participatory approach is one way to understand underlying causes of inequity (Schlosberg 2004; Schlosberg and Carruthers 2010). Community-based participatory research is a "process by which decision-making power and ownership is shared between the researcher and the community involved." (Castleden et al. 2012: 162). Community-based participatory research can include several goals such as focusing on research that is desired in the community, accounting for research-participant power relationships, accepting different worldviews, promoting empowered research participants, respecting community protocols and allowing community members to help guide the research process (Fletcher 2003). As a result, *community-based participatory research* is distinct from *research that is done within a community* where

community members are considered research subjects and not active participants (Blumenthal 2011; Castleden et al. 2012: Fletcher 2003; Koster et al. 2012). "[P]erfect or near perfect" community-based participatory research may be difficult to achieve (Blumenthal 2011: 388), thus enhancing an ambiguity between community-based participatory research and the notion of research within a community. However, there is a focus on making researcher-participant power relationship equal in community-based participatory research that sets it apart from research within a community (Castleden et al. 2012: Fletcher 2003; Koster et al. 2012).

During the research process, I shared some research decision-making power with community members. Such actions included identifying a topic relevant to the community, often acting on community recommendations of potential participants, being flexible to allow discussion topics to emerge during interviews, and reporting (and modifying) results back to the community. In spite of these elements, complete power sharing in research decision-making did not occur. Key decisions such as interview guide design, research framing and timelines were made without engagement from participants. As a result, there were elements of community-based participatory research in this research, but it was not a complete community-based participatory research approach.

I used elements of a community-based participatory approach to help understand how environmental justice is contextualized at the community level. This led to research on how environmental (in)justice influences that community's ability to share environmental benefits (see Schlosberg and Carruthers 2010), and understand the historical, political, economic, and socio-environmental context that drives inequity (Schlosberg 2004). In Saskatchewan, environmental benefits of dam projects include cost-effective, reliable power delivery. In the SKRD, environmental burdens are the range of adverse effects from hydropeaking. Using

Schlosberg and Carruther's (2010) promotion of understanding EJ at the community level to understand its dimensions in the community context provides some reasonable boundaries for defining the EJ problem in the SKRD. A case study research design was used to uncover the rich context influencing change and relationships within a community-based approach (Price and Billick 2010). A case study research design explores phenomenon within its "real-life context" when the relationship between the phenomenon and context are readily apparent (Yin 2003: 13)

### 1.4.3 Data Collection

Data were collected between July and December 2014. This research was approved by the University of Saskatchewan's Behavioral and Biomedical Research Ethics Board in July. The certificate of approval is available in Appendix I. Data were obtained from legal and policy research, interviews, and hydrometric stations in the river. I conducted legal and policy research because I wanted to investigate how law and policy influenced the operation of EBCD. I collected both interviews and hydrological data because I wanted to document the EBCD's influence on downstream burdens. The extent to which EBCD contributes to downstream impacts is a possible point of contention for provincial water agencies given the large storage capacity of the Gardiner Dam's reservoir further upstream. The large storage capacity of the Gardiner Dam's reservoir means that the Gardiner Dam can create significant seasonal modifications experienced in the SKRD (Gober and Wheater 2014). There have been previous empirical studies on the existence of downstream impacts (Waldram 1988; Waldram 1989), but there is a lack of more recent empirical evidence. More recent studies (e.g Goulet 2013; Massie and Reed 2013; Wheater and Gober 2014) discuss the existence of downstream impacts as context for other empirical research, but do not support these claims empirically. As a result, there is a 25 year gap in empirical evidence on the downstream impacts of the EBCD operation.

Given this lack of empirical evidence, identifying the range of impacts of EBCD is part of advancing EJ for NVCH and CHCN in this thesis.

In the interest of presenting a clearer and more comprehensive narrative of the EJ implications in the SKRD, empirical data are presented in two chapters. Chapter 2 includes hydrometric and interview data. Chapter 3 includes legal and policy research and interview data.

Hydrometric data were gathered from the Water Survey of Canada with the assistance of Dr. Timothy Jardine. Data included hydrometric gauge data from stations above (05KD007) and below (05KD003) the EBCD in an attempt to isolate effects directly attributed to this facility. Data were organized into graphs and included in Chapter 2.

Interview data were gathered directly from people in the NVCH and CHCN communities. In collecting data directly from people in the communities, it was important to build positive relationships between the researcher and community members. I sought to maintain positive relationships with community members by following the Four R's of Indigenous research: respect, relevance, reciprocity, and responsibility (see Castleden et al. 2012). I participated in a Cree Cultural Camp in August 2014 that was organized by a key rights holder in the area, which was a critical start for this research. This provided two benefits. First, I developed an increased respect for cultural differences and similarities. Second, this facilitated a reciprocal level of comfort between me and many of the Elders, youth, and other members of the community. Throughout the field season in the SKRD, I conducted 22 community interviews with current and former residents of the NVCH and CHCN (Table 1.0). Interviews with representatives from provincial governmental water agencies – SaskPower, the Water Security Agency and the Ministry of Environment – began in August 2014. I conducted eight interviews with provincial water decision-makers (Table 1.1).

**Table 1.0 Community Sample by Primary Role**

| Community: Primary Role | Size |
|---|---|
| Student | 2 |
| School Teacher | 4 |
| Outfitter, Trapper, Hunter, Fisherperson | 5 |
| Government: Band Council | 1 |
| Government: Village Council | 1 |
| Former Resident | 1 |
| Trades | 4 |
| Elder | 5 |
| Total | 22 |

**Table 1.1 Water Agency Sample by Department**

| Provincial Water Agency | Size |
|---|---|
| SaskPower | 5 |
| Water Security Agency | 2 |
| Ministry of Environment | 1 |
| Total | 8 |

I identified participants using a mixed, purposive sampling strategy. Purposive sampling is an approach employed for data-rich cases in research with limited resources (Patton 2002). I attempted a combination of snowball and heterogeneity sampling. Snowball sampling involved the identification of phenomenon through sampling people who have similar characteristics (see Palinkas, et al. 2013). In snowball sampling, participants are identified based on recommendations from key informants. To identify participants who may have different perspectives, I used a heterogeneity sampling (maximum variation) approach. This involved finding diverse cases to allow for emergent shared patterns (Palinkas et al. 2013). Diverse participants were identified based on identifying people who varied on variables such as age, gender, occupation and community (NVCH or CHCN). In other words, snowball sampling represented vertical movement through like cases and heterogeneity sampling represented horizontal move across unlike cases.

Typically, this mixed approach would involve using snowball sampling to identify interview participants with similar perspectives until saturation occurred (Guest et al. 2006; Palinkas, et al. 2013). Saturation, in the context of snowball sampling, refers to the phenomenon that describes a point when no new information emerges from interviewees with similar characteristics and has specific evaluative characteristics such as a predetermined stopping criteria (Guest et al. 2006; Francis et al. 2010). After saturation, heterogeneity sampling would be used to build a diverse range of perspectives. However, saturation in snowball sampling and complete heterogeneity (maximum variation) were not achieved. Both were not achieved for two reasons. First, I had some difficulty in identifying participants from the CHCN. This was because key informants were primarily from the NVCH and as a result, I established stronger relationships with NVCH community members who referred other members of NVCH in the snowball sample. This barrier, coupled with significant time and resource constraints on my research process, seemed to have also limited both saturation and heterogeneity. These constraints are a reality in community-based research (Reed and Peters 2004). Reed and Peters (2004) argue that direct control over the research process in community-based research is unrealistic and undesirable. Furthermore, they describe that a researcher in community-based research should be adaptive and resilient to unexpected change during the interviewing process (Reed and Peters 2004). The goal is to focus more on how the participant is treated and the significance of their comments rather than manipulating the process to achieve a predetermined sampling objective (Reed and Peters 2004).

Although saturation and complete heterogeneity were not achieved, shared meta-themes such as the problematic interactions between agencies and communities or the desire of NVCH and CHCN for more influence in decision-making emerged early in the first several interviews

and were noted (see Guest et al. 2006). In the interviews, I asked questions like "how much have water flows changed in the last 50 years?", "how does that affect trapping, fishing and hunting?", and "how often do you interact with the communities/SaskPower?". The full interview guide is provided in Appendix II.

Laws and policies were gathered with the assistance of Professor Patricia Hania. The preliminary analysis of water law in Saskatchewan was undertaken as partial fulfillment of the graduate course on water law. Later, further empirical analysis was done in relation to power relations. Documents (n=11) included Saskatchewan water laws and regulations, water agency policy documents and NVCH and CHCN-produced documents. Professor Patricia Hania assisted with the collection of law and policies. A list of documents and how they were used in this thesis is included in Appendix III.

### 1.4.4 Analysis of Interview Data

Coding is required because it allows for communication and connection of phenomena in an organized way (Basir, 2003). Interviews were coded separately using *Atlas.ti 7* qualitative analytical software. A hybrid thematic coding approach was used. This approach involves recognizing important themes (derived from a top-down approach using theoretical variables) and allowing other themes to emerge (bottom-up) (Fereday and Muir-Cochrane 2006). The top-down approach involved breaking major codes into sub-codes and the bottom-up approach involved identifying patterns across cases through an iterative process and following up on early emergent themes. The themes, codes and definitions are provided in Appendix IV.

Analysis was guided by two distinct but complementary epistemological approaches: two-eyed seeing and triangulation. A two-eyed seeing approach recognizes that knowledges are multiple and derive from different histories and divergent worldviews (Martin 2012). A two-

eyed seeing approach adopts an understanding that Western science and Indigenous knowledge are distinct knowledge systems that do not require validation from one another (Martin 2012). Two-eyed seeing is predominantly featured in Chapter 2 and to a lesser extent in Chapter 3. Triangulation is an approach that can minimize method bias wherein phenomena are examined from multiple data sources to determine degree of convergence (Curry et al. 2009). Triangulation is featured in Chapter 3. Triangulation integrates and validates multiple data sources, while two-eyed seeing accepts that some data sources cannot be integrated. Both water agency and SKRD communities validated the results during presentations of preliminary results. Based on feedback from these presentations, some results were modified, new areas of importance were included, and irrelevant results were removed.

### 1.4.5 Analyses of Documents and Water Law

A doctrinal research approach was used to analyze the statutes and regulations relating to dam management in Saskatchewan. A doctrinal research technique involves synthesizing "rules, principles, [and] norms,…which explains, makes coherent or justifies a segment of the law as part of a larger system of law" (Hutchinson 2013: 9). Document analysis was used to analyse policy documents. Laws, regulations and documents were reviewed and selected based on their relevance to EBCD management. The coding technique described in Section 1.4.4 was used to analyze policy documents.

## 1.5 Introducing Recognition in Dam Management

An overarching hypothesis explored in this thesis is that *attention to the meaningful participation of Indigenous people can help government representatives recognize Indigenous values to lead to a more equitable distribution of environmental benefits and burdens*. The next chapter focuses on the recognition of environmental burdens and attributes these burdens directly

to EBCD management. It proposes that the meaningful participation of NVCH and CHCN community members in EBCD decision-making could lead to greater recognition of these burdens. Within this focus, the next chapter provides an empirical example of how a cross-cultural recognition of environmental burdens can lead to a greater understanding of complexity and uncertainty in dam management outcomes (Objective 2). Authentic recognition is guided by the notion of two-eyed seeing to provide a place-based, interdisciplinary, culturally-responsive account of these environmental burdens.

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# CHAPTER 2: RECOGNIZING THE INVISIBLE LOSSES OF DAM MANAGEMENT USING A TWO-EYED SEEING APPROACH: A CASE IN THE SASKATCHEWAN RIVER DELTA

## ABSTRACT

This chapter investigates a place-based, interdisciplinary understanding of how social and environmental outcomes of dam management are linked when experienced by downstream Indigenous people. Other studies largely treat the social and environmental outcomes of dam management as separate phenomena, or connect social and environmental outcomes conceptually but not empirically. Since the 1960s, Indigenous communities in the Saskatchewan River Delta have identified a range of flow and land-use changes as a result of the construction of the E.B. Campbell Dam. The hydropeaking function of the E.B. Campbell Dam creates rapid and unpredictable changes in river discharge into the Saskatchewan River Delta. This chapter uses the cross-cutting concept of invisible losses – adverse impacts that are hidden to decision-makers – to characterize the socio-environmental outcomes experienced by Indigenous people in the Saskatchewan River Delta. The recognition of invisible losses can lead to responsiveness to a deep human-nature connectivity often identified as a dimension of Indigenous identity. This chapter's research design is guided by an interdisciplinary approach known as two-eyed seeing. A two-eyed seeing approach involves an understanding that western scientific knowledge and Indigenous knowledge are distinct and can also complement one another. The research design included semi-structured interviews with Indigenous rights holders (n=22) and the integration of hydrometric data. Findings from this case study indicate that the way that the dam is currently managed results in a loss of identity for Indigenous people in the Saskatchewan River Delta.

Key words: Dam management, invisible losses; two-eyed seeing

## 2.0 Introduction

Recognizing Indigenous rights and values as an important pathway to better relationships between governmental institutions and Indigenous people is increasingly significant in dam management. In Canada, this significance is driven by two trends. First, there is an increased formal awareness among governments and Indigenous people that policies need to be accountable to Indigenous rights and values (Boyd 2003; Newman 2011). Second, a colonial history of dispossession and disenfranchisement can be reproduced through the systematic exclusion of Indigenous people from participating in environmental decision-making (Adkin 2009; Coates and Poelzer 2010; Mascarenhas 2007; Wilson 2004). These trends are related. Understanding how participatory processes between governments and Indigenous peoples can be more meaningfully and effectively implemented is important in light of increased recognition of Indigenous rights and values (Nelles and Alcantara 2014; O'Faircheallaigh 2007; von der Porten, de Loë, and Plummer 2015).

In many cases, conventional water management has facilitated environmentally unjust outcomes and processes for Indigenous communities (Mascarenhas 2007; McLean 2007; Schlosberg and Carruthers 2010). Conventional water management is typically associated with centralized, top-down, technical solution-focused decision-making (Brunner et al. 2005; Brunner 2010). Ideally, more meaningful participation in water management would contribute to decision-making that more accurately recognizes Indigenous rights and values by deliberately including Indigenous people.

Affording Indigenous people meaningful participation in collaborative dam decision-making could help build responsiveness to Indigenous rights and values in decision-making. This chapter uses Senecah's (2004) Trinity of Voice theory of meaningful participation. For

Senecah, meaningful participation refers to the extent to which individuals and groups access a decision-making process, have standing (meaning legitimacy to participate in the process) and can influence the outcomes derived from decision-making (Senecah 2004). Meaningful participation has been proposed as integral to mitigating the adverse social and environmental outcomes of dam management (WCD 2000; Black 2001; Dusyk 2011; Goulet 2005).

In the context of dam management, meaningful participation provides an opportunity for recognition. Recognition refers to decision-making processes' responsiveness to the identity and values of individuals and groups who experience the impacts of decisions that are made (Schlosberg 2004). Meaningful participation is an opportunity for the recognition of a comprehensive understanding of the inter-relatedness of impacts and risks experienced by local people as a result of dam management (Dusyk 2011; Philipson et al. 2012). The notion of recognition is significant for Indigenous people because it represents the often ignored or misunderstood pathway for Indigenous people to secure the wellbeing of their communities, their cultural integrity and their defense of "inherited links between culture and nature." (Schlosberg and Carruthers 2010: 30).

By contrast, participation that is not meaningful may also provide a context for misrecognition. Misrecognition involves decision-makers' misunderstanding of or unresponsiveness to the identities and values of those participating in decision-making (Schlosberg 2004). Schlosberg (2004: 519) states that misrecognition is "demonstrated by various forms of insults, degradation, and devaluation at both the individual and cultural level, [and] inflicts damage to both oppressed communities and the image of those communities in the larger cultural and political realms." Participation that does not provide the context for

recognition may not be perceived as meaningful by Indigenous people (see Nadasdy 2003; Watson 2013).

Dam management that attempts meaningful participation may have a limited ability to accurately recognize the outcomes of dam management because these outcomes are defined too narrowly (Bruno and Siviglia 2012). Outcomes typically separate social and environmental phenomena, or connect social and environmental outcomes conceptually but not empirically. There is an increasing need to understanding the impacts of dam management as an interdisciplinary problem (Bruno and Siviglia 2012) – or one that sees how the social and environmental outcomes are related or interact. For example, the *River Research and Applications Journal* dedicated a special issue to this purpose (Bruno and Siviglia 2012). However, recognizing how these impacts are connected to Indigenous values and are understood by Indigenous people was missing in this issue. This chapter contributes to this gap by empirically exploring the impacts of dam management using the concept of invisible losses. Invisible losses are adverse impacts not recognized in decision-making processes (Turner et al. 2008).

In the context of dam management, invisible losses can relate to what several studies (Allan 2003; Zeitoun 2011; Wong 2015) have identified as a growing recognition of hidden connections between energy, water and food (Allan 2003; Zeitoun 2011; Wong 2015). For example, at several stages of natural resource development, in this case hydro-development, energy, water and food are linked (See Zeitoun 2011). Energy is produced from water that, when stored, can be used to for agriculture upstream of a dam (Altinbilek 2002), and when released can be recharge wetlands and water wildlife (Gober and Wheater 2014). Acknowledging these connections are critical to better understand vulnerable human populations

(Wong 2015), and in the case of flows, is critical for two reasons. First, water problems and solutions that are too narrowly defined have a limited capacity to deal with complexity and uncertainty and to adapt to change (Pahl-Wostl et al. 2013). Second, narrowly defined water problems and solutions may involve an implicit misrecognition of Indigenous identity (Turner et al. 2008). Barrett (2013) describes a human-nature connectivity valued by some Indigenous people that arises from their deep and inherited relationship to the land. This human-nature connectivity is a oneness of socio-cultural and environmental life (Barrett 2013). Definitions of dam management problems and solutions that are defined as solely environmental or social misrecognize this connectivity in Indigenous identity.

Invisible losses, by definition, involve a misrecognition of the full range of interests and values present in decision-making (Turner et al. 2008). Turner et al. (2008) characterize eight types of invisible losses. Four of these are particularly relevant for Indigenous communities residing along rivers below dams: cultural and lifestyle losses; economic losses and lost opportunities; knowledge losses and loss of identity. *Cultural and lifestyle losses* refer to decision-making that prevents people from engaging in culturally fundamental activities (Turner et al. 2008). *Economic losses and lost opportunities* refer to financial losses and the diminished capacity to influence financial gain related to decision-making (Turner et al. 2008). *Knowledge losses* refer to discontinuities in the transmission of cultural knowledge, values attributed to the land and stories (Turner et al. 2008). A *loss of identity* refers to the loss of people's perception of themselves in the context of their own inherited values: a loss of who they are (Turner et al. 2008). A loss of identity can be difficult to recognize and describe accurately (Turner et al. 2008). More research is needed to document and recognize the invisible losses of Indigenous

communities and how these losses could be rendered more visible in environmental decision-making processes (Turner et al. 2008).

The notion of invisible losses has the potential to more comprehensively describe the linkages between environmental and social outcomes to dam management operations. This chapter does not document the full range of losses potentially attributed to dam management. Rather, it focuses on specific losses relating to hydropeaking. Hydropeaking is the fluctuation of downstream water levels caused by the rapid increase or decrease in the release of water from a hydroelectric dam in response to varying power demand. Hydropeaking likely causes environmental outcomes visible to dam managers who monitor the direct environmental impact of hydropeaking such as fish stranding (Saltveit et al. 2001). This chapter builds on the concept of invisible losses and their inter-relatedness with the concept of visible losses – adverse impacts that are transparent to decision-makers.

This chapter first explains the research context of dam management and identifies literature related to the outcomes of dam operation and the need for a place-based, interdisciplinary recognition of meaningful participation. This chapter then describes the study context of dam management in the Saskatchewan River Delta (SKRD). The SKRD straddles the Saskatchewan-Manitoba border. This delta supports culturally critical wetland dependent flora and fauna such as muskrat and beaver. .Lastly, it presents findings related to visible and invisible losses and discusses the implications for dam management.

## 2.1 The Need for Empirical Recognition of Diverse Needs on Water

North America experienced a construction boom in hydroelectric dams after World War II that peaked in the 1970s (Doyle et al. 2003; Environment Canada 2004). This construction boom is referred to as the "Golden Age of Dam Construction" (Doyle et al. 2003: 30). These

dams were often constructed before legal participatory methods were codified in law in the 1970s. Today, infrastructure upgrades to these aging dams legally require public engagement.

Dams produce benefits for the general public and the environment, partially because they produce relatively little greenhouse gas emissions and are economically cost-effective (Amor et al. 2011). Additionally, hydropower, unlike wind or solar sources, can provide continuous power (O'Conner 2013). Although hydropower does not need to be stored, water storage and release can be used to meet changing power demands. Dams can also contribute to flood mitigation by storing or releasing water to manipulate the timing and quantity of water flowing through the river system (Altinbilek 2002). Water storage in reservoirs produces benefits by creating areas for fish to spawn (Jackson and Marmulla 2001), thereby building opportunities for recreational fishing. Moreover, stored water can be used to support industry, such as the agriculture industry (Altinbilek 2002).

However, downstream Indigenous and non-Indigenous communities experience disproportionate social and environmental burdens of river flow alteration (Bartlett 1989; Waldram 1988; Waldram 1989; Gober and Wheater 2014; Johnston 2013; Richter et al. 2010). Issues related to the social and environmental burdens of dam management and the high cost of dam rehabilitation have led to an increasing trend toward dam removal and decommissioning in Canada and globally (Environment Canada 2004; O'Conner, Duda and Grant 2015; Postel and Richter 2003). When decommissioning or removal is not a viable option, managing aging dam infrastructure often requires a greater understanding of burdens on affected populations and opportunities for these populations to participate in helping to define and mitigate these impacts.

### 2.1.1 The Need for Place-Based, Interdisciplinary Understanding of Dam Management Outcomes

There is an increased need for a place-based understanding of the burdens of dam management. Place refers to a geographical space imbued with meaning developed through the interaction of people and their environment (Cresswell 2004). Addressing problems through a place-based approach allows an understanding how meaning is located to specific environments. Price and Billick (2010: 5) explain that place-based research assigns "the idiosyncrasies of place, time, and taxon a central and creative role in [research] design and interpretation rather than as a problem to be circumvented through replication or statistical control." A place-based approach can be challenged by an incongruency of place and geo-political borders (Reed and Buyneel 2010). Reed and Bruyneel (2010) argue that geographical borders, while socially constructed, are relatively fixed and that these borders present a challenge to the way decision-making can advance a locally driven understanding of a problem.

A disciplinary approach or understanding of problems from one research discipline can sometimes ignore the place-basedness of a problem (Strang 2009). In attempting to understand a place-based problem, a disciplinary approach can neglect to see the diversity in how space is culturally mediated as place (Appadurai 2005). More specifically, a disciplinary approach is incompatible with an accounting of the multiple and different ways people relate to the environment and the multiple and different ways people's relationships to the environment are informed by broader environmental, economic and socio-cultural contexts (Appadurai 2005). Although a disciplinary approach to environmental problems can provide depth in understanding a particular dimension of an environmental problem, a disciplinary approach can lead to recommendations for decision-making that enhance the inequities local people experience (Strang 2009). These inequities result from a neglect of local culture and identity in

recommendations that produce unintended consequences for local populations (Appadurai 2005; Strang 2009). Furthermore, the fact that environmental problems are growing in complexity and uncertainty requires the synthesis of knowledge from a variety of research disciplines (Clark et al. 2011). An interdisciplinary approach describes the attempt to identify and synthesize the connections between types of knowledge in defining problems and solutions, and the social contexts within which problems and solutions exist (Clark 2002).

A place-based, interdisciplinary approach to dam management can increase understanding of how social and environmental outcomes connect to one another. An understanding of the place-based characteristics of an environmental problem provides greater support for decision-makers to adapt to change and complexity (Brunner et al. 2005; Brunner 2010). The integration of place into decision-making may lead to greater support of community interests and mitigate conflict between decision-makers and communities (Nie 2003).

#### 2.1.1.1 Interdisciplinary Goal: Environmental Flows

One approach to understanding the place-based and interdisciplinary dimensions in dam management has developed through concepts in the integrated water management literature. Integrated water management refers to the coordination of a range of decision-makers and stakeholders, including local community members, to balance environmental protection with social and environmental needs through water management (Halbe et al. 2013). Integrated water management involves the explicit recognition that social and environmental interactions are complex and unpredictable (Pahl-Wostl 2011). Within integrated water management, the concept of environmental flows engenders an interdisciplinary approach to understand how solutions can be designed to address links between ecological and human communities (Poff and Matthews 2013).

Environmental flows refer to the planned timing and quantity of river discharges to meet environmental needs of an ecosystem (Pahl-Wostl et al. 2013). Environmental flow literature began with the Tennant (1976) method that involved recommending adjustments to the timing and quantity of river discharges to meet the needs of a single species (Acreman and Dunbar 2004). This literature then expanded to address the needs of multiple species, and included the integration of several natural science disciplines (Acreman and Dunbar 2004). Environmental flow literature, more recently, expanded further to include social and natural science disciplines to design solutions that meet the needs of social-ecological systems (Poff and Matthews 2013; Halbe et al. 2013; Pahl-Wostl et al. 2013).

#### 2.1.1.2 Interdisciplinary, Place-Based Goals: Cultural Flows & Indigenous Flows

The notion of cultural flows expands on environmental flow literature to include an understanding of how water is used and understood in cultural practices (Johnston 2013). Johnston (2013: 11) describes cultural flows as a solution that "not only involves managing flows to sustain the ecosystem, [but also] involves managing water resources in ways that recognize, respect, and sustain cultural ways of life." The implication of cultural flows is that decision-making could include Indigenous perspectives on water and their needs from ecosystems.

Jackson et al. (2013) further expand the notion of cultural flows to the notion of Indigenous flow requirements or Indigenous flows. Indigenous flows refer to planned timing and quantity of river discharges to meet the needs of Indigenous ways of life (Jackson et al. 2013; Maclean and The Bana Yarralji Bubu Inc. 2015). Indigenous flows are different from cultural flows because Indigenous flows recognize that Indigenous people may not see their own relationship to the land as merely cultural (Jackson et al. 2013; Maclean and The Bana Yarralji

Bubu Inc. 2015). As a result, the notion of Indigenous flows provides a broader, but more sensitive lens by which the demands of Indigenous communities can be integrated into water decision-making. The goals of environmental flows, cultural flows and Indigenous flows in water management engender notions of interdisciplinarity and place-basedness. Pahl-Wostl et al. (2013) describe the need for a greater understanding of how scientific knowledge and local knowledge, including an understanding of place, can systematically identify the needs addressed by environmental flow solutions.

#### 2.1.1.3 Environmental and Social Impacts

Empirical dam management research has often contributed to an understanding of environmental and social outcomes of dam management using a disciplinary approach (Bruno and Siviglia 2012). Several studies (e.g. Bunn and Arthington, 2002; Haxton and Findlay 2008; Ligon, Deitrich and Trush, 1995; O`Conner, Duda and Grant 2015; Rosenberg et al. 2000) describe the environmental impacts of dam management and indicate that river flow alteration poses serious threats to biodiversity and riverine ecosystem health. Other studies (e.g. Black 2001; Richter et al. 2010; Tilt et al. 2009; Waldram 1988; Waldram 1989) indicate that dam management can adversely impact communities' cultural practices. An exception to the disciplinary separation of environmental and social outcomes involves understanding dam management from a human rights perspective. Several studies (Black 2001; Goulet 2005; Fearnside 2015; Ribeiro 2015) identify links between social and environmental outcomes through a human rights perspective, but these studies identify these links conceptually rather than empirically. In addition to the limited empirical understanding of environmental and social links, this literature has also provided relatively little empirical understanding of how these links are perceived by Indigenous communities.

Dam management has a role in making decisions to meet a range of social and environmental needs, and their linkages, on regulated rivers (Jackson 2013; Postel and Richter 2003). Dam management literature needs more empirical descriptions of how problems are mediated by both Indigenous people *and* non-Indigenous people to support the design of environmental flows, cultural flows and Indigenous flows that recognize the inter-relatedness of diverse needs on rivers. Cross-cultural recognition has an implication for decision-making. Problems defined by Indigenous people and non-Indigenous people can lead to decision-making that is better equipped to deal with change, complexity and uncertainty (Barrett 2013).

### 2.2 Two-Eyed Seeing as an Approach to Recognition

A two-eyed seeing approach to identify the range of environmental and social outcome linkages guides this research. Two-eyed seeing is an approach to data collection, management and analysis that explores Indigenous knowledge and Western science as they co-exist within a problem (Hatcher et al. 2009; Martin 2012). Two-eyed seeing treats Indigenous knowledge and Western science as distinct knowledge systems. While there is diversity within Indigenous knowledge, its common features can be that it is complex and holistic, often involving aspects associated with ecology and spirituality (Barrett 2013). By contrast, Western science can seek to manage complexity through reducing relationships so that they can be studied. In addition, Western science can include claims of reliability and validity attributed to its objective collection (Barrett 2013). There is growing understanding that there may be overlap between Indigenous knowledge and Western science (Argawal 1995; Barrett 2013). Nonetheless, Indigenous knowledge and Western science have been socially constructed as opposites and two-eyed seeing attempts to bridge the two (Hatcher et al. 2009; Martin 2012).

Two-eyed seeing, by definition, involves elements of interdisciplinarity and place-basedness to understand an environmental problem. A two-eyed seeing approach is an essential component of research involving Indigenous people because it creates a space where Indigenous knowledge is afforded equity in relation to Western science and in the definition of environmental problems (Bartlett et al. 2012). As a result, two-eyed seeing responds to a problematic trend in environmental research involving Indigenous people, described by Castleden et al. (2012: 174), whereby "implanting western research theories and methods – and, therefore, western values – into communities is simply another form of colonialism."

Two-eyed seeing recognizes that demands on water and knowledge about water held by Indigenous and non-Indigenous people are diverse and can be *combined* to identify hidden complexities and relationships in environmental problems (Aikenhead and Michell 2011). The word *combined* does not necessarily mean *integrated*. Western science and Indigenous knowledge are produced within distinct knowledge systems, although there can be overlap (Strang 2009). A two-eyed seeing approach celebrates these differences through interdisciplinary methods that can transform diverse data into a more comprehensive picture of environmental problems (Aikenhead and Michell 2011). Two-eyed seeing is but one place-based, interdisciplinary approach that "can deal with types of data that are rarely comparable, and do not mesh readily" to encourage ways of "managing and possibly reconceptualising their information" (Strang 2009: 2).

This chapter moves to describing the research context on dam management in the Saskatchewan River Delta (SKRD). Then, the interdisciplinary methodology, guided by two-eyed seeing, is described. This chapter then presents findings on some of the visible and invisible losses experienced by Indigenous communities in the SKRD. These findings are used

to identify how recognition can be built into meaningful participation for Indigenous people in dam decision-making.

## 2.3 Research Context

Hydro-development on the Saskatchewan portion of the Saskatchewan River system began in 1963 with the construction of the E.B. Campbell Dam (EBCD) (formerly known as the Squaw Rapids Dam). The construction of the EBCD was completed in 1966. In 1985, the Government of Saskatchewan granted a 50 year license, retroactively applied to the 1966 completion date.

There are seven hydroelectric dams in Saskatchewan that represent a clean energy strategy and energy diversification in Saskatchewan's energy portfolio, and also contribute to flood mitigation (SaskPower 2014). The EBCD is one of three major dams that regulate water flows on the Saskatchewan River System: Gardiner Dam, Francois Finlay Dam and the EBCD. The Gardiner Dam, on the South Saskatchewan River, is owned by the provincial government and operated by its water management department, the Saskatchewan Water Security Agency. The EBCD and the Francois Finlay Dam are owned and operated by SaskPower, a provincial crown corporation and licensed by the Water Security Agency[6] and are both hydropeaking dams. SaskPower – the provincial utility company that owns Saskatchewan's hydroelectric dams – provides reliable power to this company's customers (SaskPower 2014). Table 2.0 summarizes the type, license year, reservoir capacity and power-generating capacity of the three dams. Figure 2.0 shows the dams' locations on the Saskatchewan River in the geographical context of the Saskatchewan River Basin.

[6] A provincial crown corporation is a hybrid public and private institution that is wholly owned by the public but at arm's-length of the government. In Saskatchewan, SaskPower is a provincial crown corporation that has the role of a power utility.

**Table 2.0 – Summary of Dams on the Saskatchewan River**

| Dam | Type of Dam | Operator | Year of Construction | Year of License | Reservoir | Total Storage in Reservoir ($Dam^3$) | Hydroelectric Generating Capacity (MW) |
|---|---|---|---|---|---|---|---|
| Gardiner Dam (Coteau Creek) | Embankment Dam | Water Security Agency | 1967 | n/a | Lake Diefen-baker | 9,400,000 | 155 |
| Francois Finlay | Hydropeaking Dam | SaskPower | 1986 | Interim License | Codette Lake | 320,000 | 255 |
| E.B Campbell Dam | Hydropeaking Dam | SaskPower | 1966 | 1966 | Tobin Lake | 2,200,000 | 289 |


**Figure 2.0 – Drainage Basins of the South Saskatchewan and Saskatchewan Rivers with Hydroelectric Dams (South Saskatchewan River Stewards 2015)**

When the EBCD was initially constructed, hydropeaking operations included no minimum flow requirements, which allowed SaskPower to completely shut off water flows when

there was no power demand. Residents in two primarily Indigenous communities in the SKRD – the Northern Village of Cumberland House (NVCH) and the Cumberland House Cree Nation (CHCN) – have identified a range of flow and land-use problems, particularly related to fluctuating water levels arising from this hydropeaking facility (Bartlett 1989; Waldram 1988; Waldram 1989). These land-use problems centre on a declining capacity for hunting, trapping and fishing (Bartlett 1989; Waldram 1988; Waldram 1989). In 1989, SaskPower settled with the NVCH for $20 million to compensate for adverse impacts to trapping and fishing caused by the dam's construction. This settlement is known as the Cumberland House Agreement 1988. In 2004, the Canadian Government's Department of Fisheries and Oceans implemented a minimum flow requirement that required SaskPower to maintain a minimum of 75 cubic metres per second released from the EBCD. While residents observed positive changes associated with these minimum flow requirements, such as more water availability, tensions related to the impacts of hydropeaking continued (Goulet 2013; Wheater and Gober 2013). Due to the dam's age, a process began in 2015 to facilitate the relicensing of the dam for another 25 or 50 years.[7]. The relicensing is scheduled for 2016.

### 2.3.1 Study Area

The SKRD is the largest freshwater inland delta in North America. It was formed by the retreat of an ancient glacial lake, Lake Agassiz. The delta spans 9200 $km^2$ and straddles the Saskatchewan-Manitoba border. This region supports rich wetland-dependant flora and fauna that have driven human settlement and interaction since time immemorial (Goulet 2013). NVCH and CHCN residents are primarily Indigenous with Swampee Cree and Métis ancestry (Dorian and Paquin 2005). Table 2.1 shows the population characteristics of NVCH and CHCN.

[7] At the time of writing, the length of a potential renewal was under discussion.

**Table 2.1 Population Characteristics of NVCH and CHCN, 2011**

| Characteristics | NVCH | CHCN |
|---|---|---|
| Population in 2011 | 772 | 715 |
| % of the population male | 50 | 49.6 |
| % of the population female | 50 | 50.3 |
| Median age | 24.0 | 20.6 |
| % of the population 15 and over | 67.9 | 59.3 |
| % of the population Aboriginal Identity | 95 | 99.1 |
| Mother Tongue – English | 500 | 435 |
| Mother Tongue – Cree | 240 | 145 |
| Language most often spoken at home - English | 605 | 565 |
| Language most often spoken at home – Cree | 140 | 110 |
| Median Income (all private households) | 24,911 | 20,672 |
| Land area | 15.69 | 16.48 |
| Total private dwellings | 264 | 225 |

**Adapted from Massie and Reed 2013**

### 2.3.2 Methodology

A case study research design was used to understand the role of place in this study. Case studies provide rich data to understand the explicit and hidden relationships people have with the land (Price and Billick 2010). Within this case study, an interdisciplinary methodology was used that linked qualitative interview data with hydrometric data. Hydrometric data and interview data were deemed important to develop a more comprehensive understanding of EBCD outcomes. Data included hydrometric gauge data from stations above (05KD007) and below (05KD003) the EBCD. Qualitative data were collected through semi-structured interviews. Participants interviewed in this case were current and former community members from NCVH and CHCN. Table 2.2 details the community sample by participants' roles in NVCH and CHCN.

The community sample (n=22) involved a diverse range of stakeholders and rights holders (Table 2.2).

**Table 2.2 Community Sample by Primary Role**

| Community: Primary Role | Size |
|---|---|
| Student | 2 |
| School Teacher | 4 |
| Outfitter, Trapper, Hunter, Fisherperson | 5 |
| Government: Band Council | 1 |
| Government: Village Council | 1 |
| Former Resident | 1 |
| Trades | 4 |
| Elder | 5 |
| Total | 22 |

Participants were identified by attempting a mixed, purposive sampling strategy. Sampling used a combination of snowball and heterogeneity (Palinkas et al. 2013). Snowball sampling involved the identification of phenomena through sampling people who have similar characteristics and can recommend others with similar characteristics (Palinkas, et al. 2013). Relationship-building supported snowball sampling and snowball sampling supported relationship-building, as participants became active members in deciding which knowledge holders would make important interviewees (see Castleden et al. 2012). Saturation, however, was not achieved which can be attributed to difficulties in reaching CHCN participants and constraints related to time and resources. Heterogeneity sampling (maximum variation) involved finding diverse cases to allow for emergent shared patterns (Palinkas, et al. 2013). A heterogeneous sample was attempted through the identification of participants who have dissimilar characteristics across variables such as age, gender, occupation and community (NVCH or CHCN). While heterogeneity sampling also supported relationship-building, as some participants who have not previously been a part of research about water were able to express their views, complete heterogeneity was not achieved because of the aforementioned constraints.

This chapter used a semi-structured interview approach with topics relating to environmental flows, dam management and inter-stakeholder and rights holder interaction. Semi-structured interviews allowed for participants to identify how they wanted to answer questions, such as by directly responding or through storytelling (see Tuhiwai-Smith 2012). Interviews with some of the Elder participants were unstructured to increase their level of comfort (n=4). Original interviews were audio recorded, transcribed and verified by participants. See Appendix II for a copy of the interview protocol. Interviews were analyzed using *Atlas.ti 7* qualitative analytical software. Findings were verified through presentations back to community representatives.

## 2.4 Visible Losses in the Saskatchewan River Delta

The EBCD influences seasonal and daily changes to river flows. Gober and Wheater (2014) found that the large storage capacity of Lake Diefenbaker – the reservoir of the Gardiner Dam – significantly modifies seasonal river flow patterns (Gober and Wheater 2014). Reduction of summer peak flows has been an important seasonal change. This seasonal change is both a visible gain and loss: the reduction of summer peaks mitigates flooding impacts (gain), while this reduction means that wetlands in the SKRD are not recharged to the same extent (loss) (Gober and Wheater 2014; Sagin et al. 2015).

Figure 2.1 shows the EBCD's influence on changing river flows that are independent of the effects of Gardiner Dam upstream. While flows above the EBCD are moderated by the Gardiner Dam and upstream use, Figure 2.1 shows how the EBCD contributes to summer peak water flow reduction. Relating to hydropeaking, Figure 2.1 shows the relative contribution of the EBCD to the fluctuating waters as they are released into the SKRD. The implication of these fluctuations is a greater contribution to the unnatural pattern of extreme changes in river

discharge flowing into the SKRD. Figure 2.1 also includes three examples of how much flows fluctuate.

Example A in Figure 2.1 shows the difference between overall river discharge above and below the EBCD from June 24th to July 12th in 2014. This example illustrates the reduction in flows as well as the daily fluctuations during the summer when water flows are at their annual maximum. The implication of daily fluctuations is that the EBCD management leads to extreme water flow fluctuations, varying as much as 600 cubic metres per second, which appear to be unpredictable.

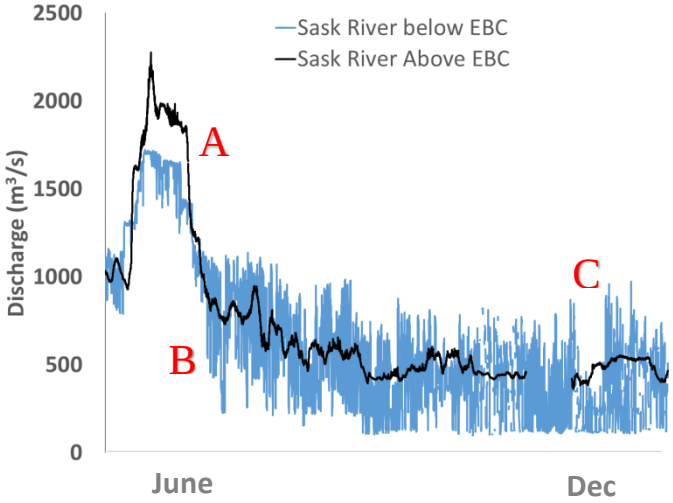
Example B in Figure 2.1 shows the difference between river discharge above and below the EBCD from July 17th to July 21st, 2014. This example illustrates the daily fluctuations during the summer when water flows have declined. The implication of daily fluctuations during low summer flows is that EBCD management leads to extreme water flow fluctuations, varying by 400 cubic metres per second, which also appear to be unpredictable.

Example C in Figure 2.1 shows the difference between river discharge above and below the EBCD from December 12th to 16th, 2014. This example illustrates the daily fluctuations during the winter when water flows coming into the EBCD are the lowest. The implication of daily fluctuations during the lowest flow times of the year is that the EBCD management strategy includes impounding water, leaving only the required minimum flow (75 cubic metres), and then releasing water that can unpredictably add up to 700 cubic metres per second of water coming through the system.

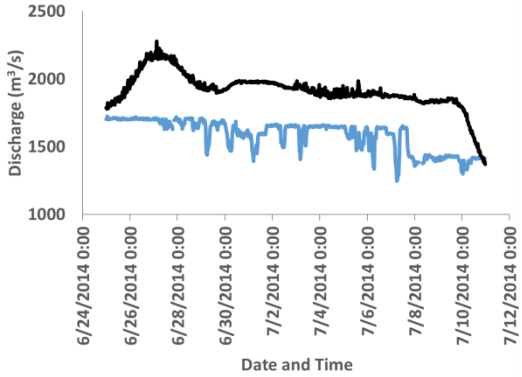
Figure 2.1 indicates two major environmental outcomes from the operation of the EBCD. First, the EBCD contributes further to the reduction of summer flood flows. This reduction causes a visible gain relating to flood mitigation, but also to a visible loss in the limited recharge

of wetlands in the SKRD. Second, hydropeaking from the EBCD significantly causes unpredictable daily fluctuations. These daily fluctuations occur in both summer and winter with flows increasing and decreasing by as much as 700 cubic metres per second. The relative contribution of EBCD management, therefore, creates is the accentuated unnatural and unpredictable river discharge pattern coming into the SKRD. Daily fluctuations are considered visible because they are evident to water decision-making agencies. They are also considered to be a visible loss because of how water is unnaturally regulated.

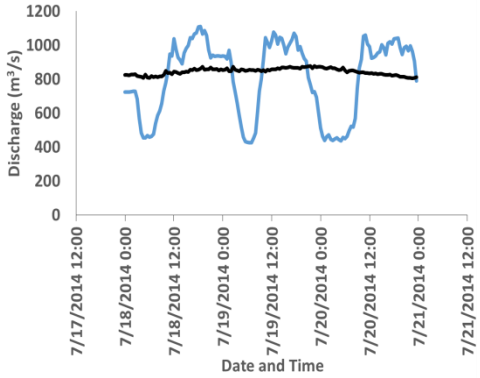
**Figure 2.1 – Comparison of Seasonal and Daily Fluctuations in River Discharge Above (Black Line) and Below the E.B. Campbell Dam (Blue Line), with Three Examples of Alterations in Flow, June to December 2014**



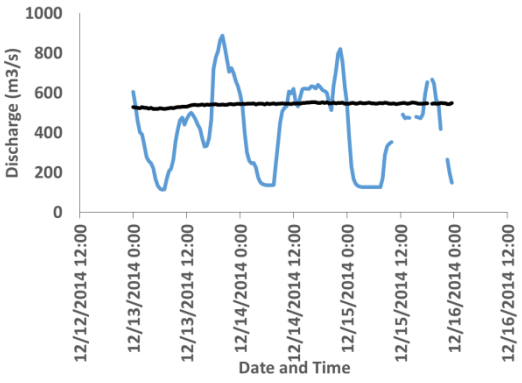

**A: Example of Reduction in Peak Summer River Discharge and daily fluctuations, June 24 to July 12, 2014**




**B: Example of Daily Fluctuation of Summer River Discharge, July 17 to 21, 2014**




**C: Example of Daily Fluctuation of Winter River Discharge, December 12 to 16, 2014**



## 2.5 Invisible Losses in the Saskatchewan River Delta

The unnatural fluctuating flows cause several seasonal invisible losses for hunters, trappers and fishers. Community members' observations on the impact of daily fluctuations demonstrate cultural and lifestyle losses, economic losses and lost opportunities and knowledge losses. The cumulative impact of these invisible losses is a loss of identity.

### 2.5.1 Cultural and Lifestyle Losses

*Cultural and lifestyle losses* describe adverse outcomes relating to culturally fundamental activities (Turner et al. 2008). In the SKRD, culturally fundamental activities include hunting, trapping and fishing. These losses are experienced by those who engage in these activities, and are created through disruptions to navigation and changes to wildlife habitat.

#### 2.5.1.1 Disruptions to Navigation

The ability to navigate the SKRD has been interrupted as a result of water flow fluctuations. Community members observed that daily fluctuations during the year led to issues relating to the unpredictability in summer and fall navigation. This unpredictability posed a challenge to fishing and fall hunting:

> You know when the water is low, like you can't really get to some places where you want to get because you are unable to motor boat through that place because of the water is so low. Some places is high and you can go everywhere. (Community Member 1)

> If you kill a moose somewhere you will have to find somewhere to gut it and all that. And the place when you cut your moose, you need somewhere to pour it. Because that happened to me a few times. We killed a moose and we couldn't find land to do it….That is thing about the high water nowadays. You can't find anywhere to clean your kill. Even where we were going to have that camp. You can go anywhere when the water is high, but certain places...you can't get off certain places because the water is too high. (Community Member 2)

Unpredictable daily fluctuations in the winter were disruptive and dangerous to winter navigation in the SKRD. Navigation through snowmobiling and dogsledding was critical to trapping, an

important cultural and lifestyle activity in the SKRD. Snowmobiling and dogsledding allowed for the increased capacity to reach trap lines. Community members noted that daily fluctuations in the winter impeded snowmobile and dogsled travel and increased the danger of travellers going through the ice:

> And again in the winter when [SaskPower] increase[s] power and they release more water and it gets kind of dangerous for people when they go out to their trap line and they hit that slush of water, we get stuck there for hours and hours at a time. (Community Member 4)

> As a dog sledder, I travelled through there and I went through the ice. One day I could be going through there and it's nice and the next day you would have water and you have fresh ice and you are travelling along and all of a sudden, "Whoop." You got 10-12 sled dogs and you only have a break there and the snow and they are pulling their hardest and they pull you right in the ice. (Community Member 4)

#### 2.5.1.2 Changing Wildlife Habitat and Declining Trapping

The SKRD supports abundant wildlife including moose, beaver and muskrat. This wildlife has attracted settlement in the area from Indigenous and non-Indigenous populations for over 200 years (Goulet 2013). The unpredictability of fluctuations not only referred to unexpected flows for human populations but also wildlife populations. In the context of summer water flow peaking times, unpredictability in fluctuations could result in drowning wildlife:

> When the water rises and it rises above the ground to about 8 feet above the land that's there now, there is not too many animals that can withstand that 8 feet of flood water. Sometimes it goes to 10 feet. A lot of this of the trees, they get drowned. A lot of them are turning into grey and kind of like a fire hazard or whatever. It's kind of sad to see that because with these trees we had shelter and food and everything from the environment. It's destroyed by the flood waters. Anything that's there, rabbit's, small animals...they are all drowned. Large animals like moose, they can swim over those areas but with the force of the water they are pinned against those trees. They are completely destroyed. We have seen them. Deer, moose, elk, they are all drowned. (Community Member 5)

> We went to check [my brother's] cabin and when we went out, I didn't even recognize the areas. I did not till we approach the cabins…after we left the cabin we ran into a deer that was stuck in a little bit of bush and there was nothing we could do and as we were going along checking everything, we saw a moose, a dead moose floating. (Community Member 6)

The muskrat and beaver were additional observable examples of how water fluctuations influenced cultural and lifestyle losses. The muskrat and beaver are wetland-dependant aquatic fur-bearers that have particular cultural significance for residents in the SKRD. Community Member 4 explained how water fluctuations posed a direct threat to muskrat and beaver populations due to freezing and flooding effects. Typically, muskrat and beaver built their houses based on predictable freezing levels. However, when water was unpredictably released and then held back, water flooded and froze on top of muskrat and beaver houses, causing a double layer of freezing:

> After everything is set, that was in October and then November where ice would freeze and it will be constant for a period of time. In January, it would flood past the area where the breathing holes are. So the beaver will have to come out and try to survive on the shore somewhere. That's what happened. We have seen it happen. (Community Member 4)

Thus, unpredictable water fluctuations disrupted navigation and reduced wildlife's availability throughout the summer and winter. This, in turn, resulted in cultural and lifestyle losses such as a reduced ability to hunt, fish and trap.

### 2.5.2 Economic Losses and Lost Opportunities

*Economic losses and lost opportunities* refer to financial losses and the reduced capacity for financial gain (Turner et al. 2008). Hunting, fishing and trapping were cultural activities with economic dimensions. The meat and pelts of moose, beaver and muskrat had been traded within the SKRD and with communities outside of the SKRD since Cumberland House was settled in 1774 (Dorian and Paquin 2005; Goulet 2013). Declining beaver and muskrat numbers represent a cultural and lifestyle loss and lost opportunity for economic gain. Declining muskrat and beaver yields resulted in financial losses and limited the ability of trappers to sell and share muskrat and beaver pelts:

> All of those 10,000 muskrat houses, there is not one and my dad told me, "Don't open it. Don't even look." But I am curious. I am just a young guy and so I start opening those things and I see all these little muskrats huddled there together inside the houses, eight of them, all frozen together and some of them eat each other. I seen that. And they...it's sad because you got no money now for the spring. You got absolutely no money for muskrat trapping because you were making nine bucks per muskrat pelt and now you got nothing coming to you for the spring and no food either. (Community Member 5)

Recently trappers were going into more southern regions to trap muskrat. This was descriptive of lost opportunities to use the SKRD for financial (or cultural) gain:

> [My husband] was not able to go trapping, this fall or last fall or this spring. There were no muskrat houses. The land is dried up and I just miss the taste of that muskrat. You know that's one of my childhood foods that I really enjoyed as a child and I still do as an adult. I really miss that. Now the trappers are going south to trap…Either way it's not good for the muskrat and for us. (Community Member 6)

> Well, I remember the day when I was a kid, when people were getting—and this is not an exaggeration, this is not a lie, there was guys getting hundred—hundred or some rats a day and it doesn't take a rocket scientist to know now that we're going down south in these swamps or in these little ponds, you know, uh, trying to eat a muskrat. There is no muskrats here anymore. This is a dangerous place for a muskrat in the spring in Cumberland House. But if you see a muskrat, he's dead 'cause you got to eat it! (Community Member 7)

Reduced financial losses meant less income saved for springtime. Declining muskrat and beaver yields were changing the extent to which community members could trap for financial gain by either limiting their income or changing the geographical patterns of trapping.

### 2.5.3 Knowledge Losses

*Knowledge losses* referred to disruptions in the transmission of cultural knowledge, values attributed to the land and stories (Turner et al. 2008). Communities in the SKRD held knowledge about what happens to water when it left the EBCD. Water-movement knowledge was linked to knowledge about hunting, trapping and fishing, so community members held valuable knowledge about the SKRD ecology:

> We've trapped or harvested fur throughout all those years that I've been out at the delta. So harvesting fur has been a big part of what we do. When you do that, of course you know about wildlife in your area and in the delta. (Community Member 8)

Knowledge about hunting, trapping and fishing was linked to the transmission of hunting, trapping and fishing techniques that were passed down inter-generationally. Community Member 9 described how knowledge of the SKRD was passed down from a parent in Cree:

> When I'm trapping, I feel really kind of proud in a way because like I'm learning what my dad has done for like ages and ages and he's kind of passed on all these things. Like when we're out there, he'll like be speaking in Cree. He's like telling me Cree words for all these weird little things that only happen like once a year or something. He'll teach me a word for like the smell of the water on a certain part of the delta or something. It's just really fun and so peaceful and kind of like you're connected with nature. (Community Member 9)

The significance of disruptions to knowledge loss was that knowledge passed down through generations would have an increasingly limited prevalence in younger generations. For Community Member 9, the water in the SKRD was a symbol through which a greater understanding of nature and the Cree language was inherited.

### 2.5.4 Loss of Identity

*A loss of identity* referred to the loss of one's perception of onesself in the context of one's own inherited values (Turner et al. 2008). In spite of over 200 years of colonization, participants within the SKRD held a deep connectivity between nature and socio-cultural life. Community Member 12 described the nature-human connection: "To me personally I have always said if the wildlife is fine, we will be fine too. I have always said that, if the wildlife aren't healthy, we will get that impact too." The nature-human connection held by some community members in the SKRD was deep within their identity:

> The mentality of the traditional meals already are starting to deteriorate in the young people. But in the older, you know, in the thirties, the forties, the fifties, there's still that. It's an, an urge. We have to have it. For some reason that's in—within our own selves. (Community Member 7)

> [Without the water] I'd be totally devastated. I don't know. It's the only place I feel home and a place like you're at peace. If I didn't have this place, I'll be very, very lost. This is my favorite place. (Community Member 9)

> We are unique in the sense here it's like a different culture. We have been colonized. [But] we held onto many of those beliefs. We carry on those beliefs but it was sure balanced with other things. Balanced with the traditional lifestyles of the people here. So it's in that respect it's very different from the Southern Plains Cree. Given that we are a historical community, the water ways is what put us here but the water ways is already now putting us into jeopardy for socio-economic gains…to us, swamp means food. (Community Member 10)

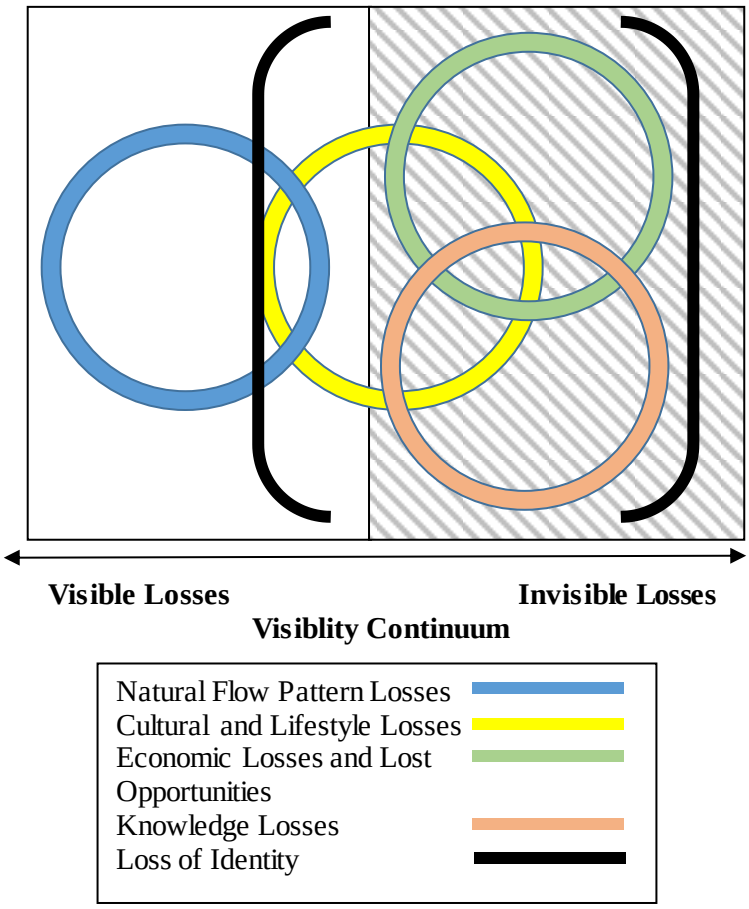
Human-nature connection within community participants' identity suggested an interdependency between cultural life, economic practices and knowledge. Losses to those areas were identity losses. For instance, Community Member 10 suggested the link between the swamp and food was threatened by river flow changes, and, when this link was threatened, the communities' belief systems were threatened. Thus, unpredictable water fluctuations are changing the ways community members related to their broader community and to their environment. In other words, the visible losses and unpredictable daily water fluctuations of EBCD operation was threatening the human-nature connection within community participants' identity, which in effect separated them from nature.

### 2.6 Connections among Losses

To summarize, cultural and lifestyle losses referred to the negative effect of fluctuating water on culturally fundamental activities such as hunting, trapping and fishing. Cultural and lifestyle losses had dimensions relating to economic and opportunity losses. Both cultural and lifestyle losses and economic and opportunity losses constrained "on the land" teaching and, hence, the transmission of knowledge about the SKRD. Knowledge losses refer to the inability to teach other community members such as youth about the SKRD, especially about the importance of hunting, trapping and fishing. The sum total of the interactions among these

losses is an identity loss. Figure 2.2 conceptually illustrates the connections among the visible and invisible losses experienced by the community participants.

**Figure 2.2 – Conceptual Diagram of Visible and Invisible Losses**




The empirical hydrometric and interview data suggest that the relationships between visible and invisible losses are highly complex. Table 2.3 summarizes the losses empirically described in this chapter and shows the recognizable connections among losses. There are clear empirical connections between fluctuating water, cultural lifestyle losses and identity loss in both the summer and winter. However, there are empirical gaps relating to how fall hunting is valued economically and as a source of knowledge transmission. These gaps are italicized within the table. The clearest connection among all invisible losses is demonstrated in the winter.

Fluctuating waters in the winter instigated a loss of identity for some community members in the SKRD. The EBCD operational practice of holding back water to the minimum flow and then releasing as much as 700 cubic metres per second added danger to navigating the SKRD and froze muskrat and beaver houses (cultural and lifestyle losses). The coupling of these outcomes led to reductions in income and forced trappers to follow muskrat to more southern regions (economic losses and lost opportunities). The change in muskrat trapping patterns reduced the opportunities for older generations to teach youth about the SKRD and the Cree language (knowledge loss). The net effect of these losses contributed to identity loss because winter fluctuations were altering the relationship people had to the SKRD. In other words, unpredictable water flows in the winter altered a sense of place.

**Table 2.3 – Summary of Loss Connections (Italicized Sections Need Further Empirical Research)**

| | Visible Loss | Cultural and Lifestyle Loss | Economic Loss and Lost Opportunities | Knowledge Loss | Loss of Identity |
|---|---|---|---|---|---|
| **Description** | Unpredictable fluctuations in summer flows during flood maximums | Drowning wildlife means fewer wildlife available | *Less income, fewer chances to hunt?* | *Reduced chance to hunt means reduced knowledge transmission contexts?* | Wildlife aren`t healthy, then people aren`t healthy + less traditional meals |
| **Knowledge Source** | Hydrometric data (Figure 2.1A) | Interview data (CM 5 & 6) | *Empirical data on impact hunting valuation is needed* | *Empirical data on how hunting and knowledge transmission is needed* | Interview data (CMs 12 & 7) |
| **Description** | Unpredictable fluctuations in late summer flows | Disruptions to navigation challenges hunting and fishing | *Difficulty to hunt means fewer opportunities?* | *Reduced chance to hunt means reduced knowledge transmission contexts?* | Less water and damaged water ways change sense of place (swamp = food) + less traditional meals |
| **Knowledge Source** | Hydrometric data (Figure 2.1B) | Interview data (CMs 1, 2 & 4) | *Empirical data on the economic burden of hindered travel is needed* | *Empirical data on how hunting enables knowledge transmission is needed* | Interview data (CMs 7, 9 & 10) |
| **Description** | Fluctuations in winter flows: holding water to minimum flow (75 $m^3/s$) then releasing higher flows | Navigating the SKRD is dangerous and limits opportunities + double freezing effect means fewer muskrat and beaver | Fewer muskrat mean less income + muskrat & trapping opportunities moving south | Valuable SKRD water knowledge threatened + less SKRD knowledge in younger generations | Less water in water ways / damage from water change (swamp = food) + less traditional meals |
| **Knowledge Source** | Hydrometric data (Figure 2.1C) | Interview data (CM 4) | Interview data (CMs 5,6 & 7) | Interview data (CMs 8 & 9) | Interview data (CMs 7, 9 & 10) |

## 2.7 Discussion

Pahl-Wostl et al. (2013: 346) identified that there was limited river flow research on the "use of scientific and local knowledge and dealing with uncertainty, decision-making processes and policy implementation." This chapter described how western science and Indigenous knowledge could identify complexity and uncertainty within the outcomes from hydropeaking in the SKRD. Four concepts that framed how western science and Indigenous knowledge can be used concurrently were used: place-based knowledge, interdisciplinary knowledge, two-eyed seeing and invisible losses. These four concepts are inter-related. This chapter identified the need for place-based knowledge and interdisciplinary knowledge in literature about the outcomes of dam management. Two-eyed seeing was identified as a methodological approach to understand the place-basedness and interdisciplinarity of decision-making outcomes that Indigenous people experience. Invisible losses were used as an analytical category to describe the adverse impacts of EBCD management that involved diverse ways the NVCH and CHCN related to the SKRD.

The goals of environmental, cultural and Indigenous flows describe recent efforts in river research to adjust the timing and quantity of river discharges to respond to the complexity and uncertainty in rivers as socio-ecological systems (Poff and Matthews 2013; Halbe et al. 2013; Jackson et al. 2013; Johnston 2013; Maclean and The Bana Yarralji Bubu Inc. 2015; Pahl-Wostl et al. 2013). However, the goals of environmental, cultural and Indigenous flows require place-based knowledge and interdisciplinary knowledge in order to be responsive to socio-ecological systems (see Poff and Matthews 2013). This chapter provided empirical data that contributed to an understanding of the challenges of environmental, cultural and Indigenous flows from

interdisciplinary and place-based perspectives. It showed how hydropeaking created a range of losses in the SKRD that was experienced by NVCH and CHCN community members.

A two-eyed seeing approach supported the recognition that there were diverse demands on water and knowledge that could be *combined* to identify hidden complexities and relationships in environmental problems (Aikenhead and Michell 2011). One value of two-eyed seeing was that the impacts of hydropeaking could be understood from both a western science perspective and an Indigenous knowledge perspective. A western science perspective, demonstrated with an analysis of hydrometric data, involved a description of the contribution of EBCD to unnatural seasonal and daily fluctuations of river discharges in the SKRD. An Indigenous perspective, demonstrated with an analysis of interview data, involved a description of the adverse impacts from the EBCD on a range of dimensions of the NVCH and CHCN participants' lives. Beyond the value of two-eyed seeing in identifying two perspectives on the outcomes of hydropeaking in the SKRD, two eyed-seeing was also valuable in understanding how these perspectives related to each other. A western science perspective and Indigenous perspective could be combined to describe how river flow fluctuations attributed to the EBCD were mediated through NVCH and CHCN perspectives through the concept of invisible losses.

The concept of invisible losses was used to identify the range of outcomes from EBCD management in a manner that is responsive to the hidden connections between energy, water and food (see Allan 2003; Zeitoun 2011; Wong 2015). In hydro-electric power production, the notion of invisible losses illustrated that when water was used to generate electricity for the SaskPower's customers, hydro-electric power generation also affected food availability for the NVCH and CHCN community members. The hidden connection to food was conceptualized through the notion of invisible losses.

Invisible losses were presented by Turner et al. (2008) as conceptual categories that could frame environmental outcomes typically hidden from or misrecognized by environmental decision-makers. This research advanced the concept of invisible losses through empirical descriptions of four invisible losses experienced by NVCH and CHCN community members: cultural and lifestyle losses, economic losses and lost opportunities, knowledge losses and a loss of identity.

Turner et al. (2008) cautioned that describing a loss of identity would be challenging. A two-eyed seeing approach using the concept of invisible losses offered an empirical description of a loss of identity. This chapter found that the loss of identity was a cumulative outcome of cultural and lifestyle losses, economic losses and lost opportunities, and knowledge losses in relation to hydrological change. The cumulative outcome as a loss of identity was the separation of NVCH and CHCN community members from the SKRD as place. For example, through winter fluctuations, illustrated by hydrometric data, there were fewer muskrat to trap which meant less culturally and economically beneficial opportunities to trap in the SKRD. Fewer opportunities to trap in the SKRD resulted in scarcer opportunities for older generations to generate and transmit SKRD knowledge to younger generations. These losses resulted in the separation of NVCH and CHCN community members from the SKRD.

The two-eyed seeing approach also provided an interdisciplinary and place-based empirical description of invisible losses to EBCD management experienced by NVCH and CHCN. Methodologically, this research demonstrated that a place-based, two-eyed seeing approach can be used to render visible hidden complexities and uncertainties, such as the relationship between hydropeaking and identity loss. This has value for environmental research that involves Indigenous and non-Indigenous people with diverse interests and demands on

water. Additionally, allowing invisible losses to become more visible has practical significance for dam managers and downstream Indigenous communities. Visible losses, representative of western science and Indigenous knowledge, can be responded to more effectively through decision-making and policy (see Pahl-Wostl et al. 2013).

There are three directions for future research that would support a greater place-based, interdisciplinary understanding of outcomes to dam management. First, a more comprehensive description of the losses to EBCD management would be supported by empirical investigations identified in Table 2.3. These empirical investigations would include a greater understanding of how hunting and fishing are economically valued, what the economic burden of disruptions to navigation in the SKRD is and how these practices relate to knowledge transmission. Second, a broader use of two-eyed seeing in empirical descriptions of dam management in Canada would lead to a more comprehensive recognition of the outcomes of upstream dam operations on downstream Indigenous people. Third, further research needs to identify how losses, such as a loss of identity, could be accounted for and remediated in dam decision-making. For example, how can an increased awareness of identity losses be integrated into decision-making to create environmental, cultural or Indigenous flows that are comprehensive, cross-cultural and responsive to place? Decision-making that is responsive to losses may require, as Pahl-Wostl et al. (2013) suggest, greater input from local people to help with recognition.

## 2.8 Conclusions

This chapter used a place-based, interdisciplinary understanding of how social and environmental outcomes of dam management are linked when experienced by downstream Indigenous people. This chapter used two-eyed seeing to advance dam management literature beyond disciplinary descriptions of the outcomes of hydropeaking to place-based,

interdisciplinary descriptions of invisible losses. A place-based, two-eyed seeing approach rendered visible the connections among losses experienced by downstream Indigenous people. One particular connection related to hydropeaking's association with a loss of identity to Indigenous people. Future research needs to find ways within dam decision-making processes to remediate these losses once they are recognized.

The next chapter builds on this recommendation by exploring how meaningful participation of downstream Indigenous people is a pathway for greater recognition, as an essential step toward remediation, of invisible losses. The next chapter argues that meaningful participation is not guaranteed in collaborative decision-making and proposes that one potential obstacle for advancing meaningful participation is unequal power relations. Chapter 3 empirically documents the relationship between power relations and meaningful participation experienced by provincial water agencies and downstream Indigenous people in the SKRD.

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# CHAPTER 3: POWER RELATIONS AND MEANINGFUL PARTICIPATION IN DAM DECISION-MAKING

## ABSTRACT

Collaborative environmental decision-making does not consistently advance meaningful participation for Indigenous people. Power relations have been proposed as an explanation for less meaningful participation in collaborative approaches. However, there are limited empirical studies explicitly documenting the relationship between power relations and meaningful participation for Indigenous people as it relates to collaborative environmental decision-making. This chapter investigates this relationship by presenting empirical findings on why and how power relations affect meaningfulness in participation as experienced by Indigenous people involved in dam management in the Saskatchewan River Delta. This chapter uses Lukes' (2005) theory of power to document the interconnected ways that structural, discursive and instrumental power constrain downstream Indigenous people's influence on upstream dam decision-making. This chapter's research design includes semi-structured interviews with stakeholders and rights holders (n=30) and document analyses (n=11). Key findings from the research shows that expressions of structural and discursive power impact Indigenous community members' abilities to participate meaningfully in dam decision-making. These findings suggested that access to decision-making was not sufficient to advance meaningful participation. Influence was a critical component of participation for Indigenous people.

Key words: meaningful participation; power relations; influence; Indigenous people

## 3.0 Introduction

Collaboration in environmental decision-making is promoted as a means to provide meaningful participation (Conley and Moote 2003; Koontz and Thomas 2006; Koontz et al. 2004). In this context, meaningful participation refers to whether participants have access, standing and influence in collaborative decision-making (Senecah 2004). Meaningful participation for Indigenous people is important given their historical disenfranchisement and systematic exclusion from environmental decision-making (Adkin 2009; Coates and Poelzer 2010; Mascarenhas 2007; Wilson 2004). However, challenges related to access, standing and influence for Indigenous people to participate in collaborative environmental decision making remain (e.g Bowman 2011; Booth and Skelton 2011; Muir and Booth 2012). Thus, in some, and perhaps many cases, the promise of meaningful participation in collaborative environmental decision-making may not be supported in practice.

There are alternative collaborative approaches that attempt to incorporate meaningful participation, one of which is adaptive co-management (Armitage et al. 2009; Berkes 2009; Olsson et al. 2004; Plummer et al. 2013). Adaptive co-management's theoretical focus on sharing influence over decision-making may be more conducive to achieving meaningful participation for Indigenous people (Armitage et al. 2009; Berkes 2009; Olsson et al. 2004; Plummer et al. 2013). As a result, adaptive co-management is a promising collaborative model for meaningful participation for Indigenous people. Nonetheless, Armitage et al. (2009) and Natcher et al. (2005) argued that power relations in broader political, economic and socio-cultural contexts can challenge meaningful participation, even in situations where adaptive co-management is used.

Power relations, which exist in relationships between people, between people and agencies, and between agencies (Lukes 2005), may limit meaningful participation for participants in collaborative approaches (Akbulut and Soylu 2012; Brisbois 2015; Raik et al. 2008; Reed and McIlveen 2006). An individual or group exercises power over another individual or group when the former affects the latter in a way that is contrary to the affected group's interests (Lukes 2005). Thus, power relations can create political and social structures that can enhance or constrain decision-making (see Bachrach and Baratz 1962; Reed and McIlveen 2006) and influence how problems and solutions are defined (see Fuchs 2007). Collaborative environmental decision-making involves power relations when participants interact, when decisions are made and when problems and solutions are developed. In a systematic review of power and collaborative approaches, Brisbois (2015: 53) argued that "considering power in the context of collaboration allows for a more realistic view of what collaborative processes can accomplish under existing socioeconomic and political conditions, and how best to approach collaboration in contested settings." Given the prevalence of power relations in collaborative environmental decision-making, a greater understanding of the role of power in constraining (or enhancing) meaningful participation may lead to more equitable decision-making (Armitage et al. 2009; Brisbois 2015; Raik et al. 2008; Sandstöm 2009).

This chapter documents the power relations in decisions related to dam management in the Saskatchewan River Delta (SKRD). Given the need to advance meaningful participation for Indigenous people in environmental decision-making and the potential for power relations to limit meaningful participation in more collaborative contexts, this chapter provides empirical data to understand the relationship between power relations and meaningful participation in the SKRD. This chapter uses Lukes' (2005) theory of power to investigate the experiences of power

relations within Indigenous communities surrounding dam management on the Saskatchewan River. It uses a mixed-method approach that includes analyses of documents and interview data to identify the extent to which meaningful participation exists in the SKRD, and how power relations relate to meaningful participation.

### 3.1 The Role of Power in Constraining Meaningful Participation

The dynamics of power in relationships between Indigenous people and the government may explain why meaningful participation is constrained in collaborative decision-making (see Akbulut and Soylu 2012; Brisbois 2015; Raik et al. 2008). Lukes (2005) identifies three faces of power – structural power, discursive power and instrumental power – that can be applied to action or inaction in decision-making. *Structural power* can explain constraints to management approaches that include or exclude individuals or groups, perspectives and knowledge in decision-making (Brisbois 2015; Dahl 1957). Structural power refers to the visible or invisible control over a policy agenda (Bachrach and Baratz 1962: Lukes 2005). It can also refer to the ability to constrain individuals' or groups' capacity to influence decision-making processes (Fuchs 2007). Analysing structural power involves the identification of procedures and rules – the structures – that promote or constrain a certain type of behaviour over others (Raik et al. 2008).[8]

Structural power can relate to meaningful participation when environmental decision-making includes a particular form of knowledge, and the people that use that knowledge (Brisbois 2015), based on regulatory requirements, policy rules and agency mandates (Ascher et al. 2010). The exclusion or inclusion of knowledge and knowledge-holders are indicative of a

[8] Raik et al. (2008) propose slightly different forms of power, but review connections between structural, discursive and instrumental power.

regulatory and social structure where access and influence over decision-making are denied by law and policy.

*Discursive power* can be expressed to condition and justify exclusionary management approaches. Discursive power refers to the less visible ways individuals or groups, perspectives and knowledge are privileged as a result of discourse (Fuchs 2007; Lukes 2005). Discourse is a "set of categories and concepts embodying specific assumption, judgments, contention, dispositions, and capabilities" (Dryzek and Neimeyer 2008: 481; see also Dryzek 1997). Discursive power, when expressed, can frame problems and solutions through debates, language and values (Fuchs 2007). Discursive power is distinct from structural power because discursive power refers to meaning-making whereas structural power refers to the social and legal constructs that contain meaning. For example, discursive power can explain why a structure exists or continues to exist (Raik et al. 2008). Discursive power can be difficult to identify empirically because discourse and its influence on structures is latent within everyday interactions between individuals and groups (Brisbois 2015).

Discursive power can relate to meaningful participation when particular ways of knowing are privileged within a dominant discourse (Ascher et al. 2010). Dominant discourses can marginalize the identities of individuals and groups because their knowledge is not deemed "true" and "observable" (Boelens 2014). Ascher et al. (2010) describe how scientific knowledge is privileged in Western discourse because "scientific expertise plays a strong role in screening and framing" problems and solutions (Ascher et al. 2010: 63). Privileging a certain form of knowledge can constrain perceptions of access, standing and influence (see Watson 2013).

*Instrumental power* refers to the visible and explicit means by which individuals or groups influence beneficial outcomes (Lukes 2005). Visible means can include coercion,

diversion and manipulation (Brisbois 2015), and can also be reflected in an unequal share of resources or an unequitable access to draw on resources (Brisbois 2015; Dahl 1957). Instrumental power is distinct from structural power because, like discursive power, instrumental power involves human agency rather than structure (Lukes 2005). In the context of instrumental power, human agency is the ability to draw on resources to persuade, coerce, divert and manipulate individuals and groups (Raik et al. 2008). The difference between instrumental power and discursive power can be less distinct (Lukes 2005). Instrumental power is behaviour, such as decision-making, whereas discursive power involves transmitting meaning through discourse that justifies and leads to behaviour (Raik et al. 2008). Instrumental power can include behaviours that result from discursive power and discursive power can justify behaviours in instrumental power. Instrumental power can relate to meaningful participation when decision-making processes or individuals prevent access, ignore standing and reject influence. However, instrumental power can also relate to changes in structural power to promote meaningful participation (see Lukes 2005). The following sections in this chapter empirically assess whether meaningful participation exists and how expressions of structural, discursive and instrumental power are evident in decision-making for dam management in the SKRD.

### 3.2 Study Area and Participants

The SKRD is the largest freshwater inland delta in North America. It spans 9200 $km^2$ and straddles the Saskatchewan-Manitoba border. Two communities in the region use the delta for traditional hunting, fishing and trapping: the Northern Village of Cumberland House (NVCH) and the Cumberland House Cree Nation (CHCN). These communities are primarily Indigenous (Massie and Reed 2013). Culturally-critical wildlife, such as moose, muskrat and beaver, are supported in the SKRD (Goulet 2013).

There are three major dams on the Saskatchewan River: the Gardiner Dam, Francois Finlay Dam and the E.B. Campbell Dam (EBCD). The construction of the EBCD was completed in 1966 approximately 100kms upstream from the NVCH and the CHCN. The Government of Saskatchewan granted a 50 year license in 1985, to be retroactively applied to the 1966 completion date. Since its construction, the NVCH and CHCN have identified a range of land-use changes and attribute these changes to EBCD operation (Waldram 1988; Waldram 1989: Gober and Wheater 2014; Chapter 2). In 2004, a minimum flow requirement of 75 cubic metres per second to be released from the EBCD at all times was instituted by the Canadian Department of Fisheries and Oceans (DFO), a federal government department that manages Canadian freshwater and ocean species in federal waters.

Changes in the SKRD can be attributed, in part, to upstream water use and other factors such as water management in Alberta, climate change, hydro-development and hydropeaking (Gober and Wheater 2014; Hurlbert et al. 2009; Schindler and Donahue 2006; Wheater and Gober 2013; Waldram 1988; Waldram 1989). River flows in the SKRD are threatened upstream from over-allocation of water in Alberta, rapid population growth, increased economic development and higher demand from irrigation for agriculture in Saskatchewan and Alberta (Gober and Wheater 2014). These threats are accentuated by climate change (Schindler and Donahue 2006; Wheater and Gober 2013) leading to an increased vulnerability of human populations and infrastructure (Hurlbert et al. 2009). The transboundary character of water availability complicates the decision space available for taking action. As a result, there are limits on what can be managed by Saskatchewan water agencies alone.

Three major provincial water agencies are involved in water management in Saskatchewan: SaskPower, the Saskatchewan Water Security Agency (WSA) and the

Saskatchewan Ministry of Environment.[9] SaskPower owns and operates the EBCD. The WSA, the water department of the provincial government, licenses and regulates the EBCD. For its part, the Saskatchewan Ministry of Environment is involved by producing scientific assessments of dam infrastructure. Table 3.0 lists these agencies, their relationship to the Government of Saskatchewan and their mandates.

**Table 3.0 – Water Agencies Relevant to Dam Management and their Mandates**

| Water Agency | Relationship to Provincial Government | Mandate |
|---|---|---|
| SaskPower | Provincial crown corporation (functions as a business at arm's-length from the provincial government) | To deliver power in a reliable, affordable sustainable manner (SaskPower 2014: 20) |
| Saskatchewan Water Security Agency | Provincial crown corporation (functions as a provincial department) | To integrate all aspects of provincial water management to ensure water supplies support economic growth, quality of life and environmental well-being. WSA supports protection of drinking water, flood and drought response, and management of water supplies, water quality and aquatic habitat. WSA owns and operates provincial dams and water supply channels (WSA 2015: 45). |
| Ministry of Environment | Provincial Department | To provide public service excellence in protecting the environment and promoting the sustainable use of natural resources to enhance economic and social benefits (Sask Environment 2015: 3)* |

*Listed in their annual report as a mission

## 3.3 Methodology

This chapter uses a qualitative case study design. Qualitative case studies provide rich data on a phenomenon within a real life context (Yin 2003). Within this research design, documents were analyzed and semi-structured interviews were completed with community and water agency participants. Documents (n=11) included Saskatchewan water laws and

[9] The WSA was formerly known as the Saskatchewan Watershed Authority.

regulations, water agency policy documents and NVCH- and CHCN-produced documents. A list of documents and how they were used in this chapter is included in Appendix III. A doctrinal research approach was used to analyze the legal and regulatory structure that constrains EBCD management. A doctrinal research technique involves the synthesizing of "rules, principles, norms,…which explains, makes coherent or justifies a segment of the law as part of a larger system of law" (Hutchinson 2013: 9). A document analysis was used to determine whether expressions of structural power were evident in water agency's policies and NVCH and CHCN documents. Laws, regulations and documents were reviewed and selected based on their relevance to EBCD management.

Interview data were collected through semi-structured interviews with current and former NVCH and CHCN community members and current water agency members. Upon suggestion from one key informant, interviews were unstructured with some Elders (n=4) to increase their level of comfort. Table 3.1 lists the community sample by participants' roles in NVCH and CHCN. The community sample (n=22) involved a diverse range of stakeholders and rights holders (Table 3.1). Water agency members were from Government of Saskatchewan agencies including SaskPower, the WSA and the Saskatchewan Ministry of Environment; this sample (n=8), therefore, involved key water agency decision-makers (Table 3.2).

**Table 3.1 Community Sample by Primary Role**

| Community: Primary Role | Size |
|---|---|
| Student | 2 |
| School Teacher | 4 |
| Outfitter, Trapper, Hunter, Fisherperson | 5 |
| Government: Band Council | 1 |
| Government: Village Council | 1 |
| Former Resident | 1 |
| Trades | 4 |
| Elder | 5 |
| Total | 22 |

**Table 3.2 Water Agency Sample by Department**

| Provincial Water Agency | Size |
|---|---|
| SaskPower | 5 |
| Saskatchewan Water Security | 2 |
| Ministry of Environment | 1 |
| Total | 8 |

A mixed, purposive sampling strategy was used to identify participants. This sampling strategy involved a combination of snowball and heterogeneity sampling (Palinkas et al. 2013). Snowball sampling involved interviewing people with similar characteristics who then recommended others with similar characteristics (Palinkas et al. 2013). Heterogeneity sampling (maximum variation) involved the identification of people who had dissimilar characteristics (Palinkas et al. 2013). Saturation and complete heterogeneity, however, were not achieved because of some difficulty in identifying participants in the CHCN and time and resource constraints. Original interviews were audio recorded, transcribed and verified by participants. Interviews were analyzed using *Atlas.ti 7* qualitative analytical software. Findings were validated through presentations back to water agency and community representatives.

The key findings for this chapter are divided into two sections. The first section gauges the extent to which meaningful participation exists within decisions associated with the EBCD

and SKRD, focussing on the role of influence and the specific strategies used by water agencies to engage community members. The second section documents the connections between meaningful participation and power relations.

### 3.4 Does Meaningful Participation Exist in Decisions Associated with the SKRD?

Saskatchewan water agencies and the NVCH and CHCN community members appear to hold two divergent perspectives on whether participation in deliberations associated with the SKRD was meaningful. As noted earlier, meaningful participation refers to whether individuals and groups are afforded access, standing and influence in decision-making processes (Senecah 2004). Access referred to whether individuals and groups had access to decision-making (Senecah 2004). Standing referred whether individuals' and groups' values and demands had legitimacy in decision-making (Senecah 2004). Influence referred to whether individuals and groups could leverage their values and demands to influence decision-making outcomes (Senecah 2004). The water agency members' perspective suggested that they were providing the NVCH and CHCN community members' meaningful participation in the form of *access* and *standing* in EBCD decision-making. The NVCH and CHCN community members' perspectives suggested they experienced a lack of meaningful participation because they were not afforded *influence* over EBCD decision-making.

SaskPower has facilitated a number of meetings with NVCH and CHCN community members since the construction of the EBCD. In 2011, SaskPower launched an Indigenous engagement programme, known as the Aboriginal Relations Strategy. This programme involved a wide range of efforts to build better relationships with Indigenous people across Saskatchewan (SaskPower 2014). One of these efforts included hiring an Indigenous liaison within SaskPower's Aboriginal Affairs Department. In 2012, under an Aboriginal Relations Strategy,

SaskPower began to facilitate quarterly meetings with NVCH and CHCN community members. These quarterly meetings were implemented to streamline SaskPower's practice of facilitating meetings with community members on a case-by-case basis into one, regular forum:

> [I]n the past we have had sort of one-off [meetings]. I meet with the community on sturgeon and fisheries issues and other groups meet with the community on providing opportunities for work in the community, whether it's facilities, during training or brush cutting, so everyone has sort of had these one offs and the intention of [the quarterly meetings] was to sort of bring all of that sort of together and have [SaskPower] at the table on the same page, speaking the same language so we all know how we are interfacing with Cumberland House. (Water Agency Member A).

From the water agency members' perspective, quarterly meetings were mutually beneficial to NVCH and CHCN community members and SaskPower because these meetings provided an ongoing opportunity for community members to share their experiences directly with SaskPower. Furthermore, quarterly meetings were beneficial because SaskPower was able to share their knowledge directly with community members. Water agency members described the benefits of the quarterly meetings:

> So [SaskPower's] intention [was] to meet quarterly and to have those communities and meetings in the community or very close to the community so that [the communities could] have good representation there, and to use those meetings as an opportunity to discuss concerns whether they [were] similar or new concerns that [were] coming up, how things [were] working, what [was] not working and just to allow that relationship to continue to build over time. (Water Agency Member B)

> You can achieve some improvements there just by having good open dialogue, trying to convey the science information and hear other information back and forth. Somewhere in that recipe mix there, I think you come up with maybe a better overall management of the system, a better understanding at least. There may be at the end of the day, some different views across the table about what you are achieving, but at least it's open or it's clear. (Water Agency Member C)

SaskPower's efforts to meet closely with NVCH and CHCN were representative of access. Access was evident through SaskPower's desire to build relationships through open dialogue at

meetings held within the NVCH and CHCN. This open dialogue, as Water Agency Member C described, could lead to "better management of the system, [or] a better understanding at least."

Community members agreed that SaskPower was providing them with access. In addition, their perspectives suggested that SaskPower was also providing standing, as indicated in the quotations below. However, NVCH and CHCN community members also indicated that, in quarterly meetings, trappers and fishers were not able to influence EBCD decision-making:

> I would say that [NVCH and CHCN's opinions] are being heard [at the quarterly meetings] but there is no follow up to it. And we have made recommendations but nothing happens, absolutely nothing happens. (Community Member 11)

> [NVCH, CHCN and SaskPower] can sit down here [at the meetings] and we can get ourselves aroused and say all the good things. And we can develop a beautiful concept. And then we walk out that door and we go our separate ways and nothing happens. (Community Member 7)

Community members agreed that access was provided through the quarterly meeting structure, and their comments suggested that standing also advanced through quarterly meetings. Standing was illustrated in the comment of Community Member 11 when this community member remarked that the community's opinions were "being heard." However, from the community members' perspective, influence was not present in the quarterly meetings. For example, Community Members 11 and 7 perceived that there was "no follow up" to the meetings and after the meetings "nothing happens." These comments suggested that community members were expecting that, through access and standing, influence would also be provided in meetings with SaskPower. Given that water agency members described meaningful participation in the form of access and standing and community members described meaningful participation in the form of influence, it appeared that water agency members and community members' perspectives diverged on the criticalness of influence in meaningful participation. The lack of influence described by community members could be explained by the ways that power was expressed.

### 3.5 Do Power Relations Explain a Lack of Meaningful Participation?

Power relations explained the lack of influence that the NVCH and CHCN community members experienced in EBCD decision-making. Particularly, discursive and structural power were expressed in different ways to explain the limited influence afforded to community members. Instrumental power was less apparent in describing limited influence.

#### 3.5.1 What Is the Relationship Between Discursive Power and Influence?

Discursive power was expressed through a dominant water agency discourse that suggested there was a limited space for NVCH and CHCH's influence in decision-making. Discursive power refers to the invisible ways individuals or groups, perspectives and knowledge are privileged as a result of discourse (Fuchs 2007; Lukes 2005). Discursive power was identified through themes in the comments provided by water agency and community members. Two distinct discourses, a Water Agency Discourse and a Community Discourse, related to how EBCD management and, then, Indigenous knowledge were perceived in relation to influence. Discourse refers to a "set of categories and concepts embodying specific assumptions, judgments, contention, dispositions, and capabilities" (Dryzek and Neimeyer 2008: 481).

##### 3.5.1.1 What Is the Relationship Between a Water Agency Discourse and Influence?

The Water Agency Discourse described how EBCD decision-making was a smaller component of a larger basin-wide decision-making process. As a result, there was a limited space for community members' to influence EBCD decision-making. Additionally the Water Agency Discourse involved an uncertainty over how Indigenous knowledge could be used to influence EBCD decision-making.

A Water Agency Discourse described how the EBCD contributed less to adverse environmental change in the SKRD than upstream water users and control structures. This suggested that there was a limited space to account for NVCH and CHCN's interests within the EBCD decision-making process and perhaps a limited space to accommodate NVCH and CHCN influence. Water agency members perceived the EBCD as having a lesser impact than the larger upstream dam, the Gardiner Dam, and its reservoir (Lake Diefenbaker):

> There may be some significant misconceptions of the impacts of the [EBCD] on the delta, …that dam only takes in what comes downstream and think of all the control structures upstream that are already manipulating siltation and manipulating water volumes and sometimes…that has to be balanced against all the benefits of electricity and recreation. (Water Agency Member D)

> So really in the grand scheme of things, [EBCD and Nipawin Dam] have the ability maybe to shave off peaks but they don't have enough storage to change seasonality of water. In that sense, they don't have a big influence on water flows …By far the largest influence on water flows is Lake Diefenbaker because of its ability to store water. It's 110 miles long and a couple of miles wide in places. It has a lot of storage and ability to influence seasonally what happens. (Water Agency Member B)

> It is by… nature when [NVCH and CHCN] see issues in the delta they look to the next structure and that is E.B. Campbell Dam and unfortunately, in a lot of cases, [SaskPower is] very restricted in that facility in terms of what we get and how we can operate but also…we are trying to manage a lot of different things and I think that always does not get translated into the Cumberland issues. (Water Agency Member E)

Water Agency Members D, B and E described how SaskPower EBCD decision-making was restricted in relation to how water is managed upstream from the EBCD. Water Agency Member D discussed how the EBCD "only takes what comes downstream". Water Agency Member B commented that the EBCD did not have a "big influence on water flows". The consequence of restricted EBCD management was that NVCH and CHCN community members' interests may not always be addressed in EBCD decision-making. This was evident by Water Agency Member E's community that EBCD operation does not always get "translated into the Cumberland issues."

Water agency members' comments suggested that there was a limited space for the NVCH and CHCN's interests to be accounted for within EBCD decision-making. More specifically, Water Agency Member B stated that the largest driver of environmental burdens in the SKRD was the Gardiner Dam and its reservoir Lake Diefenbaker. The implication of this comment is that, while there may be a limited space for NVCH and CHCN's interests to be accounted for within EBCD decision-making, SaskPower may not be the water agency responsible for addressing NVCH and CHCN interests because the WSA owns and operates the Gardiner Dam and Lake Diefenbaker (See Table 3.0). This consequence for influence on decision-making was two-fold. First, a limited space in EBCD decision-making to account for community members' interests suggested that there were limited options for adjusting EBCD operations, should NVCH and CHCN want to influence a change to how water flows are released. Second, Water Agency Member B's comment suggested that it would be unnecessary for community members to seek influence in EBCD decision-making because environmental change resulted from the operation of a WSA facility.

In addition to the Water Agency Discourse describing a limited space for NVCH and CHCN influence over EBCD decision-making, this discourse also described the uncertain role of Indigenous knowledge in decision-making. Water agency members noted concerns related to the collection as well as the validation of Indigenous knowledge. Water Agency Member F was concerned over the collection of Indigenous knowledge:

> I know in the work that [SaskPower does] in trying…to see how operations affect the environment and our downstream stakeholders, we do the best we can to involve that component. I know we try...we stay away from formal collection of [Indigenous] knowledge because there is a lot of concern that communities have had, and not just Cumberland House, but other communities have had in the past, if someone goes into the community and has a bunch of questions and they ask and they collect this [Indigenous] knowledge. (Water Agency Member F)

Water Agency Member D was reluctant to use Indigenous knowledge in decision-making when those decisions had legal implications. Water Agency Member D also stated that Indigenous knowledge had value and could be used if it was supported by western science in decision-making:

> You have to define what you are prepared to use it for and what you are not prepared to use it for. I wouldn't use it to make any decision that could have a legal designation unless you could prove it in a court of law, but I think it has real value and it's a great way to engage people to learn and so that people are participating and helping make decision…You can't use it to make, unless you have statistically reliable data, you cannot use it in decision-making, but you can't use it for planning. You can use it for historical value. You can use it for determining values. (Water Agency Member D)

Water Agency Member A indicated that Indigenous knowledge would be useful in the context of understanding local observations about the present and future condition of the SKRD, but oral history would be less useful because these accounts may not be reliable:

> [P]articipating in some dialogue with First Nations is that oral history is about in the past… I think there is a role for on the ground observation and observation through traditional activities that they would undertake in terms of understanding what's happening going forward and where we need to go going forward because you will hear things that like unbelievable that come out that has been provided through oral history and I am sure things have changed over time of course they have. (Water Agency Member A)

The consequence of the uncertain role for Indigenous knowledge described in the Water Agency Discourse was that there was an uncertainty over how Indigenous knowledge could be used within an already limited space for community members' influence in EBCD decision-making

#### 3.5.1.2 What Is the Relationship Between the Community Discourse and Influence?

The Community Discourse described how SaskPower managed the EBCD to satisfy upstream interests with the consequence of harming community members' interests. In addition, within this discourse, SaskPower did not hold enough knowledge about how community members' interests were harmed, and that community members' held this knowledge based on

their experiences in the SKRD. The implication of the Community Discourse was that if influence over EBCD decision-making was provided for community members, they could assist with producing better EBCD management outcomes in the SKRD.

Within the Community Discourse, community members described their perception that SaskPower's management of the EBCD was satisfying interests upstream but harming interests downstream. Community members described how environmental change in the SKRD was attributed to the operation of EBCD in creating water fluctuations to satisfy economic interests upstream from the SKRD:

> SaskPower is [managing the EBCD] to make money. They have the say how the water is being controlled. (Community Member 6)
>
> Well of course the EBCD has a lot to do with [change in the EBCD]… [H]olding back water to appease recreational users upstream from us [and] [t]he power demand and what I know for a fact is like whenever there is a big recreational fishing derby in Nipawin area, they will back a lot of water to appease the fisherman. That shouldn't be the case (Community Member 11).
>
> The more water [SaskPower has] in the reservoir is like banking money and then they regulated that water. (Community Member 12)

Community members described a connection between the perception that EBCD managed for economic gain and a perception that SaskPower has a lack of concern for the NVCH and CHCN interests in the water:

> [Y]ou know [SaskPower doesn't] care as long as they have money. They don't care about us. That's [why] they got lots of money from the people all over the place. (Community Member 6)
>
> [SaskPower is not] really thinking downstream from where they are. They don't care or know how much that water is valuable over here. I think they have to start changing their view on that part. (Community Member 4)

Community Member 13 described how in order to satisfy interests upstream, SaskPower harmed community interests downstream:

> The oddest time [when SaskPower] draw[s] back the water is when we're going to do our outfitting. That's when they seem to draw everything right down. So the government would make us suffer I suppose on regards to, "Oh, they'll give up," you know… I'm pretty sure…It's intentional on everything that the government does because it wants to move right in and [us] move right out. (Community Member 13).

While the Community Discourse involved the perception that SaskPower satisfied upstream interests and harmed downstream interests, this discourse also involved perceptions about knowledge. Community members perceived that SaskPower had limited knowledge of water movement and wildlife health in the SKRD and that NVCH and CHCN community members held this knowledge. Community members discussed that water agencies' knowledge did not extend into the SKRD:

> [SaskPower has] never done enough studies [in] regards [to] what effects… would take place on downstream and stuff like that. So it's always no good at all to me anyway. (Community Member 13)

> The people running the [EBCD] itself need to have more knowledge of how that water works after it leaves their turbines. I think they just don't know what effects they have just by turning that switch on and off. (Community Member 4)

> They just don't seem like they know what's going on outside of the dam. (Community Member 9)

They also discussed that they held valuable knowledge over water movement and wildlife health in the SKRD:

> [T]here is a lot of very knowledgeable people in the community. Yes they can tell you what is happening with the water system. They can tell you what is happening in the Delta where the Delta needs to be looked after. (Community Member 6)

> We've trapped or harvested fur throughout all those years that I've been out at the delta. So harvesting fur has been a big part of what we do. When you do that, of course you know about wildlife in your area and in the delta. So, we've been observing and monitoring that for our whole life. In those years I've probably had at least 500 hours of training [at] a minimum on the water throughout the delta so I've travelled the water ways quite extensively. (Community Member 4)

The implications of community members' descriptions was that if community members had some influence over EBCD decision-making, they could assist with better management of the water in the SKRD. For example, Community Member 6 indicated the community members could identify "what is happening with the water system" and "where the Delta needs to be looked after".

#### 3.5.1.3 How Is Discursive Power Expressed to Limit Influence?

Discursive power was expressed to limit influence when the Water Agency Discourse was dominant to the Community Discourse. The Water Agency Discourse appeared to dominate in the EBCD and the Community Discourse appeared to be a weaker expression of discourse. To date, Indigenous knowledge has played little to no role in decision making related to flows of the EBCD, even though community members feel they have valid knowledge that should be included in decision making. Structural power can explain how the Water Agency Discourse was dominant over the Community Discourse.

### 3.5.2 What Is the Relationship between Structural Power and Influence?

Structural power refers to the visible or invisible control over a policy agenda (Bachrach and Baratz 1962: Lukes 2005), as well as the ability to constrain individuals' or groups' ability to influence decision-making processes (Fuchs 2007). The documentation of structural power and its relationship to influence involved two analyses. A doctrinal research analysis of provincial water statutes and regulations was undertaken to determine how decision-making authority of the EBCD was legally distributed in Saskatchewan. A document analysis of informal policy was undertaken to understand how influence was or was not afforded to the community members in NVCH and CHCN.

This analytical approach revealed that structural power was apparent in the legal structure, EBCD dam license and SaskPower policy. Structural power reinforced the dominance of the WSA and SaskPower as the primary decision makers, articulated through structural power pathways that were mutually reinforced within the regulatory, license and policy structure. Within this structure, the power relations that were expressed failed to create pathways of influence for NVCH and CHCN. Moreover, attempts by the community to instigate their own pathways of influence were limited by a lack of transparency in decision-making authority as it relates to water flows and dam management.

#### 3.5.2.1 What is the Legal Framework for Dam Management in Saskatchewan?

A doctrinal research analysis, with additional interpretation supported by literature on water law in Saskatchewan, was used to identify the legal framework for hydropower management in Saskatchewan. Water management in Saskatchewan is jurisdictionally separated between the Saskatchewan Government and Canadian Government (Saunders and Wenig 2007). In 1930, the authority to manage surface and groundwater water not on federal crown land, including Indigenous Treaty Lands, was transferred to the Government of Saskatchewan (hereafter provincial government) through federal statute, known as the Natural Resources Transfer Agreement (1930) (Saunders and Wenig 2007). In 1978, the provincial government's authority to develop water resources for power generation was entrenched in provincial water law in the Saskatchewan Water Powers Act (1978). In the same year, the Saskatchewan Power Corporation and its mandate and responsibilities were entrenched in law in the Saskatchewan Power Corporation Act (1978).

In 1984, the enactment of the Saskatchewan Water Corporation Act (1984) created a water decision-making crown corporation with authority over surface and groundwater, known

as SaskWater. In 2002, the decision-making authority over surface and groundwater shifted to a newly created crown corporation known as the Saskatchewan Watershed Authority (Diaz et al. 2009). The Saskatchewan Watershed Authority was entrenched in law in 2005 within the Saskatchewan Watershed Authority Act (2005). In 2013, the Saskatchewan Watershed Authority was renamed as the WSA. The WSA was entrenched in law in the same year within the Saskatchewan Water Security Act (2013).

Throughout this time, however, decision-making authority over water resources on Indigenous Treaty Lands remained with the federal government. The provincial Saskatchewan Natural Resource Transfer Agreement (Treaty Land Entitlement) Act (1993), which ratified the federal statute, clarified that natural resources on Indigenous Treaty lands were not included:

> All lands included in Indian reserves within the Province, including those selected and surveyed but not yet confirmed, as well as those confirmed, shall continue to be vested in the [C]rown and administered by the Government of Canada for the purposes of Canada…[will] be administered by Canada in the same way in all respects as if they had never passed to the Province under the [Natural Resource Transfer Agreement]. (Saskatchewan Natural Transfer Resources Transfer Agreement (Treaty Land Entitlement) Act 1993).

Although the authority to manage water resources on Treaty Lands, such as the lands encompassing the CHCN, was not transferred to the province, the authority to administer water resources on non-treaty lands such as those inhabited by the NVCH was transferred to the WSA by the provincial government.

#### 3.5.2.2 Is Influence Addressed in the Formal Regulatory Structure?

The decision-making authority over surface and groundwater conferred to the WSA was detailed in Section 6 of the Water Security Agency Act (2013).[10] These responsibilities included

[10] Also in Hurlbert 2009.

the ability to regulate water flow, issue licenses, and undertake water management on non-treaty lands:

> In carrying out its mandate and fulfilling its purposes, the corporation *may*:
> (a) regulate and control the flow of water in any lake, river, reservoir or other water body in Saskatchewan;
> (b) receive and consider applications for, and issue, water rights licences and approvals to construct, extend, alter or operate works, and establish the terms and conditions of those licences and approvals;
> (c) promote, undertake and co-ordinate research, investigations, surveys, studies, programs and activities relating to:
> (i) the management, administration, development, conservation, protection and control of the water, watersheds and related land resources of Saskatchewan;
> (ii) conservation programs [Water Security Agency Act (2005)];

The authority detailed in Section 6(c) of the Saskatchewan Water Security Act (2013) seemed to provide an opportunity for members of the public to be involved in decision-making. The Water Security Act (2013) stipulated that activities relating to the "management, administration, development, conservation, protection and control of the water, watersheds and related land resources" could be undertaken. However, the development of a pathway of influence for those outside the WSA was only suggested and not mandated. Under Section 6 of the Water Security Act (2013), the WSA facilitated conservation programs where watersheds were managed by civil society groups (Hurlbert 2009), but no watershed management council existed in the SKRD. The central objective of these watershed councils was to draft and implement source water protection plans (Diaz et al. 2009).

The authority to regulate water flow for the purposes of generating power was under the jurisdiction of the provincial government within the Saskatchewan Water Power Act (1978) in Section 4:

> This Act applies:
> (a) to all provincial water powers;
> (b) to all provincial lands required in connection with the development or

working of those water powers, or for purposes incidental thereto. [Saskatchewan Water Power Act (1978)]

This act conveys significant authority to the WSA to flood and seize lands in the interest of developing water power. Section 10 and 11 of the Water Power Act (1978) describes these powers:

> S.10: Disposal of lands which may be submerged
>
> Where small areas only of any parcel or subdivision of provincial lands are required to be submerged along the bank of a stream in connection with any undertaking… the minister may dispose of such parcel or subdivision in accordance with the provisions of any other Act or regulation applicable to the disposal of such lands, reserving, however, the right at any time to raise the water surface to such elevation as may be required in connection with such undertaking. [Saskatchewan Water Power Act (1978)]

> S.11 Expropriation of lands by corporation
>
> If land or any interest therein is required by the corporation for any undertaking or is necessary for creating, protecting or developing any water power, the land or interest may be acquired by agreement or expropriated by the corporation pursuant to The Water Security Agency Act. [Saskatchewan Water Power Act (1978)][11]

The Saskatchewan Water Power Act (1978) allowed for, upon approval of the provincial government, a license to be granted to other agencies:

> S.7(1): Certain [licence], etc. to be approved by legislation
>
> **7**(1) No interest in any water power capable of developing more than 12,500 continuous horse power or in any land required for such undertaking or necessary for creating, protecting or developing such water power shall be [license] or otherwise granted or conveyed by the corporation under the provisions of this Act and the regulations, unless and until prior approval or subsequent ratification thereof has been given by the Legislature. [Saskatchewan Water Power Act (1978)]

The authority to dispose and expropriate lands was conveyed to an agency that was approved for a license to develop water for power generation.

> S 12(1) Taking of private lands by applicants
>
> A person who, in pursuance of this Act or the regulations, is authorized to carry out any undertaking may, after receiving written authority from the corporation, enter upon, use, occupy, take and acquire any lands other than provincial lands, or any interest therein that may, in the opinion of the minister, be required for such

[11] Corporation refers to the WSA.

> undertaking, and thereupon all the provisions of *The Expropriation Act* that are applicable to the taking and acquisition of lands shall apply as if they were included in this Act. [Saskatchewan Water Power Act (1978)]

The Saskatchewan Expropriation Act (1978) reinforced the authority of Sections 10, 11 and 12 in the Water Power Act (1978). The provincial government summarized how the Expropriation Act (1978) reinforced the authority in the Water Power Act (1978):

> The Expropriation Act authorizes the taking of real property by an expropriating authority under The Conservation and Development Act or The Water Power Act. *Expropriation involves the compulsory transfer of land or of any interest in land (including property attached to the land) to an expropriating authority in the exercise of the greater public interest.* In this case, the expropriating authority may acquire full ownership of the land or it may acquire a lesser interest, such as an easement, without the owner's consent, to allow construction and maintenance of works under those Acts: *to create, protect or develop any water power*; or to achieve environmental protection objectives by saving, conserving or developing any land or water resource. (Sask Justice 2012; emphasis added)

The regulatory structure was designed to allow the WSA significant authority to dispose of and expropriate land for the purposes of water power generation. Through Section 12(1) of the Water Power Act (1978), this authority is transferred to SaskPower as the licensee. The resultant structural power was expressed through the lack of regulation relating to public engagement in hydropower development, and, as a result, SaskPower does not have to share any of that structural power with others, including the communities affected in NVCH and CHCN. [12]

#### 3.5.2.3 Is Influence Addressed in the E.B Campbell Dam's License?

The EBCD's license, granted in 1985 to be retroactively applied to 1966, did not contain provisions for others to influence decision-making outside of SaskPower decision-making authority pursuant to the Saskatchewan Water Power Act (1978) [E.B. Campbell License

[12] One exception to this is the obligation of the Canadian Governments to Indigenous rights through the Constitutional Duty to Consult detailed in federal law. The Duty to Consult provides a possible influence pathway for CHCN but not strictly for NVCH. The Duty to Consult as a pathway for influence is not included in this analysis.

(1966)]. Specifically, it contained no reference for Indigenous people's engagement. Rather, the license was primarily concerned with the technical details related to the construction of the EBCD. The full license is available in Appendix V. .

#### 3.5.2.4 Is There an Influence Pathway in SaskPower's Informal Policies?

As detailed above, formal legislation and regulation afforded little opportunity for community member influence on water flow and dam management decision making, SaskPower's informal policies, such as their Aboriginal Relations Strategy, suggested a pathway for access to decision-making, but not influence. SaskPower stated within informal policies, such as the Aboriginal Relations Strategy, that access to decision-making was a critical component of SaskPower's operations:

> The importance of Saskatchewan's First Nations and Métis communities is reflected in SaskPower's comprehensive Aboriginal Relations Strategy, which provides a framework to build positive long-term relationships with Aboriginal communities and to enable the achievement of specific business objectives for our company. It supports Aboriginal economic development activities in Saskatchewan and promotes clear and open communication in response to social, economic and environmental issues that are of mutual concern. SaskPower's strategy focuses on four key areas: business development; community engagement; community investment; and employment. (SaskPower Annual Report 2014: 30)

However, informal policies, such as the Aboriginal Relations Strategy, contained no explicit reference to how NVCH and CHCN could advance their influence in decision-making related to the EBCD.

#### 3.5.2.5 Can Communities Identify Their Own Pathway of Influence?

NVCH and CHCN community members' abilities to advance a pathway to influence decision-making was complicated by a lack of transparency in the decision-making structure. The previous analysis in Section 3.5.2.2 illustrates that the locus of authority for water decision-making has not been straightforward in Saskatchewan, which has been apparent even to those

who possess that decision-making authority. Water Agency Member A explained this lack of transparency:

> My perception is that we don't have a very transparent process on how [water] decisions get made, and I think that's an individual, personal opinion on it having worked in this a little bit is that that is where the frustration comes. It is not very transparent. There is a lot of misunderstanding or lack of understanding how the pieces fit together, how things work together and it's not just within Saskatchewan, it's outside our borders as well. (Water Agency Member A)

The lack of transparency could be attributed to how the WSA and SaskPower's decision-making authority changed when water conditions changed. While this change was not clarified in the legal framework, it was apparent as an operating practice in water agency members' comments. During normal operation conditions (no extreme water volumes coming through the Saskatchewan River), SaskPower had the greatest day to day decision-making authority over how to operate the EBCD:

> Day to day under normal operating conditions, I would say that it's SaskPower. So at E.B. Campbell, it's what they call peaking station. So hydro is very quick to be able to respond to changes and fluctuating amounts of electricity. They can simply limit the amount of flow that's going to a turbine or turn one on or turn one off. So very quickly they can adapt and kind of ride that wave of fluctuating power needs. That's largely what they've used that for. That's actually controlled by what they call the GCC or the great control center out of Regina. They are the ones who day to day make the call how much water are we letting out. (Water Agency Member B)

> [SaskPower] manages the facility and the reservoir, in consultation with the Water Security Agency, who own the biggest storage facility on the Sask River system. I think it's SaskPower's responsibility to understand that we do have the biggest impact and should be accountable for our actions. (Water Agency Member F)

However, water agencies commented that the WSA had the greatest decision-making authority during extreme water conditions (e.g. flooding):

> When there is an extreme weather event that could compromise the integrity of the dam, [the WSA] would make that decision, but we would probably tell them because they have engineers that model flows and the flows. (Water Agency Member A)

> So, [the WSA] ultimately will manage water around that emergency event, but they will...we obviously have contact with them because we own the facilities that we have to open and close, do whatever to help achieve that requirement, but they are providing the direction. (Water Agency Member C)

Community members experienced a lack of transparency in the decision-making structure in the form of a change of access to decision-makers:

> Yet the people do make the decision in terms of water, they have changed. It used to be SaskPower now it's the Water Security Agency. So what is the point in meeting SaskPower when these guys regulate the water through [the EBCD]. Through some of these meetings and when we ask them to give us at least 25 cubic meters. "Oh we can't do that we are regulated by the Water Security Agency" Well what is the point. (Community Member 11)

Because there was no stable picture of who has decision making authority at a given time, it was difficult for community members to know where to target their efforts should they want to create their own pathway for influence.

### 3.5.3 What Is the Relationship Between Instrumental Power and Influence?

Evidence of explicit and current expressions of instrumental power were limited. Instrumental power referred to the visible and explicit means by which individuals or groups influenced beneficial outcomes (Lukes 2005). Instrumental power could be reflected in an unequal share of resources or the unequitable access to draw on resources (Brisbois 2015; Dahl 1957). Explicit expressions of instrumental power were apparent in SaskPower's capacity to implement structural power in the form of an Aboriginal Relations Strategy. Specifically, SaskPower's decision to implement quarterly meetings was an expression of instrumental power because SaskPower was able to draw on resources to hold regular meetings. These expressions of instrumental power were used in decision-making to instrumentally provide the opportunity for NVCH and CHCN to access decision-making. However, from the perspective of the

community members, these expressions of instrumental power did not provide influence over decision-making.

## 3.6 Discussion

Power relations can shape environmental management practices to limit meaningful participation (Akbulut and Soylu 2012; Brisbois 2015; Raik et al. 2008; Reed and McIlveen 2006). This chapter assessed whether meaningful participation existed for NVCH and CHCN in EBCD management and the extent to which expressions of structural, discursive and instrumental power were evident within EBCD decision-making. This chapter's findings included that meaningful participation, in the form of influence, was not present from the NVCH and CHCN community members' perspective. Quarterly meetings, facilitated by SaskPower, were opportunities for the community members to access, and experience standing in, decision-making. However, community members felt they were not able to influence EBCD decision-making outcomes. The lack of influence over EBCD decision-making stimulated frustration toward meetings with SaskPower. This frustration suggested that community members expected to be able to influence EBCD decision-making when they met with SaskPower.

Collaborative environmental decision-making literature calls for a more predominant role for power and recognition (Armitage et al. 2009; Brisbois 2015; Raik et al. 2008; Sandstöm 2009). This research used Lukes' (2005) theory of power to investigate how influence was affected by power relations in the interactions between SaskPower and NVCH and CVHN community members. An analysis of structural and discursive power led to insights about how power was expressed to constrain influence. As described in the power literature (Bachrach and Baratz 1962: Brisbois 2015; Dahl 1957; Lukes 2005), structural power can explain how influence is advanced or constrained in decision-making through the visible or invisible control

over a policy agenda. The legal structure gave SaskPower visible control over a policy agenda. This policy agenda included an Aboriginal Relations Strategy which did not accommodate for NVCH and CHCN community members' influence over EBCD decision-making.

Brisbois (2015: 53) argued that documenting power relations in environmental decision-making can provide a more "realistic" picture of the underlying conditions in the interactions between decision-makers and the public. This research advanced the collaborative environmental decision-making literature by documenting how power relations constrained the level of influence afforded to Indigenous people in dam decision-making. In addition, this research identified that there were divergent perspectives on the criticalness of influence in meaningful participation held by Saskatchewan water agencies and the NVCH and CHCN communities. SaskPower accommodated meaningful participation in the form of access and standing. The community members perceived meaningful participation in the form of influence. When influence was not secured, over a series of meetings, community members experienced frustration. Additionally, the Water Agency Discourse suggested that there was a limited space for meaningful participation in the form of influence. The privileging of the Water Agency Discourse was associated with the uncertain role for Indigenous knowledge in EBCD decision-making.

Investigating the relationship between power relations and influence provided a way to understand the interactions between government and Indigenous people over issues related to dam management. While collaborative environmental decision-making does not exist in the context of the SKRD, these findings could help collaborative environmental decision-making in two ways. First, if a collaborative pathway were pursued in the future, decision-makers should determine how the participants define meaningful participation. Second, power relations can

affect how meaningful participation is experienced by a range of participants in a collaborative arrangement. If a collaborative decision-making process were to be undertaken, then these power relations should be acknowledged and addressed. The implication is that meaningful participation could be advanced more effectively if meaningful participation is collectively understood by all participants and power relations are accounted for in potential collaborative decision-making approaches.

Future research related to collaborative environmental decision-making research should find practical ways to assess meaningful participation. Cross-cultural awareness of how meaningful participation might be defined differently and constrained by power relations in different ways may exist in other settings. Research investigating whether this is the case beyond the SKRD would be helpful in establishing a broader need to address these issues. Meaningful participation as access, standing and influence provided simple and practical language to assess meaningful participation from different perspectives. Further developing and using this language to address the role of Indigenous people in decision-making could help to collectively identify how their roles are understood and could be advanced. Additionally, as suggested by this chapter's findings, policies and policy-makers have a distinct role in expressing structural power to constrain (or enhance) meaningful participation in environmental decision-making. Environmental policy research should identify the ways that structural changes to dam management policies could secure meaningful participation, as it is defined by the populations who are discretely affected by dam management outcomes.

## 3.7 Conclusions

The findings of this chapter were that, in spite of water agency efforts to build relationships and an open dialogue with Indigenous communities in the SKRD, these

communities did not experience meaningful participation in dam decision-making. Furthermore, an investigation of power relations revealed that power relations constrained influence structurally and discursively. This research empirically identified how expressions of power in dam decision-making privileged a water agency perspective on meaningful participation. In this chapter, power relations have been proposed as an explanation of why meaningful participation is sometimes constrained for Indigenous people in collaborative environmental decision-making. As a result, collaborative environmental decision-making literature recommends that power relations should be given a more central role in empirical case studies on environmental decision-making.

Environmental decision-makers must pay attention to how Indigenous participants might define meaningful participation differently and how power relations might constrain (or enhance) locally defined meaningful participation in environmental decision-making. This chapter identified that meaningful participation was defined in the form of access and standing by water agency members and in the form of influence by community members. As a result of identifying that communities perceived meaningful participation in the form of influence, an investigation of power relations was also able to focus on how a community-defined meaningful participation was constrained.

The next chapter synthesizes the empirical findings of this thesis in relation to the notion of environmental justice. The findings are summarized to clarify an environmental justice pathway for NVCH and CHCN community members in relation to EBCD decision-making. In addition, this thesis's academic contributions and research limitations are identified. Lastly, adaptive co-management is presented as a potential avenue to advance environmental justice in the SKRD.

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# CHAPTER 4: ADVANCING ENVIRONMENTAL JUSTICE IN THE SASKATCHEWAN RIVER DELTA

## 4.0 Introduction

This thesis investigated the hypothesis that *attention to the meaningful participation of Indigenous people can help government representatives recognize Indigenous values to lead to a more equitable distribution of environmental benefits and burdens.* This thesis applied the notion of environmental justice (EJ) to frame an empirical investigation of how Indigenous people experienced environmental burdens, the extent to which Indigenous people's values could be recognized within decision-making processes and whether Indigenous people participated meaningfully in dam decision-making. In addition, this thesis explored how power relations were an underlying cause of environmental injustice.

The context for investigating this hypothesis was to explore how EJ could attenuate the range of environmental burdens attributed to E.B. Campbell Dam (EBCD) operations experienced by communities in the Saskatchewan River Delta (SKRD). Within this context, the research had three objectives:

1) To identify the range of environmental burdens experienced by SKRD communities from hydrological alteration;

2) To understand how power affected equity, participation and recognition in environmental decision making, and;

3) To propose a solution for advancing equity, participation and recognition in environmental decision making.

The following sections summarize the findings detailed in Chapters 2 and 3 and relate these findings to Objectives 1 and 2. In doing so, this chapter clarifies a pathway for advancing

EJ for Indigenous people in dam decision-making and describes how this pathway might be challenged by imbalances in power relations. An avenue for securing this pathway (Objective 3) is proposed later in this chapter. In sum, the findings related to Objectives 1 and 2 and the solution proposed as part of Objective 3 suggest that the hypothesis can be supported that with *attention to the meaningful participation of Indigenous people, government representatives may recognize Indigenous values to lead to a more equitable distribution of environmental benefits and burdens.*

## 4.1 Summary of Findings

Empirical findings from Chapters 2 and 3 addressed the concepts of recognition, meaningful participation and power. In Chapter 2, the findings identified a range of burdens attributed to EBCD operations experienced by community members in the Northern Village of Cumberland House (NVCH) and the Cumberland House Cree Nation (CHCN) within the SKRD. In Chapter 3, the findings suggested that imbalances in power relations were constraining meaningful participation from the perspective of the NVCH and CHCN community members. To render the invisible losses more visible, the power imbalances that drive the lack of meaningful participation must be addressed. The implication of these findings is that, once invisible losses and their drivers are recognized, they can then be remediated more effectively.

Chapter 2 provided an empirical example of how the cross-cultural recognition of environmental burdens (Objective 1) could lead to an increased awareness of complexity and uncertainty in how dam management outcomes are experienced by Indigenous people. This chapter focused on how EBCD altered flows to meet peak power demands in the province, an outcome of dam operation known as hydropeaking. The cross-cultural recognition of environmental burdens of hydropeaking was advanced through a place-based, two-eyed seeing

methodological approach. Using this approach, two complementary perspectives on the outcomes of hydropeaking were identified: a western science perspective and an Indigenous knowledge perspective. A western science perspective described the burdens of hydropeaking as the unnatural daily and seasonal fluctuations in river discharges. An Indigenous knowledge perspective understood these burdens in relation to the identity of the NVCH and CHCN community members including cultural and lifestyle losses, economic losses and lost opportunities, knowledge losses, and a loss of identity. Combining these perspectives, using a two-eyed seeing approach, reconceptualised these burdens as invisible losses. A significant and seemingly cumulative invisible loss caused by hydropeaking was experienced by NVCH and CHCN community members as a loss of identity. This loss of identity described the separation of a human-nature connectivity as part of community members' identities.

While Chapter 2 described how recognition could be achieved through meaningful participation, Chapter 3 provided an empirical example of how power relations that limit meaningful participation were expressed (Objective 2). This chapter focused on whether meaningful participation was present in the interactions between Saskatchewan water agencies and the NVCH and CHCN communities, and how power relations might affect meaningful participation. To investigate the relationship between power relations and meaningful participation, Lukes' (2005) theory of power was applied to document and interview data. Meaningful participation was not found to be present in the interactions between Saskatchewan water agencies and the NVCH and CHCN communities. Additionally, the NVCH and CHCN communities and Saskatchewan water agency members held divergent perspectives on the criticalness of influence in advancing meaningful participation. For instance, the Indigenous communities sought influence over EBCD decision-making, while Saskatchewan water agency

members promoted access and standing to EBCD decision-making, but not influence. Power was expressed by water agencies discursively and structurally to constrain influence. Discursive power effectively limited influence as a Water Agency Discourse dominated the Community Discourse. The Water Agency Discourse involved the perspective that there was a limited space in EBCD decision-making for the NVCH and CHCN to influence decision-making because EBCD decision-making was a smaller component of a larger basin-wide decision-making process. Furthermore, water agency members were uncertain about how Indigenous knowledge could be used within a limited space in EBCD decision-making. The Community Discourse involved the perspective that SaskPower managed the EBCD to satisfy upstream interests and consequently harm community members' interests. Furthermore, community members identified that they held useful knowledge about how their interests were harmed and suggested that community members could provide this knowledge to assist with producing better EBCD management outcomes. Structural power was expressed through the lack of regulated public engagement in Saskatchewan water law and a lack of action in SaskPower's policies to voluntarily develop a pathway for how the NVCH and CHCN community members might be able to influence EBCD decision-making. As a result, from the community members' perspective, meaningful participation was limited because influence was constrained by discursive and structural power relations.

This thesis's findings suggest a pathway for the advancement of EJ for the NVCH and CHCN communities. EJ involves three goals: equity, recognition and participation (Schlosberg 2004). To potentially advance equity, invisible losses experienced by NVCH and CHCN communities require recognition before they can be remediated. To advance recognition, the NVCH and CHCN would require meaningful participation. However, participation, as access,

was experienced negatively by NVCH and CHCN community members. For participation to be meaningful for NVCH and CHCN community members, it would have to include the influence of the NVCH and CHCN community members on decision-making. To advance meaningful participation, power relations that constrain influence would need to be taken into account and addressed. These dynamics include discursive power expressions that limit influence and structural power expressions that facilitate a lack of action toward defining how influence could be secured. For instance, when the Saskatchewan regulatory structure did not define a pathway of influence for the members of the public like the NVCH and CHCN community members, structural power was expressed when SaskPower failed to include the potential for others to influence EBCD decision-making in EBCD's license or in their policies. These findings suggest that an EJ pathway might be advanced if NVCH and CHCN were granted some influence in EBCD decision-making processes in a way that could contribute to the recognition and remediation of invisible losses attributed to EBCD management in the SKRD.

### 4.2 Adaptive Co-Management as a Potential Solution (Objective 3)

A primary characteristic of adaptive co-management is to share influence over decision-making authority among participants (see Armitage et al. 2009; Olsson et al. 2004). Co-management is defined as a collaborative decision-making approach in which government agencies share knowledge, power and resources to manage the environment together (Armitage et al. 2009; Berkes 2009; Olsson et al. 2004; Plummer et al. 2013). Co-management is undertaken adaptively when participants learn from one another and are flexible to changing social and environmental conditions.

Sandström (2009: 233) argues that "power-sharing is a key component of the definition of comanagement [sic], and it is often assumed that all of the principal actors involved must have

a degree of influence in order to define a situation as a comanagement [sic] arrangement." As a result, adaptive co-management would involve securing a level of *influence* of decision-making for NVCH and CHCN. For instance, adaptive co-management would provide a decision space where NVCH and CHCN can help define problems and solutions and integrate cross-cultural recognition of participants' values. Findings from this thesis suggest that power relations and recognition would need to be taken into account should a solution like adaptive co-management be viable for Saskatchewan water agencies and the NVCH and CHCN communities. Armitage et al. (2009: 100) discuss some of the potential outcomes of adaptive co-management when this model allows for meaningful participation, which include:

1) Greater recognition of different needs and an emphasis on distribution of resources;

2) Ongoing effort to build on culturally-sensitive, formal and informal rules and norms;

3) Trust-building and learning from each other;

4) Accommodation of different types of knowledge and development of these knowledges among participants; and

5) Enhanced capacity for organizations to respond proactively to uncertainty.

These outcomes align with the pathway for advancing EJ for the NVCH and CHCN communities. To advance recognition, an adaptive co-management solution could lead to greater recognition of losses attributed to EBCD supported by culturally-sensitive, formal and informal rules and norms. To advance meaningful participation, the influence shared by water agencies and community members in adaptive co-management could accommodate both Indigenous knowledge and western science. To advance equity, shared influence would generate an enhanced capacity for Saskatchewan water agencies to respond proactively to remediate the disproportionate environmental burdens the NVCH and CHCN communities' experience.

Adaptive co-management is one solution that may help to advance EJ for NVCH and CHCN communities, but it may not be viable. It is my opinion that Saskatchewan water agencies and NVCH and CHCN need to find more effective and culturally-sensitive ways to work together to preserve the SKRD. This research suggests that water is not only a fundamental source of fuel for SaskPower and its customers, but is also a major component of NVCH and CHCN community members' identities. In addition, the SKRD serves a vital role providing broadly shared benefits to Saskatchewan populations through flood mitigation (Gober and Wheater 2014). As a result, the Saskatchewan water agencies and NVCH and CHCN have a significant interest and responsibility in preserving the SKRD.

Lynch *et al*. (2013) demonstrated that a common goal could be identified by understanding differences and similarities among Indigenous and non-Indigenous peoples' demands on a river system. This thesis provided a preliminary understanding of some differences between water agencies and Indigenous communities. Greater attention should be paid to how water agencies and Indigenous communities could develop a shared vision for the SKRD. Community Member 7 identified a need for a shared vision:

> [I] think…if [communities and agencies] could come to a mutual understanding…[F]rom the people meeting us downstream [to] the powers that be and the needs of humanity, if we could come to an understanding and meet in the middle, I think that all of this conflict wouldn't be as bad as it is… Hey, I'm not opposed to, you know, [hydrodevelopment]. But let's be careful. Let's look at, you know, what we should not try and destroy. Because if we destroy [the SKRD], I think, if there's no water, there's no power. If we destroy it all, what are we going to do? You know, we'll be stuck.

Sharing a cross-cultural vision could lead to more effective and durable EBCD management and to the advancement of EJ for the NVCH and CHCN.

## 4.3 Summary of Contributions

A major contribution of this research was to provide empirical evidence of an underlying cause for environmental injustice for the NVCH and CHCN. Several empirical and theoretical studies (Cutter 1995; Mascarenhas 2007; McLean 2007; Mohai et al. 2009; Shrader-Frechette 2002) have argued that Indigenous populations often bear the brunt of environmental burdens. While some of these studies (e.g Mascarenhas 2007; McLean 2007) discussed why environmental injustice was experienced by Indigenous populations, Schlosberg (2004) and Neimanis et al. (2012) identified that empirically addressing the underlying causes for environmental injustice remained underexplored. This thesis, through an investigation of power relations, documented the ways that Saskatchewan's water statutes and the EBCD license constrained decision making authority to the Saskatchewan Water Security Agency and SaskPower. Furthermore, meaningful participation in the form of influence was not implemented through SaskPower's informal policies. As a result, this thesis has contributed to the literature on environmental injustice and moved it forward by answering the call of Neimanis et al. (2012) to provide an empirical basis for investigating which power relations were an underlying cause for environmental injustice.

Similarly, this research contributed to literature on collaborative environmental decision-making by addressing power relations in more systematic ways (Armitage et al. 2009; Brisbois 2015; Sandstöm 2009). Scholarship on collaborative environmental decision-making research has identified that power plays a role in constraining (or enhancing) meaningful participation in equitable decision-making (Armitage et al. 2009; Brisbois 2015; Reed and McIlveen 2006; Sandstöm 2009). While collaborative environmental decision-making research has addressed the *possible* relationship between power and meaningful participation (Armitage et al. 2009;

Sandstöm 2009), the findings presented in Chapter 3 systematically documented how power constrained influence in meaningful participation (also in Brisbois 2015). If a collaborative decision-making model in the SKRD were pursued, my research suggests an influence pathway that accounts for existing power relations would need to develop. This chapter advanced the collaborative environmental decision-making literature by documenting how power relations constrained the level of influence afforded to Indigenous people in dam decision-making.

Two other related academic contributions were made in this thesis. First, it furthered a methodological contribution to the two-eyed seeing literature. Two-eyed seeing is a relatively new methodological approach used to provide equitable space for western science and Indigenous knowledge in environmental problem research (Aikenhead and Michell 2011) and there is little empirical research on this topic. This thesis contributed to a two-eyed seeing methodology by demonstrating how Indigenous understanding is separate from and yet an equally legitimate way of understanding dam management when compared to a western science perspective. Data from a western science perspective and Indigenous knowledge perspective were treated as equally valid, which resulted in a cross-cultural description of the adverse impacts to EBCD management as invisible losses. This chapter advanced two-eyed seeing literature by demonstrating that a place-based, two-eyed seeing approach can be used to render visible hidden complexities and uncertainties in the outcomes of dam management, such as the relationship between hydropeaking and identity loss.

Second, this thesis contributed contemporary empirical evidence of the downstream losses resulting from hydropeaking. Previous studies stating the existence of downstream burdens to EBCD operation (Bartlett 1989; Goulet 2013; Massie and Reed 2013; Waldram 1988; Waldram 1989; Gober and Wheater 2014) did not empirically identify these burdens. This

research provided evidence that suggested both the Gardiner Dam and Lake Diefenbaker and the EBCD could be contributing to seasonal burdens in the SKRD. The Gardiner Dam and Lake Diefenbaker contribute to seasonal modifications from a western science perspectives (Gober and Wheater 2014). By contrast, the EBCD created seasonal environmental burdens from an western science and Indigenous knowledge perspectives. These environmental burdens stemmed from the daily and weekly water fluctuations related to how NVCH and CHCN community members use the SKRD differently depending on the season.

### 4.4 Summary of Limitations

There are several shortcomings in my research that should be acknowledged. First, a significant limitation to the use of Indigenous knowledge in documenting invisible losses was that it may have been misinterpreted. I am not Indigenous and have not lived in the SKRD to experience the extent to which invisible losses have occurred over time. I applied my western science training, for example in conducting interviews, to collect the comments and stories provided by Indigenous community members. I attempted to validate my understanding of community members' comments and stories through follow-up questions during interviews and results presentations to the community, and I presented them in an equitable research space using two-eyed seeing. Ultimately, however, the Indigenous knowledge used in this analysis was mediated by my training and the knowledge system that is part of my identity.

Second, the analysis in Chapter 3 relied heavily on interview data. Data were analyzed using the theoretical concepts of structural, instrumental and discursive power. These concepts included implicit challenges to being analyzed empirically (see Brisbois 2015) – especially those related to instrumental and discursive power. Instrumental power could refer to the explicit and intentional behaviour of coercion, manipulation and diversion (Lukes 2005). An interviewing

technique may have produced limited results on instrumental power because interviews involved emotionally-charged discussions with community members and included questions with legal implications to water agencies. As a result, participants may not have been willing to share information on their expressions of instrumental power. Discursive power referred to the invisible ways individuals or groups, perspectives and knowledge are privileged as a result of discourse (Fuchs 2007; Lukes 2005). The analysis of discursive power, by definition, suggests problems of reliability in empirically assessing discourse because of its subtleties.

The findings in this research are limited to analytical generalization and do not support statistical generalization given its qualitative focus. Analytical generalization refers to the inference of relationships between variables to other cases that may have similar features (Tsang 2014). Statistical generalization refers to the extrapolation of empirical findings of a case study to the population from which the case is drawn and to other populations (Tsang 2014). The key difference between statistical generalization and analytical generalization is that, with analytical generalization, findings are used to provide a theoretical explanation of a phenomena, rather than identifying the statistical probability of a phenomena (Tsang 2014). Findings from this research, by design, are limited in their statistical generalizability because the qualitative methodology of this research supported the goal to identify a range of phenomena relating to EBCD management (e.g. environmental burdens, power relations) and not the statistical prevalence of these phenomena. As a result, findings from this research cannot be generalized to say, for example, that environmental burdens from hydropeaking are statistically probable to an identifiable extent in cases where hydropeaking is a practice in dam management. However, indicative of analytical generalization, findings from this research can be generalized to say that

environmental burdens to hydropeaking existed in this case and may be understood similarly in other cases, upon further empirical research.

Analytical generalization from this research's findings includes the ability to develop lessons to be considered in other similar contexts (see Tsang 2014). A theoretical relationship between meaningful participation, recognition and power was developed. This theoretical relationship was that meaningful participation could help with the recognition, and, hence, remediation of invisible losses to dam management, but power was expressed to limit meaningful participation. This theoretical relationship can guide a practical understanding for how meaningful participation, recognition and power might inter-relate in dam management in this case and in other contexts that involve dam management and downstream Indigenous people. This theoretical relationship can then be empirically tested in other contexts to see if it is generalizable.

### 4.5 Significance for Environmental Justice

The advancement of EJ for NVCH and CHCN communities in relation to EBCD decision-making was significant for four reasons that, when combined, could explain how the dimensions of EJ might relate in the context of this case and in other contexts. First, this research was significant in providing an empirical description of how the NVCH and CHCN community members experienced environmental burdens disproportionately, a goal related to equity in EJ literature. Second, this research identified how these burdens may persist by describing that community members perceived their participation as less meaningful in dam decision-making, a goal related to participation in EJ literature. Third, this research described how the accurate recognition of the rights, values and demands of NVCH and CHCN community members could be advanced in EBCD decision-making, a goal related to recognition in EJ

literature. Fourth, this research was significant by describing why equity issues, resulting from the lack of recognition and meaningful participation for NVCH and CHCN community members, may have persisted through imbalances in power relations, a goal related to the identification of the underlying causes of environmental injustice. The result is that this research described how EJ might be advanced by empirically explaining how equity, participation, recognition and power are inter-related (see Schlosberg 2004). Finally, this thesis argued that adaptive co-management could advance EJ in this case because researchers have found that sharing decision-making authority with diverse participants can lead to better management outcomes (Olsson et al. 2004).

### 4.6 Recommendations for Future Research

Future research could support how Saskatchewan water agencies and the NVCH and CHCN implement an influence pathway through a solution like adaptive co-management. If adaptive co-management is viewed as a viable alternative, future research could explore how Saskatchewan water agencies and NVCH and CHCN negotiate structural rules and navigate expressions of discursive power. For instance, water agencies and the NVCH and CHCN would need to negotiate the appropriate role of Indigenous knowledge in decision-making.

More broadly, future collaborative dam decision-making research should build cross-cultural knowledge on how interests in equity from both upstream populations and downstream Indigenous people can be accommodated in dam decision-making. This research empirically assessed the environmental burdens downstream, but did not do so in relation to the benefits or burdens experienced upstream. A greater understanding of how burdens and benefits relate to one another is necessary to build a more comprehensive picture of equity. If collaborative environmental decision-making is to facilitate a more equitable distribution of environmental

benefits and burdens through increased influence for Indigenous people, future research should continue to explore how regulatory and policy structures could mandate shared decision-making authority between governments and Indigenous people. Such research would support an understanding of how recognition can change discourse surrounding the capacity of Indigenous people to effectively influence dam decision-making.

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# APPENDIX I: BEHAVIOURAL RESEARCH ETHICS CERTIFICATE OF APPROVAL

UNIVERSITY OF SASKATCHEWAN

Behavioural Research Ethics Board

**Certificate of Approval**

| PRINCIPAL INVESTIGATOR | DEPARTMENT | BEH# |
|---|---|---|
| Todd A. Steelman | School of Environment and Sustainability | 14-252 |

INSTITUTION(S) WHERE RESEARCH WILL BE CONDUCTED

SUB-INVESTIGATOR(S)
Timothy D. Jardine, Renee Carriere

STUDENT RESEARCHER(S)
Evan Andrews

TITLE
Perceptions of Water Quantity and Quality in the Saskatchewan River Delta

| ORIGINAL REVIEW DATE | APPROVAL ON | APPROVAL OF: | EXPIRY DATE |
|---|---|---|---|
| 04-Jul-2014 | 11-Jul-2014 | APPLICATION FOR BEHAVIORAL RESEARCH ETHICS REVIEW<br>PARTICIPANT CONSENT FORM - CANOE TRIP<br>RESEARCH PARTICIPANT NOTICE - CANO TRIP<br>PARTICIPANT CONSENT FORM<br>TRANSCRIPTION/PHOTO RELEASE FORM<br>PARTICIPANT CONSENT FORM - COMMUNITY MEMBERS<br>INTERVIEW GUIDE - STAKEHOLDERS AND RIGHTS HOLDERS | 10-Jul-2015 |

Full Board Meeting ☐ Delegated Review ☒

**CERTIFICATION**

The University of Saskatchewan Behavioural Research Ethics Board has reviewed the above-named research project. The proposal was found to be acceptable on ethical grounds. The principal investigator has the responsibility for any other administrative or regulatory approvals that may pertain to this research project, and for ensuring that the authorized research is carried out according to the conditions outlined in the original protocol submitted for ethics review. This Certificate of Approval is valid for the above time period provided there is no change in experimental protocol or consent process or documents.

Any significant changes to your proposed method, or your consent and recruitment procedures should be reported to the Chair for Research Ethics Board consideration in advance of its implementation.

**ONGOING REVIEW REQUIREMENTS**

In order to receive annual renewal, a status report must be submitted to the REB Chair for Board consideration within one month of the current expiry date each year the study remains open, and upon study completion. Please refer to the following website for further instructions: http://www.usask.ca/ethics/ongoing_review/

Please send all correspondence to:

Research Ethics Office
University of Saskatchewan
Box 5000 RPO University, 1602-110 Gymnasium Place
Saskatoon SK S7N 4J6
Telephone: (306) 966-2975 Fax: (306) 966-2069

# APPENDIX II: INTERVIEW GUIDE

*Introduction/Demographics*

1. What is your name?

2. How old are you?

3. Do you hunt in the Delta? Trap? Fish?

4. Please list any other purposes for which you use the Delta? *(eg recreation, ceremony)*

5. How would you describe your relationship with the land/delta? *(if participant has been interviewed by R. Abu, skip questions 3 and 5)*

*Environmental Flows*

*Transition: Now I would like to discuss water flows in the Saskatchewan River Delta.*

6. I thought we would start with a type of question that you answer on a scale. The possible responses are not at all, slightly, moderately, significantly, and extremely. How much have flows changed in the last 50 years? (not at all, slightly, moderately, significantly, extremely)

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Not at all | Slightly | Moderately | Significantly | Extremely |

7. You have indicated that flows have changed _____ in the last 50 years. Can you please describe those changes?

8. You have indicated that you __(eg fish)____ in the Delta. How have __(eg moderate)__ changes to flows impacted those activities?

    - What time of the year are those impacts most likely to happen?

9. Research scientists have suggested that one long-term trend is that the Delta is drying out. Do you agree?

    - Why do you think this is?
    - Are there any other reasons you think might be causing this change? If yes please describe.

*E.B. Campbell Dam and Flows*

*Transition: Now we are going to talk about flows in relation to the E.B. Campbell Dam. Some questions relate to how decisions are made and some relate to the flows, in particular how much and when water is being released from the E.B. Campbell Dam. These questions can be a bit technical and it is okay if you do not know the answer.*

10. What agency or agencies do you think is responsible for making decisions about how flows are released from the E.B. Campbell Dam? Any specific individuals?

    - What other agencies or individuals *should* be involved in determining how flows are released from the E.B. Campbell Dam.

11. What do you think are the reasons for deciding **how much** water is released?

12. What do you think are the reasons for deciding **when** flows are released?

13. I am now going to show a chart that I would like you to help me fill out. On the template, during low water times of the year (late summer, fall, and winter) identify how much water you *believe* is being released and when. *(Use Form 1)*

14. I am going to ask a scale question again. Please answer either very satisfied, satisfied, dissatisfied or very dissatisfied. How satisfied are you with **when** water is released from the E.B. Campbell Dam? Are you very satisfied, satisfied, dissatisfied or very dissatisfied.

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| Very Dissatisfied | Dissatisfied | Satisfied | Very Satisfied |

    - Why are you _____ with **when** water is released from the E.B Campbell Dam?

15. On a scale of very satisfied to very dissatisfied, how satisfied are you with **how much water** is being released from the E.B. Campbell Dam?

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| Very Dissatisfied | Dissatisfied | Satisfied | Very Satisfied |

    - Why are you _____ with **how much** water is released from the E.B. Campbell Dam?

16. Using the same template as we did before and the same time frame (late summer, fall and winter), what kind of flows would you *like to see* in the future *(Use Form 2)*?

    - You have identified that there are __eg: low flows___ during the __early morning__, but indicated that you preferred ____eg: high flows___ in _eg: in the early morning_. Why do you prefer to have _____ at that time? *(question can be repeated for any major differences between Form 1 and 2).*

17. Now I am going to ask you about flows between high water times of the year between spring and mid-summer. In which years within the last ten years (2004-2014) did water managers *(or who they identify in question 11)* do the best job in managing how much water is released from the E.B. Campbell Dam?

- Why?
- Was this a flood or drought year? Part of a flood or drought cycle?

18. In which years within the last ten years (2004-2014) could water managers have done a better job in managing how much water is released from the E.B. Campbell Dam?

    - Why?
    - Was this a flood or drought year? Part of a flood or drought cycle?

19. Do you consider floods to be a good thing or a bad thing for the Delta?

    - Why/Why not?

*Decision-Making*

*Transition: We have talked about flows and the E.B. Campbell Dam. I would like to shift a little to talk about decision-making in relation to flows and the E.B. Campbell Dam.*

20. The E.B. Campbell Dam is due for relicensing in 2015. At present, the Province is developing a process for "relicensing". What do you know about the relicensing process?

    - What agencies are involved in this process? Specific individuals?
    - What agencies should be involved in this process?
    - Why?

*Stakeholder Engagement*

21. In the last three years (2011-2014), how often have you been in contact with the Water Security Agency?

| # |
|---|

    - How did this contact come about? (who initiated it?)
    - Did you approach the agency? Were they willing to meet?
    - Who did you meet with/talk to?
    - Where was this consultation?
    - Do you feel you were heard during this consultation?
    - Did they make changes based on your opinion?

22. Please pick three words/terms that would best describe the contact that you have had to express you opinion with the Water Security Agency.
    _____, _____, and _____

23. In the last three years (2011-2014), how often have you been in contact with **SaskPower**?

#

- How did this this contact come about? (who initiated it?)
- Did you approach the agency?
- Where was this consultation?
- Who did you meet with/talk to
- Do you feel you were heard during this consultation?
- Did they make changes based on your opinion?

24. Please pick three words/terms that would best describe the contact you have had to express you opinion with **SaskPower**.

    _____, _____, and _____

25. Is there anything I should have asked you about flows or dam relicensing that I did not ask you?

Form 1: Perceptions of Current Flows

| Time Period | No Flow | Low Flow | Medium Flow | High Flow | Notes |
|---|---|---|---|---|---|
| Early Morning Weekday | | | | | |
| Late Afternoon Weekday | | | | | |
| Weekend | | | | | |

Form 2: Desired Flows

| Time Period | No Flow | Low Flow | Medium Flow | High Flow | Notes |
|---|---|---|---|---|---|
| Early Morning Weekday | | | | | |
| Late Afternoon Weekday | | | | | |
| Weekend | | | | | |

APPENDIX III: LIST OF DOCUMENTS

| Documents Reviewed for Chapter 3 r | Reference | Role in Chapter 3 |
|---|---|---|
| Cumberland House Teaching Module (2005) | Dorian, L., and Paquin, T. 2005.“Cumberland House.” [Teaching Module]. Cumberland House. | Explicitly used in methods |
| E.B. Campbell License (1966) | E.B Campbell License Pursuant to Saskatchewan Water Power Act, Revised Statutes of Saskatchewan (1978, c. W-6). | Explicitly used in analysis |
| Saskatchewan’s Safe Drinking Water Strategy (1999) | Government of Saskatchewan (1999). “Saskatchewan’s Safe Drinking Water Strategy.” Regina. | Reviewed for context but not explicitly used |
| History and Culture Report – Cumberland House (1974) | McKay, V., Carriere, J., Dorian, P., and Deschambault, M. (1974). “History and Cultural Report – Cumberland House.” Cumberland House. | Reviewed for context but not explicitly used |
| Compensation Notice to Local Trapper (1995) | SaskPower (1995). “Trapper/Fishermen Equipment Compensation Program.” Regina. | Reviewed for context but not explicitly used |
| SaskPower Annual Report (2014) | SaskPower (2014). “SaskPower Annual Report 2014.” Regina. | Explicitly used in analysis |
| Saskatchewan Water Corporation Act (2002) | Saskatchewan Water Corporation Act, Statutes of Saskatchewan (2002, c. S-35.01) | Explicitly used in analysis |
| Saskatchewan Water Power Act (1978) | Saskatchewan Water Power Act, Revised Statutes of Saskatchewan (1978, c. W-6). | Explicitly used in analysis |
| Saskatchewan Water Security Act (2013) | Saskatchewan Water Security Act, Revised Statutes of Saskatchewan (2005, c. W-8.1). | Explicitly used in analysis |
| Saskatchewan Watershed Authority Act (2005) | Saskatchewan Watershed Authority Act, Revised Statutes of Saskatchewan (1978, c. W-11). | Explicitly used in analysis |
| The Saskatchewan Natural Resources Transfer Agreement (Treaty Land Entitlement) Act 1993). | The Saskatchewan Natural Resources Transfer Agreement (Treaty Land Entitlement) Act, Statutes of Saskatchewan (1993, c. S-31.1). | Explicitly used in analysis |

APPENDIX IV: CODES FROM QUALITATIVE ANALYSIS

**Codes Used in Chapter 2**

| Themes | Codes | Operationalization | Sub-codes | Operationalization |
|---|---|---|---|---|
| Invisible Losses | Cultural and Lifestyle Losses | Discussion of losses to culturally critical wildlife and fish and opportunities to harvest wildlife and fish in traditional ways | Cultural Losses – Animal Declines | Discussion of animal population declines resulting from EBCD |
| | | | Cultural Losses – Beaver Declines | Discussion of beaver population declines resulting from EBCD (e.g frozen houses) |
| | | | Cultural Losses – Fish Declines | Discussion of fish population declines resulting from EBCD |
| | | | Cultural Losses – Moose Drowning | Sightings of moose drownings in high rivers flows |
| | | | Lifestyle Losses – Disrupted Navigation Summer and Spring | Stories of obstacles to the navigation of the SKRD in the summer and spring |
| | | | Lifestyle Losses - Disrupted Navigation Fall and Winter | Stories of obstacles to the navigation of the SKRD in the fall and winter |
| | Economic Losses And Lost Opportunities | Discussion of losses to income and opportunities to earn money outside of the communities, in the SKRD | Economic Losses – Equipment Damage | Descriptions of situations where equipment (e.g snowmobiles or dog sleds) were damaged because of water fluctuations |
| | | | Economic Losses – Impact from Trapper, Hunter and Fisher Losses in the Community | Descriptions of the relationship between less income from trapping, hunting and fishing to income in the communities |

| | | | | |
|---|---|---|---|---|
| | | | Economic Losses from Decreased Trapping, Hunting or Fishing | Descriptions of less income from trapping, hunting and fishing |
| | | | Lost Opportunities – Trappers Going South | Descriptions of how trappers have a reduced capacity to trap in the SKRD and now trapping in more southern regions. |
| | | | Lost Opportunities – Outfitting Losses | Stories of how outfitting has changed because of the EBCD |
| | Knowledge Loss | Discussion of loss of knowledge and less opportunities to tell stories about the SKRD | Knowledge Loss in Younger Generations | Descriptions of less Indigenous knowledge (e.g. knowledge of culturally critical wildlife; opportunities for trapping, hunting and fishing; places to hunt, fish and trap) in younger generations |
| | | | Opportunities for Knowledge Transmission | Stories of how the SKRD provided interaction between generations where storytelling and SKRD descriptions where transmitted |
| | | | Constraints on Opportunities for Knowledge Transmission | Descriptions of how interactions between generations (e.g storytelling and place-descriptions) have decreased |
| | Identity Loss | Descriptions of impacts from EBCD to an identity shared by | SKRD Identity – Human-Nature Connectivity | Descriptions of the connection between culture and lifestyle to biophysical |

| | | | | |
|---|---|---|---|---|
| | | community members | | features or wildlife in the SKRD |
| | | | Importance of Identity | Descriptions of the community members' relationship to the biophysical and wildlife are significant to community members |
| | | | Current Identity Loss | Descriptions of how changes to the SKRD are leading to identity loss |
| | | | Prospective Identity Loss | Descriptions of the potential impacts to the SKRD would be experienced as identity losses |

**Codes Used in Chapter 3**

| Themes | Codes | Operationalization | Subcodes | Operationalization |
|---|---|---|---|---|
| Access | Access Enhanced | Descriptions of how access to decision-making has increased through explicit or implicit efforts | Access Enhanced - SaskPower | Descriptions of how SaskPower has enhanced access to decision-making |
| | | | Access Enhanced-Communities | Descriptions of how communities have enhanced their own access to decision-making |
| | | | Access Situations | Increase in access situations |
| | Access Constrained | Descriptions of how access to decision-making has increased through explicit or implicit efforts | Access Constrained - SaskPower | Descriptions of when access was constrained by SaskPower |
| | | | Access Constrained-WSA | Descriptions of when access was constrained by the WSA |

| | | | | |
|---|---|---|---|---|
| | | | Access Constrained-Other | Descriptions of when access situations were constrained by other factors (ie not by SaskPower, WSA or Communities) |
| | Access Desired for Communities | Descriptions of how access to decision-making should be increased through explicit or implicit efforts | Access Desired for Communities – By Communities | Descriptions of a desire for access for communities by communities |
| | | | Access Desired for Communities – SaskPower | Descriptions of a desire for access for communities by SaskPower |
| | | | Access Desired for Communities – By WSA | Descriptions of a desire for access for communities by the WSA |
| | Access Not Desired for Communities | Descriptions of how access to decision-making is not desirable for communities | Access Not Desired for Communities – By Communities | Descriptions of access for communities not desired by communities (e.g. prefer compensation) |
| | | | Access Not Desired for Communities – By Water Agencies | Descriptions of access for communities not perceived by communities (e.g. prefer compensation) |
| | Access Pathway | Descriptions of the barriers and opportunities to promote access in situations | Access Barriers | Descriptions of obstacles to greater access |
| | | | Access Opportunities | Descriptions of situations that would enhance access |
| Standing | Standing Enhanced | Descriptions of situations where standing could be increased | Standing Enhanced - SaskPower | Descriptions of how standing could be enhanced for communities by SaskPower |

| | | | | |
|---|---|---|---|---|
| | | | Standing Enhanced- Communities | Descriptions of how standing could be enhanced for communities by communities |
| | | | Standing Enhanced- Other | Descriptions of how standing could be enhanced for community by other factors (ie not by SaskPower, WSA or Communities) |
| | Standing Constrained | Descriptions of situations where standing could be decreased | Standing Constrained - SaskPower | Descriptions of how standing could be constrained for communities by SaskPower |
| | | | Standing Constrained-WSA | Descriptions of how standing could be constrained for communities by WSA |
| | Standing Pathway | Descriptions of the barriers and opportunities to promote standing in situations | Standing Barriers | Descriptions of obstacles to greater standing |
| | | | Standing Opportunities | Descriptions of opportunities to greater standing |
| Influence | Influence Enhanced | Descriptions of situations where influence is increased | Influence Enhanced- Communities | Descriptions of how influence is advanced for communities by communities |
| | | | Influence Enhanced in Situations | Descriptions of situations where influence is enhanced |
| | | | Influence Desired for Communities – By Communities | Descriptions where influence is desired for communities by communities |
| | Influence Constrained | Descriptions of situations where | Influence Constrained - SaskPower | Descriptions of how influence is constrained for |

| | | | | |
|---|---|---|---|---|
| | | influence is decreased | | communities by SaskPower |
| | | | Influence Constrained-WSA | Descriptions of how influence is constrained for communities by WSA |
| | Influence Not Desired for Communities | Descriptions of how influence over decision-making is not desirable for communities | Influence Not Desired for Communities – SaskPower | Descriptions of how influence may not be desired for communities by SaskPower |
| | | | Influence Not Desired for Communities – By WSA | Descriptions of how influence is not desired for communities by WSA |
| | Influence Pathway | Descriptions of the barriers and opportunities to promote access in situations | Influence Barriers | Descriptions of the obstacles for influence being advanced in situations |
| | | | Influence Opportunities | Descriptions of the opportunities for influence to be advanced in situations |
| Structural Power-Legal Structure | Regulatory Power | Evidence of decision-making authority over EBCD management in regulation | Statutory Power – Provincial Government | Sections in regulation that afford decision-making power to the provincial government |
| | | | Statutory Power – WSA | Sections in regulation that afford the WSA decision-making power |
| | | | Statutory Power – SaskPower | Sections in regulation that afford SaskPower decision-making power |
| | | | Engagement – Not Regulated | Evidence of engagement not a part of regulation |

| | | | | |
|---|---|---|---|---|
| | | | | relating to EBCD management |
| | | | Regulatory Interpretation | The interpretation of decision-making authority by EBCD decision-makers |
| Structural Power- Policy Structure | Policy Power | Descriptions in policy of how water agencies describe their responsibilities in dam management | Policy Power – Provincial Government | Descriptions of how water agencies describe their responsibilities in dam management through provincial policy |
| | | | Policy Power – WSA | Descriptions of how water agencies describe their responsibilities in dam management through WSA policy |
| | | | Policy Power – SaskPower | Descriptions of how water agencies describe their responsibilities in dam management through SaskPower policy |
| | Policy Interpretation on Engagement | Descriptions of how policies are interpreted with respect to engagement | Engagement – Formal Policy | References to formal Indigenous engagement policies |
| | | | Engagement – Informal Policy | Informal references to Indigenous engagement policies |
| Structural Power relations | Legal Linkages | Sections in regulation that describe regulatory relationships | Stable Linkages | Regulatory linkages that involve and limit structural power between laws |
| | | | Dynamic Linkages | Regulatory linkages that change when situations change |
| | Policy Linkages | Sections in policy that describe relationships between policies | Stable Linkages | Connections between policies that affect EBCD management |

| | | | | |
|---|---|---|---|---|
| | | | | |
| | | | Dynamic Linkages | Connections between policies that affect EBCD management under different circumstances |
| | Structural Relationships | Descriptions of how relationships among water agencies are defined by regulation and interpreted by agency members | Constrained Relationships | Water agency members' descriptions of how regulation or policy limits more effective relationships among decision-makers |
| | | | Enhanced Relationships | Water agency members' descriptions of how regulation or policy enhances more effective relationships among decision-makers |
| | | | Complications (Lack of Transparency) | Water agency members' descriptions over how decision-making relationships are complicated |
| Instrumental Power | Instrumental Power-Expressions | Descriptions of intentional and existing behaviour by one individual or group that affects another individual or group | Instrumental Power-Explicit Expressions – Current – Water Agencies | Water agency members' descriptions of intentional and existing behaviour by water agencies that affects communities |
| | | | Instrumental Power-Explicit Expressions – Current – Communities | Community members' descriptions of intentional and existing behaviour by communities that |

| | | | | |
|---|---|---|---|---|
| | | | | affect water agencies |
| | | | Instrumental Power-Explicit Expressions – Past – Communities | Community members' descriptions of intentional and past behaviour by communities that affect water agencies |
| | | | Instrumental Power-Explicit Expressions – past – water agencies | Water agency members' descriptions of intentional and past expressions of behaviour by water agencies that affect communities |
| Discursive Power | Discourse – Water Agency | Patterns in observations by water agency members that describe the relationship they have EBCD management and the communities (not interpreting structural or instrumental power) | Relationship-Building | Comments related to on water agency members' perspective of the role of relationship building in EBCD management |
| | | | Role of Indigenous Knowledge | Comments related to on water agency members' perspective of the role of Indigenous knowledge |
| | | | What is water? | Comments related to on water agency members' perspective on what water means to them |
| | Discourse – Communities | Patterns in observations by community members that describe the | Relationship-Building | Comments related to on community members' perspective of the role of relationship |

| | | | | |
|---|---|---|---|---|
| | | relationship they have to EBCD management and the water agencies (not interpreting structural or instrumental power) | | building in EBCD management |
| | | | Role of Indigenous Knowledge | Comments related to on community members' perspective of the role of Indigenous knowledge |
| | | | What is water? | Comments related to on community members' perspective on what water is to them |

# APPENDIX V: E.B. CAMPBELL DAM LICENSE

'ROVINCE OF SASKATCHEWAN
SASKATCHEWAN WATER CORPORATION

COPY

**ACCEPTANCE OF FINAL LICENCE**
**FOR THE DEVELOPMENT OF WATER POWER**
**AT THE SQUAW RAPIDS SITE ON THE SASKATCHEWAN RIVER**

The Saskatchewan Power Corporation, a body corporate duly constituted, the head office and principal place of business of which is situated in Regina, Saskatchewan, and the postal address of which is 2025 Victoria Avenue, Regina, Saskatchewan S4P 0S1, for itself, its successors and assigns, hereby accepts the terms and conditions for this Final Licence for the development of power at the Squaw Rapids site on the Saskatchewan River, in the Province of Saskatchewan, which is attached hereto, incorporated herewith and made a part of this acceptance, and undertakes to observe and fulfill all the terms and conditions which under the Final Licence and the Water Power Regulations the Corporation as Licensee is required to observe or fulfill.

**IN WITNESS WHEREOF** Saskatchewan Power Corporation has caused to be affixed hereto its corporate seal attested by the hands of its proper officers in that behalf as of the 12 day of July, 1985.

**THE COMMON SEAL OF SASKATCHEWAN POWER CORPORATION** was affixed hereto in the presence of

**PROVINCE OF SASKATCHEWAN**
**SASKATCHEWAN WATER CORPORATION**

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**FINAL LICENCE FOR THE DEVELOPMENT OF WATER POWER AT THE SQUAW RAPIDS SITE ON THE SASKATCHEWAN RIVER**

---

**PREAMBLE**

**WHEREAS** Saskatchewan Power Corporation, hereinafter called "the licensee", a body corporate duly constituted by an Act of the Legislative Assembly of Saskatchewan, and the postal address of which is 2025 Victoria Avenue, Regina, Saskatchewan S4P 0S1, filed an application dated March 17, 1960, under The Water Power Act, hereinafter called "The Act", and the regulations enacted thereunder, hereinafter called "the regulations", for a licence to impound, divert and use water for the development of water power at the Squaw Rapids Site on the Saskatchewan River in the Province of Saskatchewan;

**WHEREAS** the licensee has constructed a development at the Squaw Rapids Site according to plans previously approved, has completed and is operating the development and has otherwise fulfilled the requirements of The Act and the regulations; and,

**WHEREAS** the licensee has executed an acceptance of this licence and has undertaken to observe and fulfill all the terms and conditions which under this licence and under the regulations the licensee is required to observe or fulfill;

**LICENCE ISSUED**

**NOW THEREFORE** this licence is issued to the licensee pursuant to The Act and the regulations, and subject to the terms and conditions contained herein.

**AUTHORIZED UNDERTAKING**

1. This licence authorizes the licensee to:
   (a) impound, divert and use certain of the waters of the Saskatchewan River at and near the site known as Squaw Rapids located on the SW1/4, Section 15, Township 54, Range 10, West of the 2nd Meridian, in the Province of Saskatchewan;

   (b) release water on SW1/4, Section 15 and SW1/4, Section 25, all in Township 54, Range 10, West of the 2nd Meridian in the Province of Saskatchewan;

(c) develop power and energy from the said waters;

(d) transmit, distribute, use, sell and deliver the said power and energy within the limits of the Province of Saskatchewan;

(e) transmit, sell and deliver the said power and energy beyond the boundaries of the Province of Saskatchewan for the purpose of inter-connecting with any other provincial or national power system in Canada;

(f) use and occupy the provincial lands necessary for the development described for the purposes mentioned in clause (a) to (e); and

(g) operate and maintain the works necessary for such development, transmission, distribution, use, sale and delivery of said power and energy, which works are located and constructed as shown on the approved plans filed in the Saskatchewan Water Corporation, hereinafter called "the Corporation", as listed in the attached Schedule A;

all of which is hereinafter collectively called "the undertaking".

**COMPLIANCE WITH PROVINCIAL LEGISLATION**

2. The licensee shall comply with the provisions of all provincial legislation now or hereafter in force and applicable to the licensee governing the granting and administration of provincial water powers and the lands required in connection with the use thereof.

**INTERFERENCE WITH OTHER RIGHTS**

3. The licensee shall not interfere with any existing water rights or any water rights granted under The Water Corporation Act or the former Water Rights Act.

**QUANTITY OF WATER DIVERTED**

4. Subject to sections 3, 6 and 7 of this licence and to section 73 of the regulations, the licensee may divert, impound and use at the Squaw Rapids site all of the water of the Saskatchewan River that is reasonably necessary to develop 288 megawatts.

**WORKS**

5. The works authorized to be maintained and operated under this licence comprise:

(a) a power house containing eight turbines capable of generating 288 megawatts, switch gear and ancillary equipment;

(b) a rolled core earthfill dam with a crest length of approximately 516 metres and a maximum height of approximately 33.5 metres;

(c) a south dyke of approximately 2115 metres in length and a maximum dyke height of approximately 8.5 metres;

(d) a north dyke of approximately 4420 metres in length and a maximum dyke height of approximately 8.5 metres;

(e) a concrete overflow spillway with a crest length of 86 metres containing five 12.2 metres by 9.4 metres rectangular vertical lift gates, and having a maximum discharge capacity of 5663.4 cubic metres per second;

(f) two emergency overflow sections to allow a portion of extreme floods to be directed to the Torch River;

(g) all necessary machinery and equipment for the development of power and energy; and

(h) all buildings, plant machinery and equipment used and useful for the development and utilization of power and energy and of certain works, including works for water diversion for discharging water back into the Saskatchewan River.

the position and substantial extent of the said works being shown on approved plans known as Saskatchewan Power Corporation Squaw Rapids Development Plans, filed with the Corporation and as listed in Schedule A.

**ELEVATION OF TOBIN LAKE**

6. (1) Subject to subsection (2) and to Section 7 the licensee shall at all times operate the undertaking in a manner that:

(a) the maximum normal operating elevation of Tobin Lake reservoir shall not exceed 313.64 metres (1029.0 feet) and the maximum reservoir elevation during extreme flood flows shall not exceed 317.3 metres (1041.0 feet) ASL.

(b) during the spring spawning and egg incubation period the elevation of Tobin Lake shall be controlled by the licensee so the elevation does not drop by more than 0.15 metres below the highest water level reached during the initial peak and except for this drop of 0.15 metres the level of the reservoir shall not

drop by more than an additional 0.05 metres for the said period and in no event shall the elevation of Tobin Lake be allowed to drop below 312.0 metres (1023.6 feet) during the said period; and

(c) for the purpose of subsection (b) "the spring spawning and egg incubation period" shall be a period of 30 consecutive days commencing when the spring flood causes the water level of Tobin Lake to rise and the first day of the period shall be:

(i) the day that Tobin Lake water elevation commences to rise if prior to that day the water elevation was 312.0 metres (1023.6 feet) or higher; or

(ii) the day that Tobin Lake water elevation reaches 312.0 metres (1023.6 feet), if prior to that day the water elevation was lower than 312.0 metres.

(2) The Corporation may orally modify the requirements of subsection (1) with subsequent confirmation in writing.

7. (1) Subject to subsection (2) the licensee shall at all times cause an average daily flow through or over the works into the Saskatchewan River of not less than 150 cubic metres per second downstream of the undertaking;

(2) The Corporation may, if it considers it expedient to do so, authorize the licensee to reduce the average daily flows to less than that specified in subsection (1).

**INTERPROVINCIAL OBLIGATIONS**

8. The licensee shall at all times observe and comply with any directives of the Corporation regarding the operation of the works necessitated by the terms of any interprovincial agreements relating to the apportionment of the waters of the Saskatchewan River System.

**RIGHTS TO LAND**

9. The licensee has acquired or will acquire all rights to lands required for the maintenance and operation of the said works.

**USE OF POWER**

10. The power and energy developed under this licence may be transmitted, distributed, sold, delivered and used for any purpose.

**TERM OF LICENCE**

11. The term of this licence is 50 years commencing on January 1, 1966.

**WATER POWER RENTAL**

12. (1) The licensee shall pay to Her Majesty the Queen in right of Saskatchewan an annual licence rental for water to be determined according to this section.

(2) For the five-year period commencing on the first day of August 1982, the annual rental shall be an amount equal to the greater of:

a) $207,360.00 or

b) 41.13 cents per 1,000 kilowatt hours generated by the plant.

(3) The annual rental may be revised at the end of the five-year period specified in subsection (2), and every five years thereafter, in accordance with subsections 48(11) to 48(12.1) of the regulations.

**GENERATING CAPACITY**

13. The licensee shall not increase the generating capacity of the undertaking beyond 288 megawatts without the written approval of the corporation.

**FEDERAL LEGISLATION**

14. The issuance of this licence does not relieve the licensee of any requirements imposed by legislation validly enacted by or under the authority of the Parliament of Canada.

**SEVERENCE**

15. The licensee agrees with the severence line as shown on the approved plan E4-2-2 WPP 2 (SPC Plan A191 - 9531.02 January 29, 1960) in the event that this licence should ever be terminated.

**HEADINGS**

16. The marginal headings contained in this licence are inserted for convenience of reference only and shall not be considered in the interpretation of this licence.

**ISSUED AT** Regina, Saskatchewan, this 16th day of June,

1986.

Minister Responsible for
Saskatchewan Water Corporation

6

SCHEDULE A

SQUAW RAPIDS PLAN INDEX

| | | |
|---|---|---|
| E4-2-2-WPP1 | A191-9511.04 (83-06-22) | General Arrangement |
| E4-2-2-WPP2 | A191-9531.02 (60-01-29) | Reservoir Area and Severence Line |
| E4-2-2-WPP3 | A191-3511.01 (63-07-22) | Earthfill Dam, Plan and Elevations |
| E4-2-2-WPP4 | A191-3551.01 (63-08-01) | South Dyke Plan, Profile & Section |
| E4-2-2-WPP5 | A191-3541.01 (63-08-24) | North Dyke Plan and Profile |
| E4-2-2-WPP6 | A191-4511.01 (63-08-24) | Spillway Plan |
| E4-2-2-WPP7 | A191-6511.05 (65-01- ) | Powerplant Elevation 951 |
| E4-2-2-WPP8 | A191-3511.3 (83-06-22) | Typical Sections |
| E4-2-2-WPP9 | 4513.03 (64-04-02) | Spillway Section and Elevation |
| E4-2-2-WPP10 | A191-4114.01 (64-04-07) | Spillway Discharge Curves |
| E4-2-2-WPP11 | A191-6511.07 (65-03-15) | Powerplant, Penstocks and Intake |
| E4-2-2-WPP12 | A191-5511.02 (83-06-23) | Penstock Intake, Penstock & Powerplant Section |
| E4-2-2-WPP13 | A191-5523.01 (62-04-17) | Penstock Intake - Sections and Elevation |
| E4-2-2-WPP14 | A191-5593.02 (61-08-02) | Penstock Intake - Plan |
| E4-2-2-WPP15 | A191-5573.02 (64-03-12) | Penstocks Plan & Elevation |
| E4-2-2-WPP16 | A191-5573.01 (64-03-13) | Penstocks Plan & Sections |
| E4-2-2-WPP17 | A191-7531.01 (64-02-15) | Power Canal 11+23 to 43+00 |
| E4-2-2-WPP18 | A191-7531.02 (64-02-15) | Power Canal 43+00 to 81+00 |
| E4-2-2-WPP19 | A191-7531.03 (64-02-18) | Power Canal 81+00 to 119+00 |
| E4-2-2-WPP20 | A191-7532.05 (64-05-21) | Power Canal - Alternative Sections |
| E4-2-2-WPP21 | A191 7563.01 (63-09-04) | Ice Skimming Structure |
| E4-2-2-WPP22 | | Capacity Curve for Tobin Lake |