RURAL WATER GOVERNANCE IN THE SASKATCHEWAN PORTION OF THE
PALLISER TRIANGLE: AN ASSESSMENT OF THE APPLICABILITY OF THE
PREDOMINANT PARADIGMS.

A Thesis
Submitted to the Faculty of Graduate Studies and Research
In Partial Fulfillment of the Requirements
For the Degree of

Special Case Doctor of Philosophy
in
Canadian Plains Studies
University of Regina

By
Jim W. Warren
Regina, Saskatchewan
December, 2013

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James William Warren, candidate for the degree of Special Case Doctor of Philosophy in Canadian Plains Studies, has presented a thesis titled, "Rural Water Governance in the Saskatchewan Portion of the Palliser Triangle: An Assessment of the Applicability of the Predominant Paradigms," in an oral examination held on November 13, 2013. The following committee members have found the thesis acceptable in form and content, and that the candidate demonstrated satisfactory knowledge of the subject material.

External Examiner: *Dr. Patricia Gober, University of Saskatchewan

Co-Supervisor: Dr. Harry P. Diaz, Canadian Plains Studies

Co-Supervisor: Dr. Gregory H. Argue, Adjunct

Committee Member: Dr. John F. Conway, Department of Sociology & Social Studies

Committee Member: Dr. Margot A. Hurlbert, Department of Sociology & Social Studies

Committee Member: Dr. David J. Sauchyn, Department of Geography

Chair of Defense: Dr. Philip Charrier, Department of History

*Participated via video conference
ABSTRACT

This thesis describes the paradigmatic forms of water governance and management employed by town and country communities, irrigation districts, regional pipeline systems and private water management systems in the Saskatchewan portion of the Palliser Triangle. It demonstrates that the trajectory of water policy development affecting the region since 2002, when the province developed its Safe Drinking Water Strategy, has reflected the influence of the market-based paradigm within the province’s water governance policy community. The application of policy measures that conform to the principles of the market-based water governance paradigm have failed to consistently produce the beneficial outcomes predicted by the paradigm’s advocates. The lack of consistent efficacy is apparent in outcomes related to water conservation, social equity and infrastructure financing objectives. The research demonstrates that the water management challenges facing the study communities are context specific. They are related to the hydrological and social conditions that obtain locally. In attempting to deal with social equity, conservation and infrastructure challenges, actors at the community level have found practices derived from each of the major water governance paradigms useful. Rather than attempting to apply any particular water governance template in cookie cutter fashion, policy makers need to be flexible and eclectic in their approaches to addressing the water governance and management challenges of rural communities in the Saskatchewan portion of the Palliser Triangle. One size does not fit all.
ACKNOWLEDGEMENTS

This thesis was made possible by the generosity of over 200 water management practitioners and residents of the Palliser Triangle who provided interviews to university researchers including this writer. A desire to improve the governance and management of water on behalf of communities in the region was evident in their comments and their donation of time. I would also like to thank my co-supervisors, Dr. Harry Diaz and Dr. Gregory Argue for their support and advice. Dr. Diaz’ efforts to involve the author in academic research projects associated with water governance and management were critical to developing the pool of primary research data which supports the thesis. Dr. Argue was particularly helpful in sharing the insights he obtained while working as a vice-president with SaskWater. Members of the thesis committee made significant contributions to shaping the theoretical perspective and direction of the thesis. Margot Hurlbert’s work on water governance and her assessment of Saskatchewan’s watershed committees stand as the foundational research in the area. Dr. John Conway assisted the author in developing a political-economic perspective on Saskatchewan. And, Dr. David Sauchyn contributed to the author’s assessment of the role that climate and climate change research should play in developing sustainable water management policies.

The proofreading efforts of my wife, Virginia Warren, were critical to the development of a presentable finished product. Without the support and patience of Virginia and my stepdaughter, Zane Guidry, during what were at times challenging and stressful periods, the project would not have been completed.
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LIST OF ABBREVIATIONS

AESB Agriculture and Agri-Food Canada’s Agri-Environmental Services Branch
(formerly PFRA – the name and mandate were changed in 2008 and then in 2013 the
AESB ceased to exist as a separate branch within the department)

BMP best management practice

CCF Co-operative Commonwealth Federation

CPR common pool resource

CSIDC Canada Saskatchewan Irrigation Diversification Centre

CSIP Canada-Saskatchewan Infrastructure Program (federal-provincial program operated
from 2001-2007)

GWP Global Water Partnership

FCM Federation of Canadian Municipalities

FFIB Family Farm Improvement Branch of the Saskatchewan Department of Agriculture

FRWIP Farm and Ranch Water Infrastructure Program

IWRM integrated water resource management

LDDA Lake Diefenbaker Development Area (irrigation)

NDP New Democratic Party

NGO non-governmental organization

NPM New Public Management

PFRA Prairie Farm Rehabilitation Administration (AESB as of 2008)

PMIP Provincial Municipal Infrastructure Program (1999-2000)

PPWB Prairie Provinces Water Board

SARM Saskatchewan Association of Rural Municipalities

SARWP Saskatchewan Association of Rural Water Pieplines

SDWS Saskatchewan’s 2002 Safe Drinking Water Strategy
SERM Saskatchewan Environment and Resource Management (Saskatchewan Ministry of Environment as of 2008)

SES Saskatchewan Environmental Society

SIPA Saskatchewan Irrigation Projects Association

SMA Saskatchewan Ministry of Agriculture

SMB Saskatchewan Municipal Board

SSR South Saskatchewan River

SSRB South Saskatchewan River Basin

SSRD South Saskatchewan River Dam

SSRID South Saskatchewan River Irrigation District

SUMA Saskatchewan Urban Municipalities Association

SWA Saskatchewan Watershed Authority (Saskatchewan Water Security Agency as of 2013)

SWDA Southwest Development Area (irrigation)

THM trihalomethanes

WWC World Water Council
CHAPTER 1: Scope and purpose

1.1 Introduction

The challenge

This thesis examines water governance and management policy and practice in the portion of Saskatchewan located within the Palliser Triangle (the driest region of the Canadian Prairies). The research presented shows that over the past decade senior government water policy for the region has emphasized measures associated with what is referred to as the market-based water governance paradigm. The thesis examines the implications of market-based policy measures for urban communities, irrigation associations, rural water pipeline associations and on-farm water systems. The research demonstrates that the application of market-based policies has failed to solve some of the more significant water governance and management challenges affecting the region. At the community level, where water is withdrawn from nature and used, there is often a preference for solutions associated with paradigms which emphasize the roles of communities and government agencies over options which rely exclusively on market-based water governance principles.

The principal finding of the thesis is that efforts to treat any of the predominant water governance paradigms as a universally applicable template will tend to be less successful in addressing water management problems than flexible and eclectic approaches which take local hydrological and socioeconomic conditions into account. The author hopes that the arguments presented in the following pages will suggest water governance and management strategies that could enhance both water security and the sustainability of rural communities in the region. Effort in this area is timely given that
the impact of anthropogenic climate change threatens to exacerbate water governance and management challenges for communities which are having difficulty meeting their water needs under existing conditions.

**The predominant paradigms**

There is a stream of analysis within the academic literature on water governance which endeavours to describe and categorize the principle forms of water governance and management in operation around the world (e.g.; Bauer 2004; Bakker 2010; Hooghe and Marks 2003; Hurlbert 2009; Linton 2011; and Ostrom 2008). Writers in this stream describe the predominant models as the market-based, state-based (or government agency-based) and community-based (or user-based) water governance paradigms (e.g. Hurlbert 2009, Johns 2008, Ostrom 2008). According to Hurlbert (2009: 47), the three models can be distinguished one from the other by the ways each distributes property rights over water -- whether water is owned and controlled privately, considered public property owned by the state, or common property controlled by users at the community level.¹ Each of these paradigms purports to offer: 1) the capacity to meet water conservation objectives; 2) the capacity to deliver social equity, measured in terms of access by all to the safe fresh water required to meet basic biological and sanitation requirements and; 3) the means to develop and support the infrastructure which enables people to make use of water.

This thesis purports to operate within this genre. It identifies the paradigmatic roots and dimensions of the water governance systems employed in rural communities in southern Saskatchewan; primarily in the portion of southern Saskatchewan located within the Palliser Triangle. Given that the market-based paradigm has been particularly
influential in shaping the trajectory of senior government water policy over the past two decades, much of the emphasis is directed at assessing the utility of market-based water governance principles in the region.

**Foreshadowing the findings**

The research presented in the thesis indicates that since 2002 the Government of Saskatchewan has endeavoured to incorporate elements of the market-based water governance paradigm into its water governance and management policies and programming. The government’s efforts have been sustained by the proposition that market-based strategies, such as utility corporatization and user-pay water management, enhance the capacity of municipal water utilities and irrigation projects to self-finance water infrastructure operations, maintenance, renewal and expansion. From the perspective of senior governments, an anticipated reduction in the demand by municipalities and irrigation agriculture for grants and subsidies is a principal benefit of user-pay and corporatized systems. This is an important consideration for governments at a time when balanced budget orthodoxy holds near hegemonic status in the field of Canadian public finance (Howlett, Ramesh and Perl 2009: 84, 85).

Efforts to introduce market-based solutions to water governance challenges in Saskatchewan conform comfortably with the prescriptions of Canadian water economists Steven Renzetti and Colin Busby. Their 2009 article in *Options Politiques*, “Water Pricing: Infrastructure Grants Hinder Necessary Reforms,” contends that water is priced so low in Canada that there is no incentive to conserve it. Renzetti and Busby assert that the under-pricing and wasting of water is encouraged when senior governments provide
water infrastructure grants to municipalities. In these instances the cost of water is subsidized -- it is made available to users below its real cost.

Investments in water infrastructure work best when those who benefit from the resulting services are the ones who pay for it. Not only do these infusions of capital grants [from senior government] break the link between pricing and the quality of service, but they also directly promote underpricing [and disincentivize conservation]. (Renzetti and Busby 2009: 34)

This thesis finds that efforts to apply market-based water governance principles in Saskatchewan have generated both adverse and beneficial outcomes. For example, the author demonstrates that the conflation of conservation objectives and market-based water utility management principles produces mutually contradictory effects. Indeed, for water managers in the communities examined, conservation is perceived to be more readily managed through regulated rationing than by relying solely on volumetric price signals. Furthermore, the thesis contends that it is unreasonable to separate the financing of municipal water and wastewater infrastructure from the larger issue of offloading. That is, the practice whereby senior governments have been requiring municipalities (which have less productive revenue streams than senior governments), to shoulder responsibilities they cannot afford (Mirza 2007). The author acknowledges that regulatory measures requiring municipalities to adopt marginal full cost recovery water pricing may have encouraged some municipalities to be more prudent about saving for water infrastructure maintenance and renewal. However, the research also demonstrates that even reasonably prudent municipalities can require grants and/or long-term government-backed financing to address water infrastructure challenges. This is due in large part to unanticipated events such as severe drought or the imposition of new water regulations which can frustrate the financial plans of the prudent and imprudent alike.
The thesis also identifies problems that arise from expecting agricultural producers who participate in multiple user irrigation projects to operate solely under user-pay principles. Industry development organizations, including the Saskatchewan Irrigation Projects Association (2008, 2008a) and Saskatchewan AgriVision Corporation (2004) contend that the maintenance and expansion of irrigation systems can contribute to economic growth and community sustainability. However, it is unlikely that these benefits can be fully realized without ongoing support from government in the form of grants and/or patient, government-supported financing arrangements.

The thesis proposes that for certain communities the combination of more stringent water quality regulations and marginal full cost pricing requirements can frustrate community sustainability. And, while the thesis does not purport to explore equity issues in any great detail, it does present evidence to suggest that market-based water governance initiatives have produced hardship for low-income households and participants in some irrigation projects.

The thesis describes how in the global context the adoption of market-based water governance measures has occurred along a continuum. In its most fully-realized form, market-based water governance involves privately owned raw water resources traded in markets combined with privatized utilities that operate under marginal full cost pricing principles. Water governance and management in Chile, for example, stands as one of the world’s most fully-realized examples of market-based water governance (Bauer 2004). In Chile, source water is privately owned and traded in markets and many of the country’s water utilities are privately owned. There are many more water governance systems operating globally where market-based maxims are less fully-realized. The Saskatchewan
system, for example, incorporates various subsidiary elements such as marginal full cost pricing and utility corporatization within pre-existing systems. At the opposite end of the hypothetical continuum one might expect a water governance and management system based on community or publicly owned source water and infrastructure which supplies water according to need and beneficial use principles as opposed to the ability to pay.

The establishment of SaskWater as a corporatized Crown-owned water utility in 2002 constitutes the Saskatchewan government’s furthest point of movement along the market-based water governance continuum.³ The thesis describes SaskWater’s mixed success in terms of providing communities with affordable water and earning profits. That said, the research also demonstrates the important contribution SaskWater has made in developing regional water systems – a strategy which offers promise in dealing with the water supply and infrastructure challenges facing Saskatchewan communities. The thesis anticipates that over the coming decades these challenges will be exacerbated by climate change.

The research presented in the thesis indicates that water managers in rural Saskatchewan typically have a preference for water governance and management systems which incorporate fairness and affordability for low-income urban residents and smaller farmers. These values militate against the adoption of certain market-based water management practices in rural Saskatchewan. The author argues that should Saskatchewan move further along the market-based water governance continuum it will probably be the result of top down imposition as opposed to popular grassroots demand. With respect to the relative efficacy of any of the various paradigmatic models examined, the author concludes that the study communities would benefit from water governance
systems that are flexibly eclectic, borrowing from one or more of the major paradigms as local conditions dictate. One size does not fit all contexts because natural and social conditions vary between communities.

1.2 The geographic focus

Renzetti and Busby (2009) contend that the adoption of the market-based water governance principle of marginal full cost pricing has been retarded in Canada due to the apparent abundance of fresh water in most of the country.

In water-scarce environments, underpricing typically leads to shortages and unreliable service. In a relatively water rich environment such as exists in parts of Canada, underpricing, combined with overexpansion of supply networks, has led to little or no reduction in the available supply of water or reliability of service. (Renzetti and Busby 2009: 33)

The primary geographic focus of this thesis is the Saskatchewan portion of the Palliser Triangle region. This is one the driest populated regions of Canada and provides an opportunity to test market-based water governance and management strategies in a region susceptible to water scarcity (Marchildon, Pittman and Sauchyn 2009: 32). The author assumes that the Palliser Triangle should be the type of region where, according to Renzetti and Busby (2009), elements of market-based water governance, such as marginal full cost pricing, should be more readily applicable than might be the case in other regions of Canada.

The research effort is further defined by its focus on “town and country communities” and their associated rural neighbourhoods within the Saskatchewan portion of the Palliser Triangle. Town and country communities are defined by Lonechild and Williams (2008) as urban centres with economies that rely heavily on the interrelationships that obtain between the urban centre and the surrounding rural
agricultural community. They might reasonably be described as rural-urban communities. Stabler and Olfert (2002) refer to the urban component of these communities as agricultural market towns or agricultural service and supply centres. The application of the term community to the rural urban centre and its surrounding rural area conforms to Jaffé’s (2003) characterization.

Day to day farm work takes place in the context of community – social relations provide much of the invisible web that allows production to take place. Rural [urban] communities in turn derive much of their character from the farm work done there. Simply put rural communities live or die according to the health of the farms that are attached to them, and farms cannot survive without healthy communities. (Jaffé 2003: 4,5)

The research effort encompasses water governance and management in town and country communities and their interconnected rural trading areas. It contends that the rural-urban communities of the Palliser Triangle offer an opportunity to study the effects of various water governance and management strategies in a context where water stress combines with economic and social stress. Many communities in the region have experienced long-term trends of population decline and perennially precarious economic conditions confronting family farm agriculture (Stabler and Olfert 2002, Diaz, Jaffé and Stirling 2003; Lonechild and Williams 2008). All but two of the communities studied in association with this thesis have relatively stable populations and have been classified by Olfert and Stabler (2002) as communities which have the potential to survive well into the 21st century. This sets them apart from hundreds of other Saskatchewan communities which are expected to contract and/or die over coming decades due to demographic and economic challenges. However, the impact of various water crises experienced by the study communities over recent decades suggests that the long-term sustainability of even
those communities considered to be likely survivors could be adversely impacted by conditions that obtain under Saskatchewan’s current water governance and management policy regime.

The thesis places considerable reliance on ethnographic data collected under two research projects coordinated by the Canadian Plains Research Center at the University of Regina between 2006 and the present: the Institutional Adaptation to Climate Change Project (IACC) and the Rural Communities Adaptation to Drought Project (RCAD). In combination, these projects provide transcripts of 267 interviews with water governance and management practitioners from the provincial and federal government agencies responsible for water issues in Saskatchewan as well as interviews with the residents, municipal officials and water management practitioners from the communities studied in relation to this thesis. The author worked as a researcher and research analyst on both projects. He also conducted additional independent research in support of the thesis including interviews with residents from communities not studied by the RCAD and IACC projects.

**Water governance and management at the community level**

While agencies of senior government are responsible for shaping important components of water governance and management policy in Saskatchewan, it is at the community level where many of those policy measures are given effect. When water is abstracted from nature to meet human needs in Saskatchewan, its withdrawal, treatment, and delivery (as well as the disposal of wastewater) is mediated primarily through municipal and community-based agencies. For most residents of Saskatchewan, municipally-owned and operated utilities perform these functions. The broad parameters
of water policy may indeed be determined at the senior government level but the impact of those policies on residents is mediated through local governments, irrigation associations and regional pipeline associations. While the thesis devotes a chapter to assessing the role of institutions and agencies of senior government in water governance and management, it places much of its emphasis on the role of actors at the community level. And, it describes local responses and local strategies for managing water under, and at times in spite of, the constraints imposed by senior governments.

1.3 Principal research questions

Principal research questions

This thesis poses two principal research questions which are consistent with assessment practices employed by scholars engaged in water governance and policy development research (the corresponding authorities are cited below). The two principal questions are: 1) a preliminary question, how are the major paradigms presented in the academic literature reflected in water governance and management practice in town and country communities and their associated rural communities in the Saskatchewan portion of the Palliser Triangle? and 2), the central question, how effective are the various practical manifestations of these paradigms (the market-based paradigm in particular) in meeting conservation, social equity, community sustainability and infrastructure-related objectives?

The assessment of the “effectiveness” of the water governance systems employed in the study communities relies upon a subsidiary set of questions (or assessment yardsticks) most of which have been applied in water governance and common pool resource scholarship by writers including, Bauer (2004), Bakker (2010), Hurlbert (2009)
IACC (2009), Ostrom (2008). Bauer (2004), for example, describes how questions related to social equity and conservation are at the core of debates about the relative utility of contending water governance models. Bakker (2010) places infrastructure maintenance and development at the centre of many water governance and management challenges. In *Privatizing Water*, Bakker (2010) describes how the challenges associated with financing and managing infrastructure have driven decisions about which paradigm can best solve water problems in a variety of jurisdictions around the world.

The subsidiary questions employed in the thesis to assess the effectiveness of water governance and management systems fall under the five headings listed below.

**Social equity**

In conformity with Bauer’s (2004) identification of the relevance and prominence of social equity issues in the international water governance discourse, the thesis asks: do the systems employed in the study communities allow for an equitable sharing of water resources? For example, are the basic needs of all community residents met without the imposition of financial hardship on low-income users? Are water shortages due to circumstances such as drought or a lack of infrastructure capacity managed in a socially equitable manner? Are communities treated equitably and fairly under government grant and lending programs that purport to offer assistance for infrastructure rehabilitation or expansion? Are water and wastewater quality regulations imposed equitably and does the regulatory framework pose unrealistic burdens on some communities, threatening their sustainability?
Infrastructure

In conformity with Bakker’s (2010) identification of the important role of infrastructure and infrastructure financing the author asks: does the water governance and management system operating in a given community provide for the effective management of infrastructure assets? For example, are there mechanisms in place for the accumulation of savings or to make loans or grants available to maintain, refurbish or expand infrastructure systems? Do government policies, designed to ensure prudent management of water infrastructure at the local level, account for unanticipated water crises such as source depletion and contamination or the imposition of new regulatory measures?

Community sustainability

In response to assessments of the challenges to sustainability and survival confronting town and country communities in the Palliser Triangle (Stabler and Olfert 2002; Diaz, Jaffe and Stirling 2003; Lonechild and Williams 2008) the author asks: does the water governance and management system enable communities to obtain raw source water and maintain their water and wastewater infrastructure without the need to impose fees which threaten their capacity to retain and attract residents and businesses?

Conservation

Bauer (2004), Conca (2006), Linton (2011), and Gleick (2012) describe how the conservation of water resources has been central to the assessment of the efficacy of water governance and management models globally. Indeed the goals of conservation and the sustainable management of water resources are integral to each of the predominant water governance models including market-environmentalist approaches and what is
referred to as soft path water management (see Chapter 2 of this thesis). The possibility that an urban community, farmstead or irrigation project could run out of water is a real and recurrent challenge for water managers in the Palliser Triangle. Conservation is understandably an integral component of water governance and management practice in the region. The thesis asks: do the water governance and manage systems employed in the study communities facilitate the conservation of water resources to the extent that instream and riparian ecosystems and aquifer inventories do not suffer significant adverse effects? And, does the system encourage the level of conservation and source water protection required to prevent source depletion, water shortages and pollution and minimize the need for infrastructure expansion? And, how will climate change impact water supplies and demand in Saskatchewan over coming decades – if scarcity conditions are indeed exacerbated as the science suggests, are current governance and management structures capable of effectively dealing with additional supply stress?

Self-referential policy effectiveness

Bauer (2004) employs a critique of the performance of the Chilean Water Code based in part on whether the goals and objectives of its sponsors were realized. This sort of post-implementation evaluation is consistent with best practices identified by scholars describing effective policy development (Wildavsky 2007: 6, 7; Bardach 2009: 26-30). Obviously it is difficult to assess the efficacy of policy initiatives in the absence of efforts to determine whether the anticipated results are being achieved. Howlett, Ramesh and Perl (2009: 178) explain that evaluation is what enables policy systems to learn. The thesis makes use of this approach by asking: does the actual operation of water governance and management systems reflect the goals and objectives of policy makers?
In other words, do the outcomes observed by the research correspond to the outcomes which legislators, bureaucratic officials and community-based groups, such as irrigation associations and municipalities, had in mind when various regulatory measures were developed and implemented?

**Subsidiary arguments**

In addressing the research questions just described the thesis explores a number of subsidiary propositions. These explorations generally arise within the context of efforts to apply concepts from a variety disciplines to the work. For example, the author identifies the utility of employing certain concepts from the field of policy analysis such as policy windows; policy, election and funding cycles; strategic representation and gold plating to inform the work (Kingdon 2003, Stone 2002, Jans 2009).

**1.4 Structure of the thesis**

The thesis provides a literature review in Chapter 2 which focuses on the literature associated with both international and Canadian water governance. The review identifies and assesses the major water governance and management paradigms that are described in the literature. That assessment contributes to the theoretical perspective employed by the thesis. The third chapter presents additional refinements to the theoretical perspective of the work. It explores the theoretical dimensions of market-based water governance within the context of utility management theory. The fourth chapter describes the methodological approach and scope of the research effort. Chapter 5 provides an overview of climatic and hydrological conditions in the Palliser Triangle; a brief history of the development of water governance systems in Saskatchewan; and, an assessment of water use patterns in the province.
Chapter 6 describes the agencies of senior government involved in water governance and their various roles. The chapter emphasizes the influence of Saskatchewan’s 2002 Safe Drinking Water Strategy and the role and performance of SaskWater. Chapters 7, 8 and 9 assess key themes associated with water governance at the urban municipal level. These chapters rely heavily on the interview data collected in association with the IACC and RCAD projects to illustrate water governance practices and challenges in the study communities. Chapter 7, Municipal Experience I, describes the impact of unanticipated water crises on the capacity of the study communities to meet their water infrastructure needs. Chapter 8, Municipal Experience II, explores the contradictions that arise when marginal full cost pricing measures are employed to simultaneously meet conservation and infrastructure financing needs. Chapter 9, Municipal Experience III, describes the impact of federal and provincial offloading on water infrastructure financing at the community level and the impact that the cost of infrastructure improvements can have on social equity and community sustainability.

Chapters 10 and 11 rely on interview data, government documents and published sources, to describe the operation of the governance and management systems employed on irrigation projects and regional rural pipelines. Chapter 10 describes the relatively well-functioning projects operating in the Lake Diefenbaker area as well as the comparatively dysfunctional systems operating in southwestern Saskatchewan. Chapter 11 assesses the operations of rural regional pipeline associations which have adopted some of the cooperative management methods employed by district irrigators. It also addresses the water governance and management issues that pertain to the approximately
150,000 Saskatchewan residents (primarily farm households) who rely on their own private water systems.

Chapter 12, the concluding chapter, synthesizes the work and describes in summary form how the research questions and associated hypotheses have withstood the research effort.

Chapter 1 Notes

1) This author has employed Ostrom’s (2008) terminology for the paradigmatic classifications. Some of the authors cited employ somewhat different definitions and labels. For example, Hurlbert (2009: 45) uses the term “user-based management” as opposed to community-based. Bakker (2010) introduces municipal hydraulic paradigm to the list. However, Linton (2011) suggests that this is actually a version of the state-based water governance paradigm.

2) The term utility corporatization refers to the process described by Bakker (2010: 25) whereby a publicly/state-owned utility is structured as a stand alone corporation, required to operate according to the norms that govern private sector corporations. A corporatized utility is expected to generate sufficient revenues and investment to finance its operations, reducing its need to rely upon subsidization by government. The process complements New Public Management theory as described by Kernaghan, Marson and Borins (2002: 23, 24)

3) In early 2013, Canada’s federal government announced that eligibility for federal water and wastewater infrastructure funding would be contingent upon municipalities entering into P3 arrangements with private sector firms for the operation of new government-subsidized utilities. This development suggests that water governance in Canada is being extended another step along the continuum leading to more fully-realized market-based water governance and management. This development occurred after the research and early drafts of this thesis had been completed.
CHAPTER 2: Literature review

2.1 Introduction

The emergence of water governance as a discrete area of focus within academic literature coincided with the global rise of neoliberalism and the international promotion of sustainable development in the 1980s. Indeed, both the neoliberal project and growing concern about the sustainability of the world’s fresh water resources significantly influenced the water governance discourse and water policy through the 1990s and 2000s.

Carl J. Bauer, in his 2004 book, *Siren Song: Chilean Water Law as a Model for International Reform*, contends that there are three themes which have dominated the international discussion of water governance since the early 1990s. In paraphrased form, they are: 1) the implications of various water governance and management models for long-term environmental sustainability; 2) the utility of private ownership (of both source water and infrastructure) and market mechanisms in facilitating optimal water allocation, conservation, and infrastructure enhancement; and 3), managing issues of equity and social inequality as they relate to access to safe and reliable water supplies – particularly in relation to market-based water governance models (Bauer 2004: 7).

It is indeed the case that one or more of Bauer’s three themes feature prominently in many of the scholarly works on water governance published over the past two decades that inform this thesis. The list of those works includes, but is not limited to: Bakker 2007; Bakker 2010; Bauer 2004; Boelens, Getches, and Guevara-Gil 2010; Conca 2006; Galaz 2002; Gleick 1993; Hall 2005; Hurlbert 2009; Linton 2010; Renzetti 2002; and, Sproule-Jones, Johns and Heinmiller 2008. Bauer’s three themes also appear in the flurry
of popular books and documentary films produced over the past two decades which address the “global water crisis,” including, but not limited to: Barlow and Clarke 2001; Barlow 2007; Bozzo, 2009; de Villiers 2003; Fishman 2011; Postel 1992; Reisner and Bates 1990; Salena 2008; Snitow and Kaufman 2004; and, Ward, 2002.

2.2 The predominant paradigms

There is a genre within water governance literature which identifies and assesses, what Hurlbert (2009: 47) describes as, the predominant water governance and management paradigms. As a general rule, each of the paradigms identified purports to provide prescriptions for addressing the challenges associated with the three themes described by Bauer (2004). This thesis focuses primarily on those paradigms which are defined in political-economic terms – according to assessments of the political, institutional and economic power relationships they describe and/or recommend (e.g., Bakker 2007a, 2010; Johns 2008 and Hurlbert 2009). The importance of understanding these relationships is advanced by Hurlbert et al. (2009: 120) who characterize water governance systems as intrinsically political. “Water governance refers to the patterns by which public power is exercised in a given context…As such it is an inter-organizational network defined by different amounts of political power and competing priorities…” Hurlbert (2009: 47) argues on behalf of the need to appreciate power relationships associated with water because, at their core, the three predominant paradigms are defined by how they distribute power over water, whether it is owned and controlled by the central state, by users at the community level or by private interests (Hurlbert 2009: 47).

Similarly, Johns (2008) describes the necessity of examining water governance through the lens of political economy to fully appreciate the sometimes conflicting
institutional interests that shape it. Johns describes the political economy perspective as follows:

The political economy of water refers to the larger social, political and economic forces at work which determine, at any given point in time, those uses and users that are likely to be most prevalent and powerful in the management of water resources. (Johns 2008: 8)

The three predominant water governance paradigms which reflect political economy perspectives were characterized by Ostrom in 1990 in connection with her work on common pool resource (CPR) management. Ostrom’s three paradigms are: 1) the state-centred model, which assumes that CPRs such as water should be publicly owned through the state and are appropriately administered by government agencies; 2) the market-based approach, which holds that CPRs, including water, are best managed as privately owned and traded commodities, distributed to users by privately owned utilities; 3) the community-based or user-based model in which CPRs, including water, can be effectively managed cooperatively by users at the community or watershed level, under certain prerequisite conditions.²

Hurlbert (2009) provides definitions which are essentially consistent with Ostrom, although she employs the term government agency management to describe what Ostrom (2009) labels the state-based model and she describes community-based water governance as the user-based model.

* Government agency management, generally associated with water regarded as public property – Government defers its authority for the management of water to an agency which assumes authority for directing who does, and does not receive water rights in accordance with bureaucratic policies and procedures.
* User-based management, generally associated with water regarded as common property – Water users, or those with license or other rights to water join together and coordinate their actions in managing water resources. Decision making is collective among users.
Market, generally associated with water owned as private property – water is allocated and reallocated through private transactions. Users can trade water rights through short-term or long-term agreements or temporary or permanent transfers, reallocating rights in response to prices. (Hurlbert 2009: 48)

These three models are reflected in accompanying patterns of ownership and management of water utilities – the withdrawal, treatment, conveyance systems that allow people to make beneficial use of water (see Chapter 3 of this thesis). The utility systems operating in the communities studied in association with this thesis include municipal water and wastewater utilities, regional and rural water pipeline associations, the utilities that deliver water to irrigation project participants and privately owned and operated water systems.

Arguments about which water governance and management paradigm might be the superior model echo the left-right debates which characterized much of the 20th century’s political discourse. For example, the market-based paradigm, asserts that power and control of water should not reside in the state or community-based institutions but is preferably vested in private actors operating in an unfettered market economy. On the other hand, the state-based paradigm allows that the role of governments in governing and managing water in the public interest should supersede the role and interests of the private sector (Bauer 2004, Bakker 2010, Swyngedouw 2006)

According to Conca (2006), debates over which paradigmatic form is preferable have frustrated international efforts to develop a universally acceptable water governance template. Conca (2006) describes how international organizations such as the World Bank, the Global Water Partnership and World Water Council (and the World Water Forums it sponsors) have, not infrequently, found their efforts in support of market-based
water governance stymied by activists and policy makers who prefer various versions of alternative models.

We seem to be at an impasse. Attempts to create a broadly cooperative international approach to managing water – to govern water globally, so to speak, seem doomed to founder on more fundamentally contested questions. Should it [water] be the privatized supply oriented vision of the forum [World Water Forum]? Or the grassroots, watershed-scale version [community-based] of the forum’s most ardent critics. Or an updated version of the state-led model of infrastructure expansion and water as a public good that so many governments have historically favoured? (Conca 2006: 4)

As noted in the preceding chapter, academic assessments of the practical application of the various paradigmatic forms in particular contexts typically apply one or more of four evaluative criteria. One method of assessment involves determining the extent to which a water governance model contributes to or detracts from the sustainability of water resources (e.g. Bauer 2004, Conca 2006, IACC 2009, Linton 2011). A second approach involves assessing the degree to which a governance model affects social equity, including the need to ensure access to clean safe water for the poor (Bakker 2010; Boelens, Getches and Armando Guevara-Gil 2010; Budd 2010, Galaz 2002, Mieno and Braden 2011, RCAD 2012). A third evaluative yardstick, which is employed by Bakker and Cameron (2002) and Bakker (2010) assesses the capacity of water governance models to account for the cost of infrastructure construction and maintenance. The fourth approach involves assessing the capacity of the institutions prescribed by each of the various governance models to produce positive outcomes in self-referential terms – i.e., the specific goals of policies and programs based on a particular paradigm (e.g. Bauer 2004; Hurlbert et al. 2009; IACC 2009; RCAD 2012; Sproule-Jones, Johns and Heinmiller 2008).
The first two assessment instruments listed above, reflect themes described by Bauer as well as principles for water governance proposed by prominent international conferences and organizations. One of the most influential of these international developments has been the promotion of the Dublin Principles and the closely related governance model referred to as Integrated Water Resources Management (IWRM). The Dublin Principles are the product of an international conference on water held in January 1992 in anticipation of the Rio Earth Summit held later that same year. The Dublin Principles and IWRM constitute an attempt to incorporate the topically prominent themes of environmental sustainability, social equity and market economics (Bauer’s three thematic streams) under the umbrella of a single all encompassing water governance model.

In summary form, the four Dublin Principles are:

(1) Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment…
(2) Water development and management should be based on a participatory approach, involving users, planners, and policy makers at all levels…
(3) Women play a central part in the provision, management and safeguarding of water…
(4) Water has an economic value in all its competing uses and should be recognized as an economic good.  

Notwithstanding their widespread influence, criticism to the effect that the four Dublin Principles can prove mutually incompatible in practice is not uncommon in the literature. The inadequacies are often attributed to the attempt to be all things to everyone at the same time. Particularly contentious is the arguably contradictory relationship between point four and the first three principles. Point four has been widely interpreted as providing an opening for the application of neoliberal market economics to water governance (Bauer 2004, Biswas 2004, Bakker 2010, Conca 2010, Swyngedouw 2006).
The work of Bauer (1997, 2004, 2004a), Budd (2010), Galaz (2002) and IACC (2009) on the implications of Chile’s 1981 market-based Water Code describes the contradictions that can arise in relation to meeting the goals of water resource sustainability and social equity through a market-based water governance model. Assessments of the Chilean model feature prominently in the water governance literature, and this thesis. This is partly because Chile’s 1981 Water Code constituted one of the earliest and most far reaching efforts to establish a comprehensive neoliberal water governance framework on a national scale. Furthermore, a prominent study of water resource development in Saskatchewan discussed later in this thesis, specifically recommends adoption of the Chilean model (Saskatchewan AgriVision Corporation, 2004).

In addition to employing sustainability and equity yardsticks, Bauer also evaluates the degree to which the Chilean Water Code achieved the goals and objectives of its neoliberal promoters. This type of analysis reflects the evaluation phase of the policy analysis process described by Wildavsky (2007) Bardach (2009) and Howlett Ramesh and Perl (2009). Similarly, evaluation of the effectiveness of the institutional frameworks (and policies) established under various models informs the work of Canadian scholars including Sproule-Jones, Johns and Heinmiller (2008); Hurlbert et al. (2009) and IACC (2009). As noted previously, this writer has adopted similar approaches in his assessment of water governance practice in the town and country communities of southwest Saskatchewan.
2.3 The state-centred/municipal hydraulic paradigm

According to Bakker (2010: 31-35), since the late 19th century the predominant water governance model employed in urban settings in modern industrialized countries has involved public ownership of source water by the state. It has also featured government/municipal agency ownership and management of urban water withdrawal, treatment and delivery infrastructure as well as the infrastructure associated with urban sewage collection, treatment and disposal. Under Ostrom’s (2008) characterizations this sort of management model would fall under the state-centred label. Bakker (2010: 31-35), however, refers to it as the “municipal hydraulic paradigm.” Linton (2011: 21), on the other hand, conforms somewhat to Ostrom’s classification and refers to it as the “state hydraulic paradigm”.

Goubert (1996), Bakker (2010) and Solomon (2010) attribute widespread adoption of this paradigm to the need for growing urban centres in industrializing countries during the 19th century to deal with public health problems that were linked to insufficient water and sanitation services. While residents of wealthy neighbourhoods could perhaps afford to pay for these services, the poor often could not. In the absence of universal access to safe water and sanitation services waterborne disease outbreaks afflicted the poor and the wealthy alike. The solution adopted in the latter half of the 19th century was to employ the financial resources of the state in support of the infrastructure needed to provide universal service. By the early decades of the 20th century the model was common in most cities in Western Europe and North America.4

Under the municipal hydraulic paradigm the provision of water services to the poor was in effect “cross subsidized” with revenues generated through taxes and fees
collected from the less poor. The US utility economist, James Bonbright (1961: 112-114) describes the advantage derived from this sort of cross subsidization as a diffusion benefit. In other words taxing the wealthy to provide service to the poor diffuses the benefits of improved health across all social classes.

By the midpoint of the 20th century, access to safe tap water and indoor flush toilets, in Bakker’s words, “became emblematic of citizenship” in a modern society (Bakker 2010: 52). No less important, the municipal hydraulic paradigm proved compatible with the dominant ideological streams presiding in different jurisdictions at different times in Europe and North America over the course of the late 19th century and through most of the 20th century. Paternalistic conservatives, populists, social democrats, socialists, Keynesian interventionists and mainstream market economists could all support, or at least tolerate, the municipal hydraulic paradigm.

Until the appearance of neoliberal governments in developed countries in the 1980s, public ownership of water resources through the state and its municipal subsidiaries and the provision of water and sewer services through publicly owned and operated utilities (usually by municipal governments) went largely unchallenged. Bakker (2010), Barlow and Clarke (2001) and Bauer (2004) contend that the challenge, when it came, was in part the result of the adoption of neoliberal economic policies by western governments and international financial institutions such as the World Bank. However, Bakker (2010) also indicates that, as of the 1990s, the municipal hydraulic paradigm had failed to deliver affordable safe water and sewer service to the residents of many communities in the developing world. Bakker attributes this in part to “governance failure.” This is a family of failures that includes political corruption; ethnic and class
prejudices of the politically influential wealthy directed against the masses of rural poor emigrating to city slums; mismanagement; and the frequent inability of governments in poor countries to self-finance major infrastructure projects (Bakker 2010: 45-47).

Notwithstanding instances of governance failure and the neoliberal challenge, the municipal hydraulic paradigm continues to be the globally dominant urban water system governance model (Bakker 2010; Pashardes, Swanson and Xepapadeas (2002a).

2.4 The market-based paradigm

Bauer (2004, 2004a) provides a critical assessment of market-based water governance in Chile. He also describes the role that the Chilean case has played in the global promotion of the privatization of water and water utilities. Bauer describes the direct linkages between the redesign of the Chilean economy following the 1973 US-backed military coup and the active participation of neoliberal ideologues, including Milton Friedman, in shaping the country’s economic future (Bauer 2004: 42). The 1981 Water Code, which privatized source water, along with additional policy measures in support of private water utility ownership, were components in that far reaching neoliberalization of the Chilean economy. Bauer describes the argument in support of market-based water governance.

…it is argued that markets increase economic efficiency by allocating [water] resources to their most valuable uses. Different values are measured and compared by prices, and the way price signals coordinate dispersed information are one of the market’s great strengths. For market forces to work property rights to water must be legally defined as private, exclusive and transferable – that is as commodities like any other. Secure ownership is an incentive to invest in greater productivity, while freedom to exchange provides the flexibility to reallocate rights according to changing social demands and conditions. From this perspective the state should intervene as little as possible, protecting property, enforcing contracts, and reducing contract costs and barriers to exchange. (Bauer 1997: 640)
Bauer (2004), Bakker (2010) and Barlow (2007) report that the World Bank and other global financial institutions, as well as certain international development agencies, embraced the principles of market-based water governance in the 1980s and 1990s. Under the rubrics of “structural adjustment” and the “Washington consensus,” countries seeking financing in support of water infrastructure projects were frequently required to turn government-owned and-operated water systems over to private sector operators. Bakker reports that over the course of the 1990s and 2000s the role of the private sector in the provision of municipal water services grew exponentially. Globally, a mere handful of new private sector water infrastructure projects were being launched annually in the early 1990s. However, private sector involvement in water infrastructure ownership and management grew steadily after the early 1990s, peaking in 2007 when approximately 80 new projects were initiated in a single year (Bakker 2010: 93). Bakker (2010: 137-161) contends that while the number of new private sector water projects continued to expand up to 2007, signs had appeared by 2000 indicating that the privatization project was likely to stall. A tide of protest had arisen globally in opposition to source water and water utility privatization. A number of prominent projects were cancelled and governments failed to proceed with others due to public protest (Assies 2010; Bakker 2010: 141; Barlow 2007: 102-141).

Market environmentalism

Following the publication of the Dublin Principles in 1992, some advocates of market-based water governance argued that the goals of environmental sustainability and social equity were not inconsistent with the private ownership of water, water markets and privatized utilities. In other words, there are no insurmountable contradictions
presented by the conflation of the four Dublin Principles into a single market-focused water governance paradigm (see Bakker 2010: 35-39; Conca 2006:155, 156; Gleick 2012: xii; Linton 2011: 48; Renzetti, 2007; Renzetti and Busby, 2009; Postel 1992: 165; Solomon 2010: 448; Swyngedouw 2003: 201, 202).

Bakker (2010: 88), Linton (2011: 47) and others refer to the post-Dublin conflation of market-based water governance with social equity and sustainability goals as “market environmentalism.” Proponents of market environmentalism promote the application of market pricing and business management principles to both privately and publicly owned water utilities (Renzetti 2002; Renzetti and Busby 2009). According to the market environmentalist perspective, water crises in the form of scarce or polluted source water or a lack of delivery and treatment infrastructure are often the result of failing to price water appropriately. Renzetti and Busby (2009), for example, contend that in Canada, users seldom pay the full cost for their water because senior governments have traditionally subsidized the construction of municipal water infrastructure. The adoption of marginal full cost pricing systems (systems that require individual users to pay the full cost of water withdrawal, treatment, delivery and effluent disposal costs) can purportedly ensure that the capital required to maintain, upgrade and expand infrastructure is available. In other words the communities and individuals that consume water should pay for it. Furthermore, the adoption of full cost pricing systems, which charge users more for each additional unit of water consumed, referred to as “marginal full cost pricing,” provides disincentives for wasting water and incentivizes conservation. An additional benefit identified by Renzetti and Busby (2009) is that user pay systems
reduce the reliance of municipalities on grants from senior governments in support of their water infrastructure.

There is a considerable literature dealing with the elasticity of demand for water and the impacts of various water pricing formulas (marginal full cost pricing in particular) on conservation (e.g.: Bell and Griffin, 2008; Mieno and Braden 2011; Millerd, 1984; Olmstead and Stavins, 2008; Pashardes, Swanson and Xepapadeas 2002; Renzetti, 2007; Renzetti and Busby, 2009). A portion of that literature contends that price signals can provide an effective and socially equitable instrument for encouraging water conservation (Bell and Griffin, 2008; Mieno and Braden 2011; Millerd, 1984; Olmstead and Stavins, 2008; Renzetti, 2002; Renzetti and Busby, 2009). However, some scholars caution that pricing is a very challenging, and at times unsuitable, demand management instrument to employ in support of social equity due to the relative inelasticity of demand for water (Mieno and Braden (2011) Pashardes, Renzetti, 2002; Swanson and Xepapadeas (2002). Writers including Renzetti and Busby (2009) and Mieno and Braden (2011) warn that pricing systems which do not make allowances for meeting the basic indoor water needs of low-income people can be socially regressive – potentially putting a heavier cost burden on low-income consumers without significantly reducing consumption by the wealthy. Later in this thesis we will examine mainstream utility price management theory (e.g. Bonbright 1961) and describe in greater detail how the goals of market-based utility management and marginal full cost pricing are sometimes inconsistent with conservation and social equity objectives.

Efforts by private sector actors and policy makers to “green” market-based water governance by embracing market environmentalist rationales have attracted criticism in
the literature. For example, in a 2006 article entitled “Power, Water and Money: Exploring the Nexus,” Erik Swyngedouw critically assesses the conflation of environmentalism and market economics that has been employed in support of market-based water governance.

A climate of an actual, impending or imagined water crisis – i.e. the discursive production of the imminence of a hydro-socio-ecological disaster – not only serves to facilitate further investment in the expansion of the water-supply (as in the cases of Athens, Guayaquil, New Delhi or Seville) but also fuels and underpins the drive toward privatization. As the price signal is hailed as a prime mechanism to manage ‘scarcity’ and the market as the preferred mechanism for allocating all scarce goods becomes an important part of strategies of commodification and privatization…In this context, strange and often unholy alliances are forged between advocates of the market and parts of the environmental movement. To the extent that the latter’s concern for the increasing, but socially constructed, scarcity of water has become more effective in reaching the wider public it leads to a greater ‘willingness to pay’ and an acceptance of the market as the best, if not the only available, mechanism for allocating it. (Swyngedouw 2006: 52)

In its ideal form, a comprehensive market-based water governance and management system would be a source to tap to effluent-discharge project involving privatized source water, water markets and privately-owned and-operated water and wastewater utilities. Pashardes, Swanson and Xepapadeas (2002) and Bakker (2010) report that comprehensive source to tap market-based systems rarely exist in the real world. Not even the Chilean system managed to establish a fully-privatized water utility sector. The IACC (2009) study indicated that over 1,000 municipal and community water board utilities managed to survive after 30 years of government support for privatization. Bakker (2010) writes that despite the flurry of water utility privatizations involving powerful transnational corporations which occurred globally in the 1990s, the international water privatization project had largely stalled by around 2007 and a number
of prominent privatizations had been or were about to be reversed. Bakker attributes this to widespread public opposition over lopsided deals which allowed private firms to override traditional water sharing and use arrangements as well as the failure of some private operators to meet expectations and promises regarding the delivery of water to low-income communities. In some of the affected communities, real and/or imagined perceptions emerged to the effect that “vulture capitalists” were acquiring control over a resource that people required to sustain life -- amounting to a capturing of monopoly rents and licenses to print money (Bakker 2010; Boelens, Getches and Guevara-Gil 2010). Demonstrations and political unrest in opposition to water privatization erupted in a number of communities, contracts with corporate water providers were cancelled and in Tanzania senior water corporation employees were arrested and deported (Bakker 2010: 78-81).

Scholars assessing the performance of Chile’s water governance model over the past three decades describe how the 1981 Water Code and associated measures, failed to meet social equity and environmental sustainability objectives as well as some of the objectives of the code’s neoliberal sponsors. Galaz (2002) and Budd (2010) describe instances where small irrigation farmers and indigenous communities have been unable to effectively defend their water rights against encroachment by wealthy farmers and mining companies. Bauer (2004) and the IACC (2009) indicate that the Chilean system has failed to successfully manage use on a water basin wide scale. Conflicts and use disruption have arisen over the timing of reservoir releases and there have been adverse effects related to the impact of upstream allocations on downstream user rights. In addition, Budd (2010) and IACC (2009) have described instances in which the ecological
integrity of natural wetlands has been adversely impacted by the system’s failure to adequately account for the water requirements of the natural environment.

Bauer (2004) also describes how the Water Code has failed to meet the expectations of its designers. For example, it was assumed that if water was “properly valued” through market trading, the resulting price information would encourage farmers and industry to self-finance infrastructure projects, removing the cost burden from the state. According to Bauer (2004) and IACC (2009), while some user-financed projects have been built by irrigators and industry, large projects have typically required financial support from the state. Ironically, Bauer asserts that one of the most significant failings of the system, from the perspective of its designers, is that far less water has been traded than anticipated. Nonetheless, the Chilean government (democratically elected since 1990), has recently taken steps to discourage speculation in water rights. Solanes and Jouravlev (2006) report that Chile has introduced a water tax that will be applied to unused water potentially held for speculative purposes. This sort of measure is somewhat similar in its effects to the beneficial use provisions (the “use it or lose it” system) that govern irrigation water allocations in much of western North America (Reisner and Bates 1990 and Chapter 10 of this thesis).

**Corporatization, P3s and New Public Management**

It would be incorrect to assume that the global decline in water infrastructure privatizations that Bakker (2010) describes is synonymous with a fatal decline in the influence of market-based water governance principles and market environmentalism. Bakker and Cameron (2002), Bakker (2005) and Bakker (2010) describe governance models that fall short of full utility privatization, but nonetheless allow for varying
degrees of private sector participation as well as the application of private sector management principles to municipal and state-owned systems. In other words market-based influence is expressed along a continuum. At one end of the continuum we find jurisdictions such as Chile where market-based principles are expressed in a near fully-realized form. Toward the opposite end of the continuum we find jurisdictions where market-based goals and principles are less fully-realized. Less comprehensive models might conform generally to the municipal hydraulic paradigm yet incorporate elements of the market-based model such as marginal full cost pricing, public private partnership (P3) arrangements or what Bakker (2010) refers to as utility corporatization.

**P3s in practice**

Bakker and Cameron (2002) and Bakker (2010) describe a variety of P3 arrangements available to municipalities and potential private sector partners. The options include scenarios in which the private sector partner builds, owns and operates the water and/or wastewater utilities. Alternatively, a private sector firm may simply contract to operate a utility on a municipality’s behalf. Bakker and Cameron (2002), describe the troubled relationship between the City of Hamilton and the various corporations it contracted to manage its water infrastructure, including the infamous Enron. Other observers, including Vining and Boardman (2008), have described the mixed success of water management P3s in Canada and note that while they are somewhat rare in relation to water and wastewater utilities in Canada, interest in the approach appears to be increasing. Vining and Boardman (2008) write that there are three rationales typically employed by municipalities for entering into P3 arrangements: 1) avoidance of on-budget expenditures; 2) the putative capacity of private sector firms to
be lower-cost builders and/or operators than municipal governments, and: 3) the governments’ (central or municipal) wish to avoid risks associated with construction and operation. The principle drawbacks and causes of concern and frustration are that in certain cases costs do not decrease under private operators; infrastructure maintenance and operational performance fail to meet the municipalities’ expectations, and there are onerous transaction costs associated with negotiating, monitoring, enforcing, renegotiating, litigating and cancelling contracts (Bakker and Cameron 2002; Vining and Boardman 2008; Bakker 2010).

**Utility corporatization**

Another intermediate point on the market-based water governance continuum described in Bakker (2010), is the “corporatization” of publicly owned water utilities. Under the corporatized model, central state and/or municipally-owned water and wastewater systems operate as arm’s length enterprises and are expected to generate the revenues required to fully cover their costs (including allowances for the accumulation of the capital required for infrastructure maintenance, upgrading and expansion). The City of Edmonton’s water utility, EPCOR, operates under this model and has sold its services to a number of municipalities across North America.5 This thesis devotes considerable attention to SaskWater, Saskatchewan’s for-profit Crown owned water utility which operates under what Bakker would describe as a corporatized model. Indeed, SaskWater, like EPCOR, constitutes something of a water governance agency hybrid. It is a corporatized state-owned utility that is expected to operate in much the same way a private corporation would in seeking what are essentially P3 type arrangements with municipal customers.
SaskWater and other provincial and federal government agencies involved in water governance and management in Saskatchewan have also been subject to a wave of management reform under the rubric of what Kernaghan, Marson and Borins (2002: 23,24) refer to as new public management (NPM). The NPM model assumes that the performance of government bureaucracies can benefit by behaving more like private corporations. Indeed, NPM builds on neoliberal assumptions regarding the relative inefficiencies of public agencies relative to private businesses (Ostrom 2008: 22). The research presented in the thesis suggests that when applied to the operation of publicly owned water utilities, NPM-inspired objectives conform comfortably to facets of market-based water governance including utility corporatization and the adoption of marginal full cost pricing.

2.5 Type II and community-based systems

Ostrom (2008) demonstrates that in certain contexts, cooperatively governed community-based institutions are capable of effectively governing and sharing common pool resources with minimal involvement on the part of the central state. Furthermore, under certain conditions, community-based irrigation systems are capable of functioning effectively without having to privatize the resource and/or major infrastructure components or comply with other market-based water governance maxims (Ostrom 2008: 200, 201). With the exception of requiring financial support from senior government for major infrastructure initiatives and water allocations, the multiple user irrigation systems operating in western Canada fit Ostrom's definition of community-based CPR systems (and which Hurlbert (2009) describes as user-based systems). They are also consistent with the Type II governance systems described by Hoooghe and Marks (2003). Type II
governance systems stand in contrast to top down governance systems led by central state agencies (i.e. Type I systems). Under Type II systems, governance and management institutions and the physical scope of their jurisdiction are based on the specific public service functions they perform. For example, assume a group of adjoining municipalities perceive economies of scale in having a combined transit service. If a combined service is established and operated on a quasi-independent basis, at arm’s length from its sponsoring municipalities, the agency administering the transit service would be a function-based Type II system.

Hooghe and Marks underline the importance of nested relationships whereby Type II agencies are nested under an umbrella of central and regional government support. Ostrom (2008) similarly asserts that effective community-based CPRs benefit from being nested within a supportive environment provided by central and regional governments. The research presented in this thesis suggests that in Saskatchewan the realization of the benefits of supportive nesting is related to the availability of financial support from senior governments. In Saskatchewan that support has been sporadic and frequently insufficient (see Chapter 10 of this thesis).

According to Bakker (2010: 208-210), community-based water governance should not be viewed as a sort of progressive panacea – a readily accessible alternative to neoliberal inspired solutions or top down governance by the state. Bakker contends that communities can lack the financial and technical capital required to effectively construct, manage and operate their own water infrastructure. Furthermore communities do not always exploit water resources in isolation from other users. This is because water resources reside in basins that can transcend the jurisdictional boundaries of the
communities that use them. The potential for allocation and consumption conflicts between users and communities, suggests the need for umbrella organizations, perhaps state-based institutions, which can act as honest brokers in the mediation of disputes over the equitable sharing of water between communities and user groups. Furthermore, the research presented in this thesis indicates there could be benefit in ensuring there is an authority in place to ensure riparian and in-stream ecosystems are protected.

2.6 IWRM and the international template

International agencies with water related mandates, including the Global Water Partnership (GWP) and the World Water Council (WWC), have endorsed the Dublin Principles and embraced a governance model that can purportedly foster their implementation as a universally applicable water governance template. That model is frequently referred to as integrated water resource management (IWRM). Discussion of IWRM features prominently in water governance literature and many scholars and policy makers have embraced it. Conca (2006) writes that among international agencies, such as the GWP, the WWC and the World Bank, IWRM has achieved virtual hegemonic status.

By the late 1990s, the idea of integrated water resource management [including its neoliberal-inspired elements] had emerged as the dominant paradigm by which to view and discuss water policy issues in an international context. A professional community of water experts had crystallized around the concept, promoted it vigorously, and developed increasingly robust transnational links in doing so. (Conca 2006: 145, 146)

According to Bauer, IWRM wisely incorporates water’s physical-hydrological characteristics within the purview of water governance.

Integrated water resources management (IWRM) aims to be a comprehensive and interdisciplinary approach that recognizes and deals with the many social, economic, political, technical and environmental aspects of water issues. According to the Global Water Partnership, ‘IWRM is a process which promotes
the coordinated development and management of water, land, and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.’ This requires understanding of the overall water cycle -- that is the continuous process of water as it evaporates from the oceans, precipitates as rain and snow and flows downhill across land surfaces through rocks and soil back to the oceans. (Bauer 2004: 8)

In conformity with point 2 of the Dublin Principles, IWRM supports the sharing of decision making related to water governance and management with a plurality of stakeholders; particularly local communities at the watershed level. At a minimum, IWRM is expected to provide a space for community voices to be heard in discussions about water management and consulted about policy development. Conca writes that there have been positive (albeit limited) developments in this regard represented by, “…emerging institutions [which] have found a way to incorporate more pluralistic understandings of authority, more flexible conceptions of territorial sovereignty, and more heterogeneous ways of knowing about problems and solutions” (Conca 2006: 7).

Hurlbert (2009: 54) employs criteria established by the Water Action Unit of the World Water Council in evaluating water governance systems on the Canadian Prairies. These criteria emphasize the importance of watershed level input in policy formation, and the notion that devolution of authority from the state to community and watershed level stakeholders is generally beneficial. According to the principle of decentralization and subsidiarity described by Hurlbert, authority over water management should be delegated to its lowest feasible level (Hurlbert 2009; 54). This principle assumes that the watershed is where water users confront the challenges of meeting their water needs. It is also where much of the conflict over resource allocation often occurs (e.g., between upstream and downstream users). Devolving decision making from central state authorities to
stakeholders at the watershed level recognizes the value of local knowledge in effectively managing water resources. Hurlbert et al. (2009) describe how Saskatchewan’s provincial water management agency, the Saskatchewan Watershed Authority, has promoted the establishment of watershed stewardship committees to develop source water protection plans for their respective watersheds. Nowlan and Bakker (2010) recognize value in the devolution of participation in consultation and decision making around water and are somewhat optimistic about the potential benefits of the institutions emerging in western Canada. They describe the Alberta government’s support for a “shared governance” model which includes communities, irrigation organizations and other water users at the watershed level in consultative processes.

Shared (or devolved or delegated or collaborative) water governance may be broadly defined as the involvement of non-state actors in decision making for water management. Shared governance is defined by the Alberta Water Council as a structure where both government and other stakeholders share responsibility for the development and delivery of policy, planning programs or services, but where the government retains legislative authority. (Nowlan and Bakker 2005:8)

More pessimistic assessments of IWRM are available in the literature. According to Biswas (2004: 250), IWRM is “a vague, indefinable and unimplementable concept,” despite its widespread popularity. This criticism is partly rooted in the idea that the Dublin Principles contain mutually contradictory goals (e.g., you cannot privatize water and trade it in markets and at the same time expect socially equitable outcomes).

2.7 Rejection of the modern template

There is a stream of argument within water governance literature that rejects the water governance traditions which dominated the modern period. According to writers who are critical of the modern approach to water, including Gleick (2012), Linton (2010)
and Matthews, Gibson and Mitchell (2007), the world’s water problems cannot be solved by continuing to rely on the supply focused water management practices that typified water governance over the past two centuries. According to Linton (2010), for example, over the course of the modern period, water management has relied too heavily on mega-projects – the construction of large dams and reservoirs. A typically modern solution to water supply challenges has been to mobilize capital and technology to increase the available supply. The modern approach to water is frequently referred to as “hard path” water management. Solutions to the ecological and social problems that arise in relation to supply focused hard path water management are purported to be found in post-modern “soft path” approaches which recognize the importance of environmental sustainability and the importance of conservation through demand management. According to Gleick:

Soft-path solutions rely less on traditional hard infrastructure that transports water over large distances or centralized water supply and wastewater treatment. Rather, soft-path solutions encourage more local water supply options. Greater water conservation and efficiency (e.g., the use of low flow devices in homes and businesses and the use of precision irrigation technologies on farms), using water more than once (e.g., graywater and recycled water), managing local surface and groundwater resources together, smarter use of economics (e.g., water pricing and innovative markets)…. (Gleick 2012: 150)

It is noteworthy that for some scholars the rejection of the hard path does not coincide with the rejection of market-based water governance principles such as the privatization of source water and marginal full cost pricing. Robert Glennon’s foreword to Gleick (2012), a book which extols the soft path approach, contends that market-based water governance and the soft path are mutually compatible.

Rather than trying foolishly to create new supplies of water, we must use the resources we have more effectively. And that means using (1) price signals to encourage water conservation and (2) market forces to encourage the reallocation of water from lower-value to higher-value uses. (Gleick 2012: xi, xii)
On the other hand, there are critics of modern supply focused water governance who rank neoliberalism as the most suspect of the modern paradigms. Linton (2011) and Conca (2006), for example, are supportive of certain soft path objectives but remain critical of the post-Dublin prominence given to neoliberal inspired governance systems. Boelens, Getches and Guevara-Gil (2010) are critical of efforts to impose water governance templates developed by international institutions, including transnational corporations, on communities. Their critique of the global water regime focuses much of its attention on its neoliberal inspired components. They categorize the neoliberal project as one among other “utopian” paradigms of the modern period. For Boelens, Getches and Guevara-Gil, local social, cultural, hydrological and biophysical contexts are critical considerations in assessing and designing water governance systems. Like Linton and Conca, they are opposed to the cookie cutter like imposition of templates developed in the self-referential settings of international conferences. Universally applicable, one-size-fits-all solutions are rejected in favour of flexible approaches, capable of accommodating local knowledge and traditional use and management practices suited to the context of specific biophysical and social environments.

For Canadian scholars Matthews, Gibson and Mitchell (2007: 353), the soft path approach provides the foundation for a new post-modern water ethic that embraces environmental and social concerns. Linton (2011) promotes a soft path approach referred to as “hydrolectics.” According to Linton (2011: 23), hydrolectics enables people to identify with water’s social and cultural dimensions as opposed to focusing solely on its
economic uses – an approach not dissimilar from that of Boelens, Getches and Guevara-Gil (2010).

2.8 Canadian issues

Not surprisingly, the work of Canadian academics and institutions in the field of water governance scholarship reflects the various internationally prominent themes and debates described in this chapter. At the same time, Canadian scholars have focused attention on a number of issues that are particularly relevant and topical in the Canadian context. These include what Sprague (2007) has referred to as “the myth of Canadian water abundance” and what Sproule-Jones, Johns and Heinmiller (2008) and Hurlbert et al. (2009) describe as the institutional fragmentation of water governance in Canada.

Sprague (2007: 23) contends that Canada’s renewable supplies of freshwater are much less abundant than is popularly assumed. This is particularly true for parts of the Prairies where water is relatively scarce. Challenging this widely-held hydrological misconception fits comfortably alongside campaigns by NGOs and Canadian nationalists, such as Maude Barlow and the Council of Canadians, to prevent the export of Canada’s fresh water (Barlow and Clarke 2001). It also contributes to the rationales employed in support of market environmentalism (e.g., Renzetti and Busby 2009).

Discussion of the institutional and jurisdictional fragmentation which characterize water governance and management in Canada is a recurrent theme in the literature. Water governance in Canada involves multiple layers of authority and responsibility, reflecting the constitutional development of Canadian federalism. Corkal and Diaz (2009), Johns and Rasmussen (2008), Hurlbert et al. (2009) and IACC (2009) describe the challenges produced by the complex and at times confusing mix of overlapping spheres of authority
and competence. Johns and Rasmussen note the potential for buck-passing and dropped balls that arises when more than one government agency and/or level of government manages the same policy file. The Federation of Canadian Municipalities describes the outcome of institutional buck-passing, perhaps more precisely, as the off-loading of responsibility and costs from senior governments onto municipal authorities (Mirza, 2007).

Canadian water governance scholarship takes a somewhat paradoxical position in relation to jurisdictional fragmentation. On the one hand, scholars such as Nowlan and Bakker (2010) and Hurlbert (2009) describe the advantages of the devolution of more decision making authority from senior governments to local institutions (e.g., watershed committees). At the same time, as noted above, there are scholars who are critical of the institutional fragmentation affecting the system. Some scholars have gone so far as to recommend the centralization of authority in a federal institution empowered to develop and enforce national standards for water security and drinking water safety. At the McGill University Institute for the Study of Canada’s 2010 conference, Canadian Water: Towards A New Strategy, some participants suggested, only somewhat tongue in cheek, that what Canada really needed to ensure water resource sustainability and universal access to safe drinking water was to establish the office of a national “Water Czar.”

Chapter 2 Notes

1) a The newness of the genre. The relative newness and evolving nature of the body of academic literature focusing on water governance is described by Alan Hall (2005). Indeed, Hall describes water governance as “a recent term,” emerging in the 1990s that may not yet be well understood (p. 111).

1) b Water governance defined. Some writers, including Hall (2005), provide neologistic definitions of water governance:

   Governance is about the allocation and regulation of resources and is thus intensely political. It is a more inclusive concept than government per se, embracing the relationship between society and
its government. The concept of water governance relates here to government policies and actions related to water, encompassing rules, regulations and institutions; but it also relates to networks of influence, including international market forces, the private sector and civil society. It embraces both the formal and informal institutions by which authority is exercised (Hall 2005: 112).

Other writers, including Bakker (2007) and Conca (2006), employ the lexical meanings of the terms governance and management to water. For example, Conca understands governance as “…the performance of governing functions – including the mobilization of resources, the authorization of official knowledge, the framing of policy and the setting of standards…” (Conca 2006: 374, 375). This writer has adopted Conca’s lexical approach and applies the colloquial understandings of the terms governance and management to water governance and management.

1) c Neoliberalism is defined in Chapter 3 section 3.2 of this thesis. The author employs the definitions of neoliberalism and the closely associated concept neo-conservatism provided by Brown, Roberts and Warnock (1999), Pitsula and Rasmussen (1990) and Conway (2006). Brown, Roberts and Warnock define neoliberalism as a collection of ideas and attitudes which emerged in the 1970s.

1) d Sustainable development defined. The emergence of the concept sustainable development and debates about environmental sustainability versus unrestricted economic development are associated with the World Economic Conference on Environment and Development on the Economy and the Environment and the resulting production of the 1987 Bruntland Commission Report, Our Common Future. The report defines sustainable development as, “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

2) Ostrom (2008) identifies the utility of community-based common pool resource (CPR) management within certain contexts. Her assessment identifies the long-term success of CPR systems for water governance and management on multiple user irrigation systems in parts of Spain and the Philippines. According to Ostrom the factors, or dynamics, common to effective community-based CPR governance and management include: shared cooperative values as opposed to confrontational norms that would encourage opportunistic behaviour; the embeddedness of historical decisions and rules that have been in place for a long time that assist in effective collective management; the local community system must have substantial autonomy including the ability to change rules, which is not necessarily available under centrally controlled systems; the procedures for transforming rules must be acceptable to central state authorities; collective community governance must be nested within supporting institutions at the regional and central levels of the state and are strengthened through networks of linkages with other institutions; community governance systems need rules that can be enforced along a graduated scale – with higher penalties for serious and repeat infractions and lesser penalties for minor infractions and first offences; the communities need the capacity to police and enforce adherence to the rules, and; they need the ability to adapt – to meet challenges and threats and take advantage of opportunities provided by policy windows (Ostrom 2008: 100, 201).


4) According to Bakker (2010: 31) France stands as the most significant national anomaly. Since Napoleonic times the water utilities in most large urban centres were privately owned. The long history of private sector water management in France has been associated with the rise of French companies such as SUEZ and Veolia on the national stage in France and internationally in the 1990s.

5) EPCOR claims to own and/or operate 50 water and wastewater plants, primarily in Canada but also has contracts with communities in Arizona and New Mexico. http://corp.epcor.com/watersolutions/Pages/water-solutions.aspx (accessed April 19, 2013).
6) Forest (2010) provides a summary report on the proceedings of the McGill Institute for the Study of Canada’s 2010 Water Conference. An audio link to the conference proceedings is accessible at
CHAPTER 3: Theoretical perspective

3.1 Introduction

Bakker and Cameron (2002) have described efforts to apply elements of market-based water governance in Canada, primarily in association with P3 arrangements. This thesis builds on that work by examining the process in Saskatchewan. And, foreshadowing the case made in subsequent chapters, this author contends that measures compatible with the market-based paradigm have had a significant influence on the trajectory of water governance and management policy development in the province since at least 2002. In support of that case, the current chapter provides a review of the theoretical foundations of market-based water governance in conjunction with an assessment of conventional utility management theory. The incorporation of utility management theory into the assessment sheds added light on the challenges that have arisen in conjunction with efforts to apply market-based water governance principles in the context of the communities studied for this thesis. The author presumes that the introduction of utility management theory into the assessment effort constitutes a novel contribution to Canadian water governance literature.

Following the discussion of market-based water governance and utility management theory, the chapter briefly describes a set of concepts from the fields of public policy and community sustainability scholarship that inform the thesis.

3.2 Deconstructing market-based water governance

Neoliberalism defined

A brief characterization of neoliberalism is in order at this point in the work to illustrate why it is considered to be the political and economic ideology that inspires and
embraces market-based water governance and market environmentalism. Neoliberalism is an ideology that incorporates “a profound aversion to government intervention in the economy, the welfare state, and collectivist values in general, combined with an equally profound admiration for private enterprise and the free market system” (Pitsula and Rasmussen 1990:1).

Saskatchewan scholars Brown, Roberts and Warnock (1999) write that neoliberalism,

…signifies aversion to government interference in business and the private lives of people. It stresses competition between individuals who are solely responsible for their own fortunes. As in 19th century liberalism, it reasserted the virtue of hard work, individual responsibility and the universal and timeless validity of the impersonal market. All collective communal arrangements…that protect people against the disciplining effects of market competition are the target of neo-liberal [sic] hostility. Exempted are those collectives such as corporations constructed on behalf of capital. (Brown, Roberts and Warnock 1999: 30)

Thus defined, the neoliberal perspective supports private ownership of water, which, like any other commodity, should be traded in markets where price signals determine its value. Given neoliberal aversion for state intervention in markets, water utilities are appropriately operated as private businesses. Indeed, utilities owned by governments in the UK, the US and Canada (including Saskatchewan) have been targeted for privatization by neoliberal governments since the 1980s (Pitsula and Rasmussen 1990, Conway 2006). Neoliberal aversion for the activist governments of the post World War II period has encouraged a “hollowing out of the state,” whereby the role of government has been diminished across a wide range of activities. The aversion for state intervention in economic affairs is evident in neoliberal antipathy toward state-made regulation and “red tape.” Economic activity, so the argument goes, is best regulated by market mechanisms not rules and regulations imposed by governments. Similarly, the fiscal capacity of the state is diminished. Reducing the activities of the state is presumed
to allow for reductions in government expenditures which in turn can allow for reduced taxation on incomes and capital.

The neoliberal economy is an ideal type which rarely exists in fully realized form. That being said, governments inspired by neoliberalism have introduced policy measures which, while they may fall short of the ideal, reflect movement along a continuum from the discredited welfare state toward an unfettered market economy. In the realm of water governance and management, movement along the continuum toward the neoliberal ideal is reflected in water utility privatization, P3 arrangements, the corporatization of water utilities and the introduction of New Public Management systems in government bureaucracies. Movement along the continuum is also evident in the application of principles of market-based water governance such as user pay marginal full cost recovery which relies on price signals to allocate water. The section of the chapter which follows describes the influence of neoliberalism, via market-based water governance, on utility management in North America.

**Market-based water governance and pricing**

Notwithstanding the limited real world application of market-based water governance as a complete or fully realized package, certain facets of market-based water governance have been widely adopted (Pashardes, Swanson and Xepapadeas 2002: 18). Market-based water governance maxims such as marginal full cost pricing and the privatization of various water management functions have been promoted by economists and applied in many jurisdictions around the world (Millerd 1984; Jones 2003; Bauer 2004; Bell and Griffin 2008; Bakker 2010). For example, Jones (2003: 11) reports that “OECD [Organization for Economic Co-operation and Development] countries are all
working toward the goal of ‘internalizing’ the full marginal costs (including environmental costs) into decisions that affect water use and water quality.”

Under the market-based paradigm, water markets and the marginal full cost pricing of water purportedly ensure that prices for water reflect its “real” economic value, which is in turn assumed to be synonymous with its social value (Pashardes 2002: 14; Howe 2005: 44; Gleick 2012: 152, 153). Real value is discovered through the utility maximizing behaviour of consumers and firms (Millerd 1984: 8; Bell and Griffin 2008: 1). Appropriate valuation will supposedly assist in reducing the waste of increasingly scarce water associated with governance systems which provide water at prices that are lower than what markets would identify.

The almost worldwide phenomenon of rising water scarcity makes the economic perspective useful in multiple ways. Among these is the policy significance of signaling scarcity to all water users through more informed rate-making, so as to motivate efficient consumption and conservation behaviour. (Bell and Griffin 2008: 1)

Markets and/or price signals will purportedly ensure that water is directed toward its most economically valuable uses – “from lower-value to higher-value uses,” which are in turn assumed to be its most socially valuable uses (Gleick 2012: xii). There is an assumption that by relying on water trading occurring in an unfettered water marketplace, and by eliminating state regulated water allocations and subsidies, water will be put to its best purposes. For example, if urban residents or industries are willing to pay more for water than irrigation farmers, then, by definition, urban and industrial uses would be socially more desirable than irrigated agricultural production.

There is a widespread assumption among market environmentalists that publicly owned and operated water utilities across North America frequently charge customers far
less than they should for water (Postel 1992: 166; de Villiers 2003: 299; Renzetti and Busby 2009). It is apodictically assumed that a private or corporatized utility which relies on sales to meet its bottom line requirements will charge more for water than a utility that is subsidized with injections of cash generated from other sources such as the municipal property tax base, or grants from the general revenues of state/provincial or central governments (e.g., Renzetti and Busby 2009).

According to Bakker (2010), advocates of market-based water governance contend that the failure of water governance and management systems to deliver service to the poor in the developing world is often the result of the failure of publicly managed systems to charge enough for the water they provide to allow for the financing of necessary infrastructure maintenance, upgrades and expansions. This is an aspect of what Bakker (2010: 44-47) refers to as governance failure. If the water and wastewater systems were operated as private for-profit utilities, so the argument goes, the financial incentives and necessary capital required to deliver service to the unserviced would be more readily available.

Olmstead and Stavins (2008: 13) caution that social welfare and social equity can mean quite different things to economists than they mean for social scientists working in other disciplines. For some economists, optimal societal welfare (defined as Pareto optimality) refers to conditions in which exchanges in competitive markets among rational and informed utility maximizing firms and households generate the best social outcomes possible. E.K. Hunt (2003: 144) describes the optimal welfare equilibrium of conventional economics to mean that “each point on the utility-possibility frontier represents a situation in which no change in production and no additional amount of
commodity exchange could possibly make a single individual any better off without worsening the position of some other individual.” According to Hunt, social welfare in conventional economic theory is a function of the achievement of equilibrium represented on indifference curves and is not synonymous with sociologically understood social welfare which assesses inequality in terms such as unequal life chances or income inequality.

Strictly speaking, the mitigation of inequality under welfare economics rests on ensuring that economic actors have the capacity to engage in unconstrained utility maximization. Thus, Olmstead et al. (2008: 6) observe that the provision of water to low-income water users at prices that are lower than those offered to higher income water users contravenes the welfare principles of conventional economics since it distorts equity in relation to the opportunity to exercise utility maximization. They contend that policy makers considering market-based approaches to water management need to be more cognizant of social equity in policy design as opposed to assuming that the equity suggested by welfare economics alone is sufficient (Olmstead et al. 2008: 13).

Pashardes, Swanson and Xepapadeas (2002a), are critical of market fundamentalist (neoliberal) approaches to water governance which avoid the regulatory administration of prices in favour of markets, noting the value of administrative planning.

The social planner [or regulator] maximizes a social welfare function appropriately defined to include any externalities relating either to the use of water, subject to the constraints of the hydrological system… Some or all of these externalities are ignored by private agents choosing their water use to maximize private profits [or utility]… The efficient use of water resources can be attained by the choice of an appropriate regulatory scheme that seeks to include private agents in a way that approximates the socially optimal use. (Pashardes et al. 2002a: 11)
This writer has adopted a definition of social equity in relation to water that considers affordability of water for meeting basic biological and sanitary needs on the part of all citizens, including members of low-income households, as an appropriate benchmark for describing socially equitable water governance and management systems. Furthermore, providing access to water for non-domestic industrial or agricultural purposes should not conflict with the basic needs of households or riparian ecosystems. This definition approaches the somewhat vaguely defined concept, “the human right to water” described by Barlow (2009: 170, 171) and Bakker (2010: 12, 13).

While market-based water governance is not frequently found operating as a theoretically ideal or fully realized system, there are numerous water governance systems that employ particular elements of the market-based model. Bakker (2010) and Bakker and Cameron (2002) provide taxonomies of water governance models with classifications that range along a continuum from publicly owned and operated utilities at one end to privatized source water and water utility systems at the other. In between the public-private ideal types they identify a variety of mixed models such as public-private partnerships (P3s) that rely on varying levels of private sector participation or, as in the case of corporatized utilities (Bakker 2010: 31), are influenced by neoliberal maxims regarding the benefits of applying business principles (e.g., NPM) in the management of public sector systems.

The various rationales provided for private water utility ownership and management can also align comfortably with the pursuit of the postmodern soft path water management paradigm that eschews traditional supply enhancement efforts that feature dam building and infrastructure expansion (Gleick 2012: 150). Encouraging
conservation through pricing, it is argued, can save communities on the cost of infrastructure expansion. And, particularly appealing to market-environmentalists, it can reduce the need for more large dams and the associated disruption of in-stream and riparian ecologies.

3.3 The conflation of utility costs and water prices

Most of the world’s privatized and corporatized water and wastewater utilities operate in jurisdictions where source water remains a publicly owned resource that is not open to private ownership and trading in markets. (Chile is one of the exceptional cases where both utilities and source water can be privately owned.) This is a situation that has encouraged economists to develop techniques for ascribing price values (shadow prices) to source water in the absence of water markets (Millerd 1984: 14). For example, Renzetti (2002:140) refers to a pricing model developed for the San Joaquin Valley in California that assesses the marginal utility of water across several use categories to arrive at a source water price estimate. However, Renzetti (2002: 93) acknowledges, developing these synthetic prices is a complicated undertaking that relies on a wide range of potentially contestable assumptions about consumer behaviour. Furthermore, price estimates are highly context specific both in terms of the hydrological characteristics of a given watershed and water use patterns in any particular community. Thus, Renzetti (2002: 141, 142) maintains that a source water value developed for the San Joaquin Valley is unlikely to prove appropriate in other water basins which will have their own unique supply and demand characteristics. Other economists, similarly, attest to the context specific nature of the hydrological conditions and use patterns that frustrate the
creation of a universally applicable source water price (Timmins 2002; Pashardes, Swanson and Xepapadeas 2002).

The absence of either water markets or a synthetic price for source water has not deterred some economists from assuming that pricing can be effectively employed to manage water demand. According to Olmstead and Stavins (2008) and Pashardes, Swanson and Xepapadeas (2002), hundreds of studies of water price elasticity have been conducted over the past few decades in which economists attempt to identify the changes in prices required to affect demand levels. This writer proposes that attempting to influence water demand through the rates that utilities charge customers for water and wastewater services can produce outcomes that are inconsistent with market environmentalist objectives and/or the profitability of water utilities. To make this case it is helpful to examine market-based utility management theory and the principles that constitute widely accepted best management practices (BMPs) for North American utilities.

The Bonbright model

Elements of the market-based water governance paradigm were being promoted in North America prior to the advent of neoliberalism. US economist, James C. Bonbright’s 1961 book, Principles of Public Utility Rates, for example, recommends price setting principles similar to those preferred by market-based water governance advocates today. Bonbright was indeed somewhat ahead of his time, a number of the utility management principles he advocated have received greater acceptance in conjunction with the rise of neoliberalism than they did when he first proposed them. Most of Bonbright’s utility rate management principles fit rather comfortably into today’s
neoliberal prescriptions for water management and now have the status of conventionally accepted wisdom for utility managers and policy makers responsible for private, public and corporatized public utilities in many jurisdictions across North America.¹

For Bonbright, the term \textit{public utility} applies equally to utilities that are owned and operated by governments (municipal, state/provincial) as well as to privately owned and/or operated utilities. According to Bonbright, the defining features of a public utility are whether it provides an essential service, or at least a service for which consumers have great difficulty finding substitutes, and whether the provision of such services tends to produce natural monopolies (Bonbright 1961: 3 - 8). Despite presumptions about the role of market pricing in the provision of utility services, public electrical, natural gas and water utilities in many North American jurisdictions, including both privately and publicly owned systems, are subject to regulation and oversight by state and provincial regulatory bodies often referred to as utilities commissions. The reality is that utility rates are often set administratively, not in markets, although this does not mean that market-based principles do not figure prominently in the rate setting process.

Bonbright’s recommendation that utilities recover the full cost of delivering their services through charges to their customers is clearly consistent with full cost pricing advocated by today’s market environmentalists. Bonbright, like Canadian economists Renzetti and Busby (2009), holds that this principle works to reduce or eliminate the need for municipalities and senior governments to subsidize utility operations. Bonbright’s opposition to the practice of utility rate “cross subsidization,” whereby one group or class of customers pays a disproportionately higher rate than another class of user is, indeed, a widely (but by no means universally) accepted utility management maxim today.
A troubling example of cross subsidization for Bonbright was the tendency of senior governments in North America during the post-WWII period to subsidize the expansion of electrical utility service to rural areas (Bonbright 1961: 62, 68). These programs resulted in situations in which rural customers paid less than the full costs incurred to provide them with electricity. Either urban residents made up the difference by paying more than what it actually cost to provide them with service, or rural service was subsidized by government. Governments provided a range of rationales in support of below cost rural electrical rates. The provision of electrical utility service was widely viewed as an indicator of social and economic progress (Archer 1980; Bakker 2010; Champ 2001; White 1968). It was consistent with the expansion of the welfare state during the post-WWII period. Bakker (2010: 52) describes this rationale in connection with the widespread adoption of the municipal hydraulic paradigm during the 20th century whereby access to safe drinking water and sewage disposal became a “material emblem of citizenship” in modern democratic societies. Furthermore, there was concern in some jurisdictions, including Saskatchewan, that if rates were set high enough to achieve full cost recovery in the short run, many rural residents would be reluctant to acquire the service. The expense of delivering power to widely dispersed rural customers and the ability to recover costs would become even greater with lower subscriber numbers. Offering lower than cost initial rates, it was assumed, would encourage a higher number of connections and offer greater potential to capture a higher proportion of actual costs over the long-term (White 1968, Champ 2001, SRRP 2007). An additional argument in support of lower rural rates was concern about the sustainability of family farm agriculture. The 1930s and 1940s had been economically challenging for agriculture
in various jurisdictions, including parts of western Canada, and there was political support for providing government assistance to farmers (Gray 1967).

Bonbright is similarly opposed to assisting low-income customers through the rate system. Lower rates for the poor equates with their being cross subsidized by the less poor. Bonbright concedes that there are important “diffusion benefits” associated with public health measures such as universal vaccination programs and, by extension, one would assume the provision of safe potable water and sewage disposal (Bonbright 1961: 24). Nevertheless, he argues that the utility rate structure is not the appropriate place to be implementing social welfare measures. According to Bonbright, trying to assist poor people through subsidized utility rates adds to the complexity of an already complex rate setting process. Other instruments such as a progressive tax system and social welfare programs are, he claims, better suited to supporting low-income people.

… public utility rates are ineffective instruments by which to minimize inequalities in income distribution and that alternative instruments (including public education, social security laws, progressive taxation, and possibly even some form of socialized medicine) are better designed to accomplish this objective even on the assumption that the objective itself is desirable. (Bonbright 1961: 30, 31)

Bonbright’s position is reflected in the Organization for Economic Co-operation and Development’s (OECD) 2003 position on water pricing which holds that it is preferable to apply full cost marginal pricing to water than it is to subsidize water rates on behalf of efforts to provide service to the poor (Jones 2003: 12).

Despite Bonbright’s admonition, many (but by no means all) North American municipalities employ increasing block water rate structures which provide a lower-priced rate block, often referred to as a “lifeline rate,” that purportedly allows low-
income people to meet their basic needs at a lower than full cost rate (Pashardes et al. 2002a: 5; Renzetti 2007: 269; Bell and Griffin 2008: 2). A lifeline block might offer a lower than full cost rate for the first 3,000 gallons a household uses in a given month.² Use beyond this basic needs level falls into higher use blocks with higher per unit prices. It might be argued that lifeline rates are non-discriminatory in that use within the lower rate block is available to all customers regardless of income status. However, Olmstead and Stavins (2008), contend that they are nonetheless a form of cross subsidization because water use within the higher blocks subsidizes lower block use and is therefore prejudicial to the higher income customers who are more likely to be using more water (e.g., for lawns and swimming pools).

Renzetti (2002), and Renzetti and Busby (2009: 35) support the marginal full cost pricing principle, yet they recommend lifeline rates. Renzetti also, and somewhat contradictorily, assumes that given the low cost of potable water in Canada, “there is no reason to believe current water pricing in Canada harms many low-income households” (Renzetti 2002: 165). For Renzetti, this suggests there is some latitude for increasing prices without jeopardizing social equity – a contention that will be challenged by research presented later in the thesis. Pashardes, Swanson and Xepapadeas (2002a: 5) contend that increasing block rates constitute a form of progressive social policy similar to progressive income taxes and can potentially be used as a tool for both social justice and conservation. On the other hand, decreasing block rates that discount higher block use rates are held to be socially regressive and inimical to conservation.
3.4 Bonbright’s BMPs

Bonbright distils his principles down to eight key points, or what might be referred to as best management practices (BMPs) for setting utility rates. The list is provided below and followed by an assessment of the implications of their application to water utility governance.

Bonbright’s Eight Utility Rate Making Principles

1) Simplicity and public acceptability
2) Freedom from controversy
3) Revenue sufficiency
4) Revenue stability
5) Stability of rates
6) Fairness in the apportionment of total cost
7) Avoidance of undue rate discrimination
8) Encouragement of efficiency (Bonbright 1961: 291)

Simplicity, freedom from controversy and rate shock

Bonbright’s first two points recommend simplicity and transparency in the rate making process. He maintains that the public and utility customers (often one in the same) are less likely to object to processes conducted openly involving the forms of due process typically expected of agencies responsible for safeguarding the public interest.

Reducing controversy over rates is, in part, accomplished by ensuring that rates remain relatively stable. Volatility should be minimized and rate increases should be applied incrementally as opposed to large abrupt increases which customers tend to have more difficulty managing. Ensuring rate stability requires that current rates should stand as indicators of “rates to be charged at over a somewhat extended period in the future” (Bonbright 1961: 334). Rate adjustments should be based on long-term marginal costs as opposed to “those highly volatile costs reflected by short-term marginal costs” (Bonbright 1961: 334)
Bonbright’s caution against setting rates that might prove controversial or politically unacceptable, is recognized by utility regulators today through efforts to avoid “rate shock.” Rate shock is a result of the abrupt imposition of steep rate increases (SRRP 2009: 22, 27). Rate shock is particularly problematic in relation to services that are non-substitutable or have non-discretionary uses. Households can have difficulty adjusting their budgets to meet sharp rate increases for necessities; particularly over the short term. This can have social equity implications since people with low incomes can experience greater difficulty in adjusting to higher rates than high-income customers (Mieno and Braden 2011). Olmstead et al. (2008) describe how abrupt rate increases and increases thought to be excessive can prove politically unacceptable. They point to the example of Tucson, Arizona in the 1970s when after two years of drought the City Council imposed marginal full cost pricing for water and was voted out of office at the next election (Olmstead et al. 2008: 15, 16). Cases presented later in the thesis will describe how the imposition of new water quality guidelines by the Government of Saskatchewan in 2002 and climate related water supply crises have contributed to rate shock and public opposition to water rate increases in some communities over the past decade.

Revenue sufficiency and stability

Bonbright’s third point, revenue sufficiency, is supported by market-based water governance advocates and market environmentalists today and is typically referred to as full cost recovery. As noted earlier, this principle requires utilities to be self-sufficient -- operated on a user pay basis that avoids, or at least reduces, the need for additional grants in support of operations and infrastructure financing. For market environmentalists it contributes to conservation by pricing water at its “real” value.
Revenue stability refers to the utility’s need to obtain the revenues required to cover costs over the long-term. If, for example, during a warm winter utility customers purchase lower volumes of electricity or natural gas the resulting loss in revenue could hypothetically jeopardize the financial sustainability of a utility. Utilities need to be assured that rates can be set accordingly. This principle presents a challenge to those who conflate environmental objectives with utility rates. If for example, a water utility is confronted by a summer with above average rainfall and a corresponding decline in lawn watering, its revenues will presumably be lower than in an average year. In order to meet its revenue requirement, the utility may wish to raise rates. Conversely, a dry summer with high levels of lawn watering can serve to increase revenues. The problem this presents to those who see water prices as a means to support conservation is that in the first instance the pressure on the utility to increase water rates comes from the fact that water (in the form of rainfall and higher reservoir levels) has become more abundant not more scarce. The second scenario conforms to the situation faced by Saskatchewan’s Crown-owned water utility, SaskWater. The corporation’s first profitable year (following its creation in 2002) was 2006 which had a hot dry summer. Customers used more water than they had in previous years which generated higher revenues and a profit. At the same time the corporation’s communications office was investing in the promotion of water conservation, e.g., the installation of low flow appliances. A contradiction is observed in this instance, whereby by the corporation’s putative efforts to promote water conservation were in conflict with the shareholder’s (Crown Investments Corporation of Saskatchewan) profit objectives.³
This author contends that the situation just described demonstrates one of the principle paradoxes inherent in the conflation of market environmentalist principles with market-based utility management. The contradiction resides in the failure to clearly differentiate between the value of the commodity (water) from the cost of its withdrawal from nature, treatment and delivery.

Bonbright appreciates the distinction. For example, he writes that the wasting of economic resources can occur when a utility’s infrastructure is operating at less than full capacity. Advocates of market-based water governance in Canada, (e.g., Renzetti and Busby 2009) have based their support for full cost recovery partly on the assumption that too many municipalities have difficulty financing water infrastructure expansion without grants and special financing arrangements because they have historically charged rates that were too low. But, Bonbright indicates that utilities are not always encountering such limits. For example, when major new utility infrastructure works are built they frequently allow for growth in their customer base over their life spans. This occurs in Saskatchewan when municipalities, irrigation districts, or rural pipeline associations are anticipating growth. Bonbright (1961: 14) indicates that one of the strategies that occurs to managers of a for-profit utility corporation facing unused capacity is to offer discounts to encourage higher use in order to make fuller use of expensive unused capacity and generate additional revenues and profits. For the utility, waste can be represented by unused capacity, whereas an environmentalist might view discounted water rates as wasteful of water.
Fairness in total cost apportionment

For Bonbright, fairness in cost apportionment implies higher charges for those who use more of the service and lower charges for those who use less. In other words, higher charges should apply to those who cost the utility more and lower charges should apply to those who cost it less. Under points six and seven he is referring to how those costs can be spread fairly among customers.

While Bonbright opposes the cross subsidization of rates between groups such as high and low income earners or between small businesses and residential customers, his methodology allows for the construction of various rate classes and for different rates to be charged to those different customer classes. For example, utilities should be concerned about the need to build for peak demand. For municipal water utilities, peak demand typically occurs during the hotter days of summer when parched lawns, gardens, golf courses and parks require the most watering. As noted previously, Renzetti and Busby (2009) contend that avoiding infrastructure expansion costs can be addressed in part through conservation inducing price increases. Others might recommend conservation programs including education or incentives to purchase low flow appliances or recycle wastewater (Fishman 2011). Notwithstanding the relative efficacy of these sorts of strategies, large North American electrical and natural gas utilities often create special discount rate classes for customers who agree to curb their consumption during peak demand periods.4

Similarly, discounts are sometimes made available to large customers who are willing to accept interrupted electrical service. By having the option of rerouting electricity during a period of high demand, or because of an equipment breakdown, the
utility can potentially maintain service to other parts of the system. The rate
discrimination involved in these sorts of classifications is justified by the proposition that
the benefits of avoiding the cost of infrastructure expansion accrue to all customers in the
system. That said, in practical terms the discounts are not available to all customers.
Utilities typically lack the technical capacity required to apply interruptible and peak
period discounts to all of the individual households and businesses that might want them.

Electrical and natural gas utilities typically break their customer billings into
charges for delivery costs that include system operation and maintenance costs (a flat or
fixed connection fee) and a volumetric charge for the quantity of the commodity (e.g.,
electricity or natural gas) used. The natural gas or electricity (the commodity) consumed
by a customer is typically listed separately from the cost of its delivery. A utility wishing
to charge a higher delivery fee to account for things such as the longer distance required
to service a farm as opposed to an urban residence might do so without altering the
system-wide volumetric rates for consumption. A water utility, such as one of
Saskatchewan’s rural water pipeline associations, might wish to charge customers located
a long distance from a water treatment station or a more densely packed customer cluster
a higher fee. However, since source water typically cannot be legally bought or sold in
Saskatchewan (and most other Canadian provinces), it is technically impossible to have a
separate volumetric charge for the water per se. In reality the volumetric and delivery
charges are the same thing – a delivery charge. In other words, while the water bills
received by many of Saskatchewan’s urban residents include volume-based charges,
those fees are in reality withdrawal, treatment and delivery fees. They are not a
commodity fee. Attempting to use pricing to manage demand under these circumstances
produces a somewhat awkward conflation of water conservation objectives and widely accepted utility management practice.

The marginal cost concept that market environmentalists recommend ideally involves the setting of water use rates so that users pay the full cost of each additional unit of water they consume -- although, the employment of volume based block rates is widely accepted along with the mathematical complications they impose. Therefore, the price for each additional unit of water consumed within a particular block should approximate the cost of providing that unit. Again, customers pay more if they use more (Renzetti 2002; Renzetti and Busby 2009).

However, if we turn the problem around and look at it from the perspective of the water utility, the next unit of water that a customer consumes does not necessarily cost the utility more than the previous unit cost the utility to produce. Again, since in nearly all Canadian jurisdictions raw water is free, the costs incurred by utilities are for providing the infrastructure along with the withdrawal, treatment and delivery of the water. When a water utility operating at less than full capacity acquires a new customer connection, or perhaps a cluster of new customers in a new subdivision, the cost of servicing the new customer(s) could well be below the average cost of providing service to pre-existing customers. Bonbright (1961: 14) explains that the per unit marginal cost of servicing the new customer is often lower than the average cost per pre-existing customer because fixed costs typically become lower per customer when spread over more customers. The new customers in this sort of circumstance should receive service at a lower rate than pre-existing customers or indeed everyone’s water should be made less expensive (assuming we are employing the full cost recovery principle). On the other
hand, if servicing a new customer or cluster of new customers in a new subdivision exceeds the capacity of a utility’s existing infrastructure, requiring measures such as treatment plant expansion, new pumping stations, larger and/or longer supply mains, et cetera -- the marginal costs incurred to service each of the first new customers might be millions of dollars.

Another widely accepted BMP emanating from Bonbright holds that existing customers should not be required to bear the costs a utility incurs to obtain new customers. The underlying principle being that he or she who obtains the benefit should incur the costs (Millerd 1984: 9). Bonbright similarly states that rate schedules should allow consumers to purchase all the service they want at the price that they like but should not require them to pay for service that they don’t want (Bonbright 1961: 153). In other words, if a developer wishes to construct a large new subdivision, the developer and/or the residents of that subdivision should be expected to shoulder the full cost of service expansion. However, in actual practice urban municipalities in Saskatchewan rarely, if ever, charge higher water rates to new customers in new subdivisions that are within their corporate limits. Subdivisions located outside the city limits wishing to connect to a city’s treated water system are another matter. There are subdivisions and bedroom communities surrounding Saskatoon that are provided with water by the cities at rates that cover actual costs along with a markup.5

Research findings presented in Chapters 9 and 10 of this thesis describe the cost allocation challenges confronting irrigation districts and regional water pipeline associations in Saskatchewan. These arise when new systems are being organized or major expansions are envisioned. Foreshadowing that discussion, we find that the most
widely adopted solutions involve cost sharing arrangements that do not conform to the principle of marginal full cost recovery.

**Efficiency**

Bonbright’s eighth point, the encouragement of efficiency, recognizes the challenges associated with the regulation of monopoly enterprises. Given their monopoly status, public utilities are not fully subject to the forces that put pressure on firms in more competitive situations to control costs. Bonbright’s rate setting model bases the prices charged to consumers on the total costs incurred by the utility and requires regulators to assess whether those costs are legitimate. Are revenues high enough to allow for effective maintenance and infrastructure replacement or is the utility perhaps selling its services at an inappropriately low rate to increase the volume of sales and short-term profits? Are costs excessive, due perhaps to poor management, runaway labour costs, excessive executive salaries, or excessive profit taking? For Bonbright (1961: 156), a critical test is whether rates are sufficient to attract capital to a utility business. Currently the Saskatchewan Rate Review Panel, a utility rate monitoring agency, applies a variety of tests to determine the reasonableness of a utility’s cost structure. The efficiency yardsticks employed include cost comparisons with other public and private Canadian utilities. Other factors such as inflation rates measured via the consumer price index and local labour markets statistics contribute to the analysis. And while it is not by any means the central focus of Bonbright’s concern in regard to efficiency, the waste of natural resources, as noted above, is something that he allows utility regulators should attempt to avoid.
**Fair rate of return**

Bonbright is not entirely unequivocal regarding the most appropriate method for determining the level of profit that utilities are entitled to. He identifies a number of the challenges confronting regulators when attempting to define fairness. One of the regulatory challenges he identifies in relation to determining reasonable rates of return is that public utilities are usually considered to be too essential to fail. According to Bonbright, determining appropriate or fair rates of return involves the assessment of comparative rates of return on investments in unregulated industry and financial markets (Bonbright 1961: 121,122). However, if comparable rates decline significantly, perhaps due to a general economic downturn, those responsible for ensuring the ongoing provision of important utility services have a problem. Suppose the economic downturn is severe enough to produce temporary plant closures, permanent shutdowns or bankruptcies in comparable industries. Clearly, shutting down water, electrical or natural gas utilities until economic conditions improve is out of the question. Similarly, failing to maintain the corporate credit of a private utility service provider during a recession raises the possibility that finding other investors to purchase and operate a utility that bankrupted its previous operator could be a tough sell. Therefore, the capacity of the utility to attract capital becomes a proxy measure for fairness (Bonbright 1961: 122). Regardless of how a supposedly unfettered marketplace might treat a money-losing firm, regulators can prove reluctant to allow utilities to go bankrupt. Barring the option of having municipal or senior governments take over financially troubled utilities (an unattractive option for Bonbright), the solutions that remain include allowing the utility to charge rates which exceed the returns on investment available to other firms and
investors in a depressed economy. Alternatively, grants, subsidies or special financing can be provided by government to see the utility through an economic downturn. One might reasonably identify these options as practices that enable rent seeking on the part of utilities. In the absence of regulatory balancing, private and public water utilities are protected from failure and have the capacity to garner extraordinary profits – or more colloquially, they have “a license to print money.”

3.5 The elasticity problem

Given the consensus among market environmentalists and proponents of market-based water governance about the important role played by prices in managing water demand, it is somewhat remarkable that many economists also contend that “the sensitivity of residential water demand to price changes is quite low” (Olmstead et al. 2003: Abstract). Residential water demand is relatively price inelastic. Mieno and Braden (2011: 721) report elasticities ranging from -0.02 to -0.489, depending on variables such as the type of use, seasonality and household income levels. Olmstead and Stavins (2008: 7) report on a meta analysis that identifies a median short-term elasticity of 0.38 and a long-term elasticity of -0.51. The elasticities reported in the literature reviewed by this writer were all below -0.60. North American residential water use rates, particularly in winter, are simply not very sensitive to changes in price. Economists confront additional challenges when attempting to identify the effects of price elasticity of demand for water used in agriculture and industry, where a complex mix of factors such as climate, commodity prices and a variety of non-water input costs can affect demand for water.6

Renzetti (2002) acknowledges the somewhat contradictory nature of views held by market environmentalists who are convinced that raising residential water prices can
assist in conservation initiatives with the relative inelasticity of residential water demand. “Economic factors such as the price of water and household income clearly play an important role in water use. Nonetheless it is also quite clear that residential water demand, with the possible exception of outdoor use in the summer, is price and income inelastic” (Renzetti 2002: 33).

Mieno and Braden’s (2011) study of residential demand in the Chicago area provides insights into how the socioeconomic and cultural characteristics of residential water demand influence elasticity. They divide residential water use into non-discretionary and discretionary categories. Non-discretionary water use involves meeting basic human needs for water – those needs related to nutrition and sanitation (drinking, cooking, housecleaning, laundry and toilet flushing). Discretionary uses are largely outdoor uses that occur primarily during the summer period. These include lawn, garden, park and golf course watering, filling swimming pools and washing cars. Not surprisingly, apartment dwellers tend to use less discretionary water than people living in single unit dwellings with yards. Generally speaking, the larger the yard the higher the consumption (Olmstead, Hanemann and Stavins 2003; Mieno and Braden 2011: 715). For obvious reasons, non-discretionary use rates tend to be relatively resistant to changes in price (Taylor, McKean and Young 2004: 414). However, while there are no substitutes for the water people require to meet their biological needs, some traditionally non-discretionary uses can become discretionary (or substitutable) depending on the availability and cost of water saving appliances such as low flow toilets and new wastewater treatment technologies that allow for water recycling. Conceivably, many discretionary residential uses could be curtailed during a water supply emergency and
water saving practices such as xeriscaping and low flow appliances offer opportunities to reduce regular consumption rates (Renzetti 2002: 135; Fishman 2011).

Mieno and Braden (2011) and Olmstead and Stavins (2008) have found that discretionary residential use elasticities are affected by income levels. Higher income neighbourhoods, where lot sizes are larger and fewer people live in apartments, tend to use more discretionary water than lower income neighbourhoods. Furthermore, non-discretionary water use in higher income neighbourhoods is less sensitive to increases in water prices than is the case in lower income neighbourhoods. Mieno and Braden contend that social equity problems arise when pricing is used for water demand management “because lower income households would contribute a disproportionate share of use reduction” In other words, “the higher the income the less sensitive people are to a change in price” (Mieno and Braden 2011: 714, 919). As described by Mieno and Braden discretionary uses constitute a qualitatively different commodity form of water than non-discretionary uses. Fully understanding elasticity of demand for water requires separate assessments of each form of consumption and the income levels of households. Mieno and Braden’s (2011) work underlines the notion that lifeline rates accounting for non-discretionary uses complement efforts on behalf of social equity.7

The case studies presented later in this thesis suggest that in certain water use and supply contexts price is not perceived by water management practitioners as the most effective tool for managing water demand. For example, the most commonly experienced water stress faced by small rural-urban centres in southwestern Saskatchewan involves critically low reservoir levels associated with increased lawn and garden watering on hot summer days. Not only do even-day odd-day and nighttime only rationing regulations
tend to solve short-term supply shortages, they are perceived to be far simpler to administer and understand than seasonally fluctuating rate structures based on arcane mathematical formulas. Conversely, Olmstead and Stavins (2008: 15) and Olmstead Hanemann and Stavins (2003: 3) note that many economists contend that the monitoring and enforcement costs (transaction costs) are the downfall of rationing through regulation. Clearly, there is a lack of agreement between those economists who support the efficacy of price signals as a conservation tool and the water management practitioners interviewed in connection with this thesis.

**Metering and rate shock effects**

While price management might not always do everything that market environmentalists claim it can do, there is one particular facet of volumetric water pricing that appears to have a significant impact on water demand. The installation of water meters on customer connections in combination with the introduction of volumetric charges has produced significant reductions in use rates. Renzetti (2007: 265), for example, reports a 70% reduction in water use in Canadian jurisdictions which moved from flat monthly water rates to metered volumetric pricing systems. Similarly, Olmstead et al. (2008: 9) report a 30% increase in elasticity of demand for water when utilities include volumetric price information on water bills. The field research supporting this thesis includes comments from municipal water administrators who report that metering and volumetric charges encourage people to be more conscious of the water they were using. However, as numerous studies of the elasticity of residential water demand suggest, following any initial use reduction effect associated with the installation of meters, water demand eventually becomes more normally inelastic. One might
reasonably speculate that metering decreases the incidence of wasteful practices such as failing to repair faulty plumbing fixtures or continuing to apply water to the lawn even though it is saturated and water is running into the street. Once obviously wasteful practices are curbed, users will nonetheless run up against the limits imposed by the non-discretionary characteristics of many water uses.

Research presented later in this thesis describes how rate shock can produce an effect similar to that produced by the installation of meters. Abrupt, large rate increases can contribute to use reductions and efforts by consumers to repair faulty plumbing and appliances.

3.6 The wastewater problem

One of the core arguments in support of marginal full cost pricing of water is to conserve scarce supplies. Another reason for reducing use rates is that much of the water used by households and industry is contaminated through use and requires treatment before being discharged back into the environment. Untreated or poorly treated effluent can have negative effects on ecosystems and the quality of the source water that communities rely on for raw supplies. And, some observers (e.g. de Villiers 2003; Fishman 2011) note the distressing fact that even effluent that meets current environmental standards in North America contains chemical and pharmaceutical residues and that no one is quite sure what the long-term environmental and health implications of this might be.

It is difficult to imagine how, in a hypothetical unfettered marketplace, businesses could find a way to make money treating sewage to the standards required for source water protection and the protection of public health in the absence of government
regulatory standards, monitoring and enforcement. As was noted in Chapter 2, this was one of the reasons that municipalities began adopting the universal provision model in the mid-19th century. Public health concerns required that proper wastewater disposal be considered a public good that governments manage.

Furthermore, environmental contamination, including the contamination of source water is generally considered to be an aspect of market failure – the relative inability of markets to account for externalities. Pashardes, Swanson and Xepapadeas (2002: 11) acknowledge that “some or all of these externalities are ignored by private agents choosing their water use to maximize profits.” There are therefore economists and market environmentalists who concede that some form of government regulation is required to mitigate adverse externalities, typically through setting regulatory standards around effluent quality. Once that point has been conceded the focus for economists has involved identifying the appropriate methods for assigning costs to pollution mitigation and the water users responsible for it (Renzetti 2002: 68; Bell and Griffin 2008: 6).

3.7 Concepts from the field of public policy analysis

The thesis makes considerable use of concepts derived from the field of public policy analysis. The use of these concepts reflects a theoretical position which assumes certain organizational characteristics are the outcome of social processes that produce identifiable and recurrent patterns of behaviour. This approach reflects sociological approaches to understanding organizations and elites. Classical Weberian scholarship (e.g., Michels 1959), for example, suggests that the appearance of various patterns of organizational/bureaucratic behaviour can transcend the original goals of institutions. In this sense, one might reasonably infer that there are features and patterns of
organizational behaviour and performance that apply to each, some, and perhaps all, water governance institutions and agencies regardless of the paradigmatic form upon which they are based. Concepts which have proven particularly helpful in assessing water governance for the purposes of this thesis include Deborah Stone’s (2002: 359) concept “strategic representation” whereby policy making bodies attempt to characterize policy objectives in terms that are most readily acceptable by the public; particularly by those who hold ideological perspectives that might not readily embrace policy measures associated with a particular paradigm. Another useful concept is Kingdon’s (2003: 173-175) notion of policy windows. Indeed, as the discussion in subsequent chapters of this thesis will demonstrate, the two most significant developments in water governance policy in Saskatchewan (e.g., the creation of the PFRA and the 2002 Safe Drinking Water Strategy) arose in conjunction with crises, or complacency disruption events, which provided windows of opportunity for the adoption of substantive new policy initiatives. The research also demonstrates the impact of political/election cycles on water governance policy making and policy consistency (Kingdon 2003: 173-175). An assortment of additional terms and concepts that feature in the field of academic policy analysis appear in the thesis, and the author endeavours to define them and support their applicability to his argument. Some of those which make frequent appearances include gold plating and one-size-fits-all programming (Jans 2009; Conca 2006: 6).

Chapter 3 notes

1) Bonbright’s (1961) Principles of Public Utility Rates remains the classic study in the field and is regularly cited as the ultimate source of best practices in utility rate regulation. Berg and Tschirhart (1988: 7), for example, reproduce his eight principles and note the important role Bonbright’s methodology plays in the regulation of natural monopolies. The Saskatchewan Rate Review Panel (SRRP), the agency responsible for advising the provincial government on the advisability of utility rate changes proposed by the province’s electrical and natural gas utilities and the provincial auto insurance monopoly, applies the Bonbright principles in its rate review deliberations (SRRP 2007: 43; SRRP 2008: 7).
2) In Chapter 9 of this thesis the rationale for the 3,000 gallons per month consumption ceiling for lifeline rates is provided. The 3,000 gallon threshold is assumed to meet the basic biological and sanitation requirements of an average size family which employs commonly available conservation appliances and practices.

3) SaskWater’s 2001-2011 financial performance is discussed in Chapter 5 of this thesis.

4) In Saskatchewan, large industrial consumers of electricity such as the Evraz steel plant at Regina have been placed in the class of customers receiving rate discounts in exchange for agreeing to reduce their use of electricity during demand peaks (SRRP 2008).

5) Chapter 11 of this thesis describes the operation of regional pipeline associations in Saskatchewan, and notes that subdivisions outside the corporate limits of Saskatoon which purchase water treated at the Saskatoon water treatment plant pay a significant markup over Saskatoon residents. Similarly, customers on the regional rural pipeline supplied by SaskWater’s Gravelbourg water treatment plant, pay higher rates than residents of Gravelbourg. In fact they pay the highest rate for potable water of any residents of the communities studied in support of this thesis.

6) Agricultural demand (for irrigation water) is obviously influenced by climate factors as well. If a region receives significant rainfall during the growing season the demand for irrigation water declines. Additional factors influencing the value irrigation farmers place on the water they use include land values, the prices they receive for the commodities they produce, the prices they pay for non-water inputs and the cost of water saving technologies (Karagiannis, Tzouvelekas and Xepapedas 2002; Renzetti 2002; Burt 2007). Industrial water demand is affected by the economic conditions that obtain for any particular company at a given time, the availability of purchased water substitutes such as water re-use/recycling and the cost effectiveness of water saving technologies (Renzetti 2002).

7) The problem that Mieno and Braden (2011) were grappling with involved a directive made by Illinois state water regulators requiring a 3% reduction in residential water demand. As expected, they found that a much smaller price increase would be required to produce use reductions in lower income communities than would be required in higher income communities. For example, reducing residential water use by 3% would require a price increase of just 6.7% in a community where incomes averaged $45,900. In another study community where average income was $71,400, a rate increase of 77% would be required to obtain the 3% reduction in demand. For the lower income community, the rate increase would amount to 0.74% of household income. Whereas, for the higher income community it would be 0.45% of household income. Important issues emerging from Mieno and Braden’s findings are: 1) the inequities associated with the higher impact of prices on lower income households; 2) the potential for rate shock issues and public opposition associated with a double digit increase in public services; and 3), the seasonality of water price elasticity. The table provided below summarizes Mieno and Braden’s findings regarding the relationships between seasonality and income levels to water price elasticity.

<table>
<thead>
<tr>
<th>Community</th>
<th>Average Income</th>
<th>Winter Elasticity</th>
<th>Summer Elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addison</td>
<td>$45,900</td>
<td>-0.402</td>
<td>-0.489</td>
</tr>
<tr>
<td>Naperville</td>
<td>$71,400</td>
<td>-0.020</td>
<td>-0.066</td>
</tr>
</tbody>
</table>

Based on Mieno and Braden (2011: 721)
CHAPTER 4: Methodology

4.1 Introduction

The first of the two principal research questions posed by the author seeks a characterization of the water governance and management systems employed in the Saskatchewan portion of the Palliser Triangle. In addressing this question, the author assesses institutional dimensions of water governance in Saskatchewan. The dimensions considered include: the structure of decision making authority, including its jurisdictional distribution; identifying the principal agencies charged with water governance and management; describing the policies and programs developed and administered by those agencies and; assessing the degree to which the institutional system conforms to features of the dominant paradigms.

The relevance of an institutional focus in assessing water governance and management systems is described by Johns and Rasmussen (2008) who write:

… an overview of institutional arrangements at various levels in the Canadian federal system based on the fundamental assumption that it is critical to understand the historical development and evolution of Canada’s water management institutions in order to analyze the current policy context of political conflicts related to multiple water users across the country.(Johns and Rasmussen 2008: 59)

Hurlbert et al. (2009: 120) identify the importance of assessing the role and performance of government agencies along the various levels of a given power continuum, stating that, “Institutions always operate in a hierarchical context, where larger (usually public) institutions tend to shape the operational context in which local and informal institutions function.”
The institutional assessment relies, in part, on interviews with water governance and management practitioners. It also examines government documents and publications, and published assessments produced by scholars and non-governmental organizations. Elements of the institutional assessment appear throughout the chapters of the thesis that follow, however, Chapter 6 focuses significant attention on the role of senior government agencies in water governance in Saskatchewan.

The second principal research question posed by the author requires an assessment of the capacity of the systems employed in the study area to address conservation, social equity and infrastructure related objectives. It also asks whether the operation of these systems reflects the objectives of the policy makers who designed and implemented them. The author contends that while constitutionally derived authority for water governance might be vested in senior governments and their agencies, the practical manifestations of that authority are typically experienced at the community and/or watershed level. Furthermore, despite the roles and authority vested in senior governments, community-based actors are not without influence in shaping water governance and management at the local level. The research effort employed to identify and assess the community-based features of water governance and management relies, in large part, on interviews with water governance and management practitioners and water users located in the study communities. The data supplied by interviews are supplemented by research along other lines of sight including: the institutional assessments previously described; published literature and government documents and statistical reports. The community-level facets of water governance and management combined with the institutional assessment provide a foundation for characterizing the
systems employed in Saskatchewan in relation to the dominant paradigms presented in the literature. The combined effect of employing various lines of sight similarly facilitates assessment of the capacity of the paradigmatic forms observed to meet the objectives identified in relation to the second research question.

4.2 The utility of triangulation

The research design incorporates what Berg (2007) refers to as “multiple lines of sight” or “triangulation” into the assessment process. According to Berg, “by combining several lines of sight, researchers obtain a better, more substantive picture of reality; a richer, more complete array of symbols and theoretical concepts; and a means of verifying many of these elements” (Berg 2007: 5).

While published literature and government documents contribute to this assessment, the author also relies on interviews with water governance and management practitioners working in senior and municipal government; in community-based agencies such as irrigation districts and regional pipeline associations; and with individual urban community residents and farmers. The community-based assessments combined with the institutional assessments, similarly, contribute to the author’s effort to employ a triangulated research approach.

The capacity to corroborate and/or compare perceptions about the performance of the water governance and management systems operating in the study communities is valuable given that the research uncovers varying accounts of reality. Theoretical perceptions about the capacity of various paradigms to provide for optimal water governance do not necessarily coincide with the circumstances that emerge in association with their practical application. Similarly, the accounts provided by government officials
and government publications about the benefits of a particular policy measure or program do not always coincide with the accounts of community-level respondents who are expected to live with the results.

Deborah Stone’s (2002) interpretation of “strategic representation” is helpful in identifying the importance of checking the purported objectives of government policies against the possibility that governments entertain unstated objectives. For example, Stone suggests that the documents produced by government agencies for public consumption are not always informative because governments often present policies in terms most likely to gain the widest possible public approval. Policy makers “deliberately fashion portrayals so as to promote their favored [sic] course of action” (Stone 2002: 133). Furthermore, Stone contends policy makers tend to describe policy initiatives in ways least likely to fuel opposition. Spencer (1986: 25) cautions, “Given the efforts of the bureaucracy to protect its public image and by the bureaucrat to protect his career chances, it is easy to see why it is difficult to carry out independent research on questions that are controversial…” Similarly, Argue (1999: 96) warns that public documents do not always reflect the whole record of an administration – the material that makes it into the public domain has been subjected to culling.

The researcher may reasonably expect to discover that the accounts of respondents at the community-level do not always coincide with information provided by government officials or available through academic sources. For example, interviews conducted in support of this thesis with farmers indicate that there is considerable dissatisfaction with elements of the Saskatchewan Crop Insurance Corporation’s insurance schemes. However, promotional material published by the corporation suggests
that many of the problems identified by respondents have supposedly been resolved by program changes over recent years (RCAD 2012; Warren and Diaz 2012). Similarly, while virtually all of the farmers interviewed in association with this thesis appreciate that the climate has undergone major changes in recent decades, very few of them accept the scientific consensus around anthropogenic global warming (Warren and Diaz 2012: 351, 352). While the author does not claim that the research model identifies the “correct” version among differing accounts, it nonetheless demonstrates that differing accounts are in operation and have the capacity to affect outcomes and contribute to conflict.

4.3 Research design

Regional focus

The Saskatchewan portion of the Palliser Triangle provides the geographical setting for this thesis. Climate and hydrological conditions in this region facilitate the examination of water governance and management systems under conditions of relative scarcity when compared to other regions of Canada. The author contends that these geographic conditions facilitate an assessment of the utility of market environmentalist maxims. Market environmentalism and market-based water governance purport to offer solutions to the problems of water scarcity and inadequate infrastructure. Renzetti and Busby (2009) promote the adoption in Canada of the marginal full cost pricing systems associated with market environmentalism but concede that in much of the country the relative abundance of freshwater has retarded the adoption of market-based solutions (Renzetti and Busby 2009: 33)
Accepting Renzetti and Busby’s proposition, it is reasonable to assume that in a region of Canada where water is in relatively short supply, the principles and practices of market environmentalism and market-based water governance should be relatively more applicable than they would be in regions where water is more abundant. Sauchyn and Kulshreshtha (2007: 277) report that “The Canadian Prairies are Canada’s dry region” – and this author proposes that a reasonable case can be made to the effect that if market-based water governance and market environmentalism are applicable anywhere in Canada (given Renzetti and Busby’s qualification), it should be on the Prairies.

Recurrent short-term water deficits (drought) impact the economy, environment and culture of the Prairies. Seasonal water deficits occur in all regions of Canada, but only in the Prairies can precipitation cease for more than a month, surface waters disappear for entire seasons, and water deficits persist for a decade or more, putting landscapes at risk for desertification. (Sauchyn and Kulshreshtha 2007: 278)

While the Prairies are relatively dry compared to other regions of Canada, there are some areas of the Prairies that are considerably drier than others. The drier regions are contained within what is referred to as the Palliser Triangle. That region encompasses a large portion of the Canadian Prairies including a small section of southwestern Manitoba, the southwesterly third of Saskatchewan’s agricultural area and a large portion of southeastern Alberta. Drought related water stress is more commonly experienced within those portions of Saskatchewan located within the Palliser Triangle than those outside its boundaries (Marchildon, Pittman and Sauchyn 2009: 32). Chapter 5 of this thesis provides an overview of the climate and hydrological conditions that constitute the underlying material environmental conditions that influence the region’s water governance and management systems.
The Saskatchewan portion of the Palliser Triangle also provides the researcher with the opportunity to examine the effects of water governance and management systems in a region which has experienced considerable economic stress and community decline. For decades, the farm economy in the region has been affected by increasing input costs and relatively stagnant commodity prices (Diaz, Jaffe and Stirling 2003; Lonechild and Williams 2008). The challenges in agriculture have contributed to significant demographic shifts in the region. Farm size has increased and the number of farms and farmers has declined. Similarly, many of the smaller towns and villages in the region have been experiencing long-term population decline. Dozens of smaller centres have ceased functioning as viable municipal entities and have reverted to hamlet status or disappeared altogether. Many more communities are expected to disappear by the mid-point of the current century (Lonechild and Williams 2008; Stabler and Olfert 2002).

Given these challenges, the region provides an opportunity to assess the impacts of water governance and management policy on communities already struggling to meet sustainability challenges. It allows us to consider the effects that various water governance and management practices can have on community sustainability in situations where multiple stress factors are in operation (Chapter 1 of this thesis also describes elements of the rationale for the regional focus).

Assessing institutions and government agencies

The institutional assessment relies in part on the review of documents produced by agencies responsible for various facets of water governance and management, including annual reports and relevant statutes. A number of the documents examined provide insights into government objectives that were not identified in the various
promotional materials presented to the public (SaskWater 2002; SaskWater 2002a; SaskWater 2007). Published sources that inform the assessment of the roles of government agencies are also consulted. These include the 2002 Report of the Commission of Inquiry Re: North Battleford (The Laing Report); publications produced by the provincial association for irrigators (SIPA 2008a; SIPA 2008b); the governance manual for the Saskatchewan Association of Rural Water Pipelines (SARWP 2009); Colligan-Yano and Norton’s (1996) history of the Saskatchewan Urban Municipalities Association and; Saskatchewan AgriVision Corporation’s (2004) fifty year water development plan for Saskatchewan. The author also relies on secondary sources when reflecting on developments in the political economies and electoral politics of Canada and Saskatchewan which have influenced water governance and management in the province (e.g. Brown, Roberts and Warnock 1999; Conway 2010 and; Pitsula and Rasmussen 1990).

In addition to the attention given to documents and published sources, the research effort includes the assessment of 42 interviews with water governance and management practitioners employed by agencies with province-wide mandates. These interviews were conducted in support of the Saskatchewan Water Governance Assessment which was a subsidiary component of the Institutional Adaptation to Climate Change (IACC) project coordinated by the Canadian Plains Research Center at the University of Regina from 2006-2009 (IACC 2009, 2009a). An additional 52 interviews with water governance and management practitioners operating at the community level were conducted in support of the Rural Communities Adaptation to Drought (RCAD) project, coordinated by the Canadian Plains Research Center at the University of Regina.
and independently by the author in support of this thesis (RCAD 2012). An annotated index listing all 267 of the interviews supporting the research effort is provided in Appendix 1.

Water governance interviews

The interviews with water management practitioners conducted in association with the IACC project involved lengthy interviews (approximately one hour each on average) with senior employees from the federal and provincial government agencies most active in water governance and management in Saskatchewan. Thematic guidelines based on water governance issues identified in the literature were developed to facilitate the overall direction of the interviews. However, the structure remained informal enough to provide for the emergence of new themes and issues not anticipated prior to each interview. The respondents included representatives from the Saskatchewan Ministry for the Environment, the Saskatchewan Watershed Authority, the Saskatchewan Ministry of Agriculture, SaskWater, the Prairie Farm Rehabilitation Administration (currently known as the Agri-Environment Services Branch [AESB] of Agriculture and AgriFood Canada), Environment Canada and the Prairie Provinces Water Board. Representatives of a number of Saskatchewan-based non-governmental organizations (NGOs) with interests in water governance and management were also interviewed. Respondents included members from departments and agencies of executive government at the assistant deputy minister, executive director and manager levels as well as some front-line workers. Interviewees from Crown corporations held positions ranging from vice president to department manager and front-line employee positions. While not all of the employees and officials from these agencies with senior positions related to water governance and
management were interviewed, a significant number of key players did indeed participate. The IACC project also conducted interviews with respondents whose activities can be classified as local or community-based in nature. These include interviews with participants in the watershed stewardship committees. The interviews were transcribed and coded for assessment with the NVIVO interview data management system.¹ A complete listing of those interviews by agency is provided in Appendix 1. The coding for interviews provided in Appendix 1 is employed where IACC interviews are cited in the thesis. The use of codes reflects the safeguarding of anonymity provided to respondents under the terms of the University of Regina Ethics Board’s approval of the project. The following table, Table 4.1, provides a by agency summary of interviewees from senior government agencies and NGOs with province-wide mandates.

**TABLE 4.1 Interviews with water governance and management practitioners from senior government agencies and NGOs with province-wide mandates.**

<table>
<thead>
<tr>
<th>Agency*</th>
<th>No. of interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saskatchewan Ministry of Environment</td>
<td>5</td>
</tr>
<tr>
<td>Saskatchewan Watershed Authority</td>
<td>8</td>
</tr>
<tr>
<td>Saskatchewan Ministry of Agriculture (IACC 3), (RCAD 3)</td>
<td>6</td>
</tr>
<tr>
<td>SaskWater</td>
<td>4</td>
</tr>
<tr>
<td>Saskatchewan Municipal Board</td>
<td>1</td>
</tr>
<tr>
<td>Prairie Farm Rehabilitation Administration (IACC 4), (RCAD 5)</td>
<td>9</td>
</tr>
<tr>
<td>Environment Canada</td>
<td>2</td>
</tr>
<tr>
<td>Canada/Saskatchewan Irrigation Development Centre</td>
<td>2</td>
</tr>
<tr>
<td>Saskatchewan Association of Rural Water Pipelines officials</td>
<td>1</td>
</tr>
<tr>
<td>Prairie Provinces Water Board</td>
<td>1</td>
</tr>
<tr>
<td>Saskatchewan Environmental Society</td>
<td>1</td>
</tr>
<tr>
<td>Other interviews with respondents from agencies with province-wide mandates</td>
<td>10</td>
</tr>
</tbody>
</table>

* The reader is directed to Appendix 1 of this thesis for a complete listing of the interviews and corresponding agencies described in this table.
Community level research

The community level research supporting this thesis relies on the assessment of 230 in-depth interviews (generally over one hour each in length) conducted in association with the RCAD project; several interviews conducted under the IACC project and interviews conducted independently by the author in support of this thesis. That project began in 2009 and was reaching completion as this thesis was being drafted. This writer participated in the RCAD project as an interviewer and research analyst (personally conducting 77 of the interviews). Thematic guidelines based on scholarship dealing with community vulnerability to drought were developed to facilitate the overall direction of the interviews. The guiding themes included areas of inquiry focused on water availability, use, governance and management in the study communities. However, as was the case for the IACC interviews, the structure remained informal enough to provide for the emergence of new themes and issues not anticipated prior to each interview. The community level interviews conducted in association with the RCAD and IACC projects as well as the community level interviews conducted independently by the author are listed in Appendix 1. This data is subject to University of Regina Ethic’s Committee regulations regarding privacy, therefore the interviews are identified via a coding system described in Appendix 1. The following table, Table 4.2, provides a summary of community level interviews by respondent occupation.

TABLE 4.2 Selected community level interviews by occupational category

<table>
<thead>
<tr>
<th>Occupational category (in relation to water governance and management)*</th>
<th>No. of interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers and ranchers</td>
<td>121</td>
</tr>
<tr>
<td>Farmers and ranchers supplied by regional pipelines</td>
<td>25</td>
</tr>
<tr>
<td>Farmers and ranchers who participate in irrigation projects</td>
<td>32</td>
</tr>
<tr>
<td>Farmers and ranchers who operate private irrigation systems</td>
<td>4</td>
</tr>
<tr>
<td>Municipal administrative staff</td>
<td>11</td>
</tr>
</tbody>
</table>
Municipal public works managers and water and sewer works managers and operators | 10
Irrigation project association officials | 8
Regional pipeline association officials | 5
Community-based employees of federal and provincial govt. agencies | 11
Elected municipal officials (urban and rural) | 22
Watershed stewardship committee officials and active participants | 3

* Note that interview respondents can appear in more than one occupation category. The reader is directed to Appendix 1 of the thesis where the multiple occupational classifications applicable to respondents is described. Additional occupational categories are represented in Appendix 1.

The community-level assessment also relies on statistical and documentary information, including municipal financial reports. Published sources also inform the community level assessment, including SIPA (2008, 2008a) and Saskatchewan AgriVision Corporation (2004). In combination, these multiple lines of sight provide the empirical basis for the assessment of water governance and management systems in eight Saskatchewan communities and their surrounding rural areas. The community study approach employed reflects elements of what Berg refers to as exploratory and explanatory case studies (Berg 2007: 292). Exploratory studies are intended to assist researchers in identifying prominent themes and issues that can assist in hypothesis development. Explanatory case study methodology is “…useful when conducting causal studies… particularly in complex studies of organizations and communities” (Berg 2007: 292). The exploratory function was incorporated as an ongoing feature of the interview methodology, in which a flexible open-ended approach allowed for new themes and topics to arise over the course of interviews which had not been previously identified by the researchers. The explanatory function allowed for the testing of various water governance and management models and strategies associated with the predominant paradigmatic forms identified in the literature review.
Citation system

The author has employed in-text references for material derived from the IACC and RCAD interviews as well as those interviews he conducted independent of those projects. The references employ interview codes which are listed in Appendix 1 of this thesis. Appendix 1 provides a cross-referencing of the codes with the agencies, communities and respondent occupations related to water governance and management. The references based on the interviews have been italicized to distinguish them from references referring to publications and documents (which are presented in standard type). Interview references that refer to NVIVO coded transcripts contain a paragraph number as opposed to a page number (e.g. SWA1: Para. 21-22). Where the original transcript text is being referred to, the page number is indicated (e.g. MC1: 6). There are 29 of the interviews conducted in association with the RCAD project which were subsequently incorporated into a book by Jim Warren and Harry Diaz (2012), *Defying Palliser: Stories of Resilience from the Driest Region of the Canadian Prairies*. The interviews included in the book were edited into a narrative form with the written approval of the interviewees. When referring to material from interviews incorporated into this book, the thesis cites the book as opposed to the original interview transcripts.

Community selection criteria

Six of the eight town and country communities selected for examination in support of this thesis are located within the Palliser Triangle: Maple Creek, Shaunavon, Kindersley, Coronach, Gravelbourg and Assiniboia. Each of the communities that were selected from within the boundaries of the Palliser Triangle were located in Crop Districts where at least two drought-induced district-wide crop failures had been
experienced since 1960. Two additional town and country communities, Maidstone and Duck Lake, Saskatchewan lie outside the Palliser Triangle, in wetter areas. Maidstone was selected for assessment by the RCAD project to facilitate a climatic comparison, as a means to understand the different sorts of challenges experienced by communities in less drought prone areas of the province. Duck Lake was selected by the author to allow for comparative consideration of a community which lacked the population and economic base which Stabler and Olfert consider essential to long-term survival. In addition, contemporary media reports indicated that Duck Lake was undergoing significant water management challenges including a dispute with SaskWater. And, as the research demonstrates, the case of Duck Lake provides important insights into the implications of market-based water governance in relation to social equity. Map 4.1 provided below locates the boundaries of the Palliser Triangle and the urban communities and irrigation districts studied in support of this thesis.

Map 4.1: The Saskatchewan portion of the Palliser Triangle and the study communities, including irrigation development areas (LDDA and SWDA) and irrigation projects
Each of the eight municipal water governance systems (those systems operating in the study communities) studied in support of this thesis are in communities that reflect characteristics of what Lonechild and Williams describe as town and country communities. They are similarly described by Stabler and Olfert as agricultural market towns or agricultural service and shopping/trading centres. The economies of these communities are highly reliant on the provision of goods and services to their surrounding agricultural areas. All but two of the eight study communities selected meet the criteria set by Stabler and Olfert (2002) for communities with the potential to survive as stable, if not growing, rural service centres well into the 21st century. This writer includes Coronach in the group of communities likely to survive. It does not precisely meet Stabler and Olfert’s general criteria, however its local coal mine and electrical power generating plant rank it among those communities which Stabler and Olfert describe as potential exceptions to their declining community classification. The community can be expected to remain relatively stable until such time as the power plant is closed. Duck Lake is clearly among the communities that Olfert and Stabler characterize as liable to experience ongoing population decline over the course of coming decades.

It is assumed that excluding communities from either end of the survivability continuum (i.e. growing cities and “dying” towns and villages, with the exception of Duck Lake) from the research assessment simplifies the number of variables influencing a municipality’s water management decisions. Cities located in the Palliser Triangle were excluded from consideration based on the assumption that their more diversified...
economies placed them outside of the town and country community category, and their populations tend to be growing. Aside from the exceptions of Duck Lake and Coronach, all of the urban communities examined have fewer than 5,000 residents and more than 1,000 residents.

No less important in determining community selection is the fact that a similar process was employed by the Rural Communities Adaptation to Drought (RCAD) project. The RCAD project produced a pool of approximately 230 interviews with water governance and management practitioners; urban municipal officials; farmers who operate their own water systems and irrigators. The availability of the RCAD interview transcripts for review by the author in support of his thesis research encouraged him to adopt the community selection criteria and qualitative research methods utilized for the RCAD project. The author supplemented the RCAD effort by conducting follow-up interviews with RCAD respondents as well as interviews with additional respondents from the study communities and government agencies who were not interviewed in connection with the RCAD project (these are identified in Appendix 1). In conformity with the RCAD project’s community selection criteria, the communities chosen for study reflect the range of natural and constructed water sources relied upon by urban communities across Saskatchewan.

Saskatchewan’s Ministry of the Environment has classified the various sources of raw water that urban communities depend upon. These include: groundwater sources (GW); groundwater sources under the direct influence of surface water conditions (GUDI); groundwater sources suspected to be under the direct influence of surface water conditions (GUDI?); pipelines (PL) that are connected to surface or groundwater sources.
located outside a community’s corporate boundary and which possibly supply a regional network of urban and rural water users.

Table 4.3 provided below describes features of the study communities relevant to the selection criteria described above.

<table>
<thead>
<tr>
<th>Community</th>
<th>Source water supply</th>
<th>Population 2011*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assiniboia</td>
<td>SW</td>
<td>2,418</td>
</tr>
<tr>
<td>Coronach</td>
<td>GW</td>
<td>711</td>
</tr>
<tr>
<td>Duck Lake</td>
<td>GW</td>
<td>577</td>
</tr>
<tr>
<td>Gravelbourg</td>
<td>SW (low quality)</td>
<td>1,116</td>
</tr>
<tr>
<td>Kindersley</td>
<td>Pipeline (SW)</td>
<td>4,678</td>
</tr>
<tr>
<td>Maidstone</td>
<td>SW and GW</td>
<td>1,156</td>
</tr>
<tr>
<td>Maple Creek</td>
<td>GUDI?</td>
<td>2,176</td>
</tr>
<tr>
<td>Shaunavon</td>
<td>GW</td>
<td>1,756</td>
</tr>
</tbody>
</table>


Municipal water systems supply most of the water consumed by households in the Palliser Triangle. However, water management activity obviously extends beyond urban municipal boundaries. The research effort extends to the rural municipalities that fall within the trading areas of the study communities. It assesses water governance and management systems employed by farmers and ranchers who operate within these trading areas. These are primarily privately owned and operated water systems, including the wells and dugouts that provide household water and water for livestock as well as privately owned and managed irrigation systems. In addition to private systems there are a number of community-level organizations which provide water infrastructure and delivery services to farmers and ranchers in the study area. These include multiple user irrigation projects and regional pipeline associations that service many farmsteads. The assessment of multiple user irrigation projects includes the relatively well-functioning
systems that are supplied by Lake Diefenbaker and the comparatively dysfunctional irrigation projects located in the southwest corner of the province that rely on streams of local origin. The author also conducted interviews with five irrigators and two irrigation project officials from Alberta which facilitated comparisons of a number of apparently successful irrigation system management practices operating in that province with conditions in Saskatchewan.

The thesis also examines the operation of regional water pipeline systems that service multiple urban municipalities and neighbouring farms and ranches. Kindersley and the neighbouring community of Eston, for example, are supplied with water by the EK (Eston-Kindersley) pipeline which draws its source water from the South Saskatchewan River. A number of lateral lines connected to the EK pipeline supply regional pipeline associations that provide water to area farmers and ranchers.

4.4 Interview methodology

The interviews supporting this thesis were conducted and assessed to facilitate increased understanding of particular research themes. This applies to the interviews conducted with both the IACC and RCAD projects as well as those conducted independently by the author. The design of the interviews and interview assessment process reflect what is referred to as a theoretical sampling and data collection. According to Burgess this method allows researchers,

…to engage in selection [of both themes and interviewees] in terms of theoretical sampling which will allow for particular categories to emerge out of the data that is [sic] gathered. In this way, the field researcher can develop extend, modify and test hypotheses and concepts. (Burgess 1986: 76)
The various themes and topics which researchers incorporated into the interviews were intended to provide insights into the nature of the activities of governance agencies: the challenges and barriers to success that interviewees encountered as well as an appreciation of those aspects of policy that were generating positive results. The various themes and issues addressed by the IACC and RCAD interviewers included lines of questioning that allow for the assessment of the second principle research question addressed by this thesis.

The use of interview data in support of the research questions assumes that in-depth interviews conducted by trained interviewers can provide important insights into peoples’ understanding of the geophysical, social, political and economic circumstances that shape their lives. That assumption is consistent with the theoretical foundations of qualitative research methodology.

Qualitative research properly seeks answers to questions by examining various social settings and the individuals who inhabit these settings. Qualitative researchers, then, are most interested in how humans arrange themselves and their settings and how inhabitants make sense of their surroundings through symbols, rituals, social structures, social roles and so forth… How inhabitants of a setting define their situation determines the nature and meaning of their actions as well as the setting itself. (Berg 2007: 9,13)

Interview themes, structure and interview candidate selection were designed to conform to what is referred to as a theoretical sampling approach.

Theoretical sampling is the process of data collection for generating theory whereby the analyst jointly collects, codes and analyses his data and decides what data to collect next and where to find them, in order to develop his theory as it emerges… Researchers can therefore, engage in selection in terms of theoretical sampling which allow particular categories to emerge out of the data that is [sic] gathered. In this way, field researchers can develop, extend, modify and test hypotheses and concepts. .. First theoretical sampling does not end until new concepts and categories no longer appear. (Burgess 1986: 75a)
Particular interviewees were selected because researchers assumed they could contribute insights into the practical application of various water governance and management models and techniques. In other words candidate selection was influenced by the researchers’ characterization of the major theoretical paradigms described in the academic literature. Interview candidate selection and the structure of the interviews were designed to provide information that would aid in the recognition of instances where elements of the various paradigms were being employed in the study communities and in interpreting the implications of their employment relative to the research questions under consideration. Interview candidates were identified through a chain referral or snowball selection process which is a commonly employed theoretical sampling strategy.

Snowballing is sometimes the best way to locate subjects with certain attributes or characteristics necessary to the study. Snowball samples are particularly popular among researchers interested in various classes of deviance, sensitive topics, or difficult to reach populations… The basic strategy of snowballing involves first identifying several people with relevant characteristics and interviewing them or having them answer a questionnaire. The subjects are then asked for the names (referrals) of other people who possess the same attributes they do -- in effect, a chain of subjects driven by the referral of one respondent of another. (Berg 2007: 44)

The first step for interviewers was to approach presumably well-informed and well-connected members of the community, elected town or rural municipal officials or grain elevator agents, for example. Berg (2007) refers to these as “key informants.” These people were interviewed and during their interviews were asked to suggest other individuals who might provide helpful information related to the various themes and topics covered in the interview including water management issues. Those people were then interviewed and asked to provide additional referrals and so on. For the community-level research associated with the RCAD project the process continued apace until
approximately 30 interviews were conducted in each community. Interviews with officials with various water governance and management agencies conducted in association with the IACC project reflected a similar process. Prospective interviewees working at senior levels within the relevant agencies were identified and interviewed and asked for referrals to other water governance and management practitioners. For some of the agencies studied, most of the senior (executive level) officials involved with water governance and management policy were interviewed. As was noted previously, this writer conducted numerous follow-up interviews with individuals who had been interviewed in conjunction with the RCAD and IACC projects. He also conducted interviews with several individuals involved in water governance and management in agencies with province-wide scope who were not interviewed in conjunction with the IACC project.

4.5 Utility of the data: constructing plausible interpretations

The interview data pools that support the thesis do not constitute scientifically randomized probability samples. This prevents the researcher from describing the research findings as being statistically representative of what might be encountered in wider populations. For example, it is difficult to make generalized assumptions supported by probability analysis to the effect that the experience of the study communities is representative of the experience of similar communities in southern Saskatchewan. That said, there are indeed qualities of the research findings which suggest that for particular respondent classes the interviews reflect a considerable proportion of the total population of respondents available in particular categories. For example, the IACC interview pool includes interviews with most of the senior bureaucrats involved in policy development
and delivery in the agencies with central roles in water governance and management in Saskatchewan. Similarly, when limiting the scope of assessment to the study communities themselves, the interview sample includes virtually all of the water management practitioners resident in each community. According to Becker and Greer (1986) the size of such a sample relative to the size of the particular population under consideration along with the systematic coding and analysis of interviews can indeed generate reasonably useful interpretations; particularly interpretations that are relevant within the set of interviewees. This is especially the case when high frequencies of similar respondent comments are found in the transcript data (Becker and Greer 1986: 32).

Notwithstanding the limitations that obtain with respect to making statistical generalizations based on the community cases studied, they do allow us to draw conclusions about the universal applicability of various water governance and management principles and strategies. If, for example, the research demonstrates that a particular facet of the market-based water governance model produces adverse impacts, or fails to produce theoretically anticipated results in its application in a particular community, it is reasonable to conclude that the feature under consideration lacks unqualified applicability in all contexts.

Similarly, if the research demonstrates that in one or more of the cases studied, there are particularly effective strategies being employed we can safely conclude that these strategies appear viable in particular contexts. By way of illustration consider one of the findings presented in Chapter 8 regarding the efficacy of water rationing as a conservation measure which can reduce the need for expanding infrastructure in the study
communities. Market-based water governance theory assumes that the supposed weight of transaction costs limits the value of rationing programs relative to the use of water pricing to reduce consumption (Olmstead and Stavins 2008). The case studies demonstrate that for the municipalities under consideration, rationing has proven to be an effective use reduction strategy and is viewed as less challenging to administer than seasonally adjusted volumetric pricing to achieve a similar end. Using this approach we can perform tests on hypotheses derived from the major water governance paradigms in relation to the communities studied and develop reasonable conclusions about their applicability within particular contexts. This approach involves what Becker and Greer (1986: 249) refer to as employing measures of plausibility as opposed to measures of probability.

Chapter 4 Notes

1) NVIVO is a computer software package “that supports qualitative and mixed-methods research.” It facilitates the coding of interview data according to themes and topics of interest to the researcher. The system is owned and marketed by QSR International Pty Ltd. 2012. [www.qsrinternational.com/products_nvivo.aspx](http://www.qsrinternational.com/products_nvivo.aspx).

2) For the purposes of this table, occupation is defined in terms of those activities a respondent engages in that are most relevant to water governance and management. For example, a person operating a small retail business but also sits on the Town Council is listed in the table as an elected municipal official, and listed as a business operator.

3) The source for the coded water source categorizations is the Saskatchewan Ministry of Environment, which provided the author with a coded listing of water sources for all urban communities in Saskatchewan (via an email from Sam Ferris to the author July 27, 2009).

4) The snowball technique also provides opportunities to identify interviewee prospects with non-conventional approaches to issues by asking respondents to refer them to someone who does not share their views.
Chapter 5: Hydrology and history -- an overview of the context

5.1 Introduction

This chapter provides an overview of the climatic, hydrological and historical context of water governance and management in the study area. It includes a description of the development of water governance and management policies and practices over the past century and sets the stage for the following chapters which examine the challenges confronting water managers in the region today.

5.2 Climate and hydrology of the Palliser Triangle

The Palliser Triangle is named after the Irish adventurer, John Palliser, who travelled across the Canadian Prairies in 1857 and 1858. Palliser described a wide swath of territory in the region as a near desert that was unsuited to agriculture (Spry 1995). The boundaries of the region correspond to the extent of the Brown Soil Zone lying north of the 49th parallel of latitude in what are now the provinces of Manitoba, Saskatchewan and Alberta. Historically, one of the limiting factors for agriculture in the region has been a dearth of precipitation, a condition which over the long term has produced the region’s grassland ecology and brown soils. According to Lemmen, et al. (1997: 121), The Palliser Triangle, “is the driest part of the Canadian prairie provinces and characterized by a strongly negative annual moisture balance.”

Economically devastating droughts, including those that occurred over the course of the 1930s, the late 1980s, and 2001-02, have demonstrated the region’s climatic sensitivity and the variable nature of its surface water resources (Lemmen et al. 1997, Wheaton, Kulshreshtha and Wittrock 2005). The impact of drought extends beyond the resulting economic losses associated with declines in agricultural production. The
drought of 2001-2002, for example, adversely impacted surface water supplies. SaskWater, the Crown corporation responsible for managing the province’s water resources at that time, estimated that over 40 urban municipalities were facing drinking water shortages due to drought as of 2002 (SaskWater 2002a). And, according to the paleoclimatic record, the droughts of the past century have been a veritable walk in the park compared to the severe multi-year droughts of previous centuries (Sauchyn 2010: 31). Sauchyn reports that the prairies were affected by droughts lasting over a decade in the 18th and 19th centuries. He notes that drought in the 1790s reduced flows on the North Saskatchewan River to the extent that fur traders at Fort Edmonton were unable to ship freight by canoe (Sauchyn 2010: 37).

The availability of surface water for consumptive purposes is limited not only by shortages in precipitation. Many, but not all, of the surface waters in the region have high concentrations of dissolved minerals, making them unsuitable for irrigation and impractical to treat for human consumption. Lemmen et al. (1997) report that due to the glacial geology of the region its water drainage systems are poorly interconnected, with over 45% of the region's landscape characterized as internally drained. The lack of natural drainage outlets has contributed to the high salinity levels of many of the area’s lakes and sloughs. “A conservative estimate of 1.5 million saline lakes in the Palliser Triangle reflects a density and diversity of salt lake environments unequaled in the world…” (Lemmen et al. 1997: 123)

Not surprisingly, groundwater sources, given the relative resilience of groundwater to drought compared with surface water sources, are utilized by over half of the urban municipalities in the Saskatchewan portion of the Palliser Triangle and by most
of the region’s farmers and ranchers. That being said, access to treatable groundwater is limited in many parts of the region. The region’s glacial geology is reflected in an erratic distribution of groundwater resources suitable for treatment for most human uses. The distribution of clay subsoils with limited permeability is interspersed with deposits of water-bearing sand and gravel (Warren and Diaz 2012: 337; SWA4 Para. 104). This means that readily accessible groundwater is available in some locations and not in others. In addition, many groundwater deposits contain high concentrations of salts and other noxious substances making them unsuitable for consumption by humans and/or livestock (Toth et al. 2009: 95, 96). The community-level research supporting this thesis provides numerous examples in which the availability of good quality groundwater can vary considerably within relatively short distances.

As one of the respondents indicated, having access to good quality groundwater has not been a serious problem for him since he found water at six or eight feet, whereas his neighbour had to drill a 260-foot well and gained access to only low quality drinking water (Warren and Diaz 2012: 337).

In other instances, respondents were required to dig exceptionally deep wells. One respondent reported having an 800 foot well drilled at a cost of $80,000 which produced marginally palatable water. In describing the quality of his expensive well water this respondent said, “Technically it is supposed to be safe to drink, the cows seem to like it, but I wouldn’t drink it unless I was looking for a laxative – it sure cleans you out.” (Warren and Diaz 2012: 337).

Some farm and ranch respondents are unable to establish water wells near their yard sites. Some respondents rely on dugouts, some haul drinking water, and some are connected to regional water pipeline systems. Urban centres in the region are similarly
affected. Shaunavon, for example, has ample supplies of high quality groundwater, whereas the communities of Kindersley, Gravelbourg and Assiniboia have been unable to find high quality groundwater locally.

The most significant surface water source in the Palliser Triangle portion of Saskatchewan is the South Saskatchewan River (SSR). Flows in the SSR do not depend significantly on run off and stream flows originating in the Palliser Triangle. The major tributaries supplying the SSR originate in the foothills and mountains on the eastern slope of the Rocky Mountains – a region which receives higher precipitation than the southern prairies of Alberta and Saskatchewan.

…runoff from the eastern slope of the Rockies into the river system is the main source of water, supplying more than 75% of the annual runoff within the basin while less than 25% of the basin’s runoff is generated from the Prairies. Between 40% and 50% of the SSRB [South Saskatchewan River Basin] is classified as non-contributing as it does not generate runoff into rivers or streams in an average year. The semi-arid Prairie Ecozone portion of the SSRB is heavily reliant on local snow, rain and groundwater for its water supply, and is naturally exposed to a high risk and frequency of drought. (Toth et al. 2009: 95)

Approximately 42% of Saskatchewan’s residents rely on the SSR for their drinking water. The Lake Diefenbaker reservoir, located on the river, also supplies a number of irrigation projects with a highly reliable supply of water. Irrigators on these projects are able to obtain water on demand (up to an allocated limit) throughout the growing season (see Chapter 10 of this thesis). Irrigators operating in the southwest corner of the province are less fortunate. The irrigation systems in the southwest are supplied by streams of local origin. That is, they originate within the boundaries of the Palliser Triangle and are subject to the drought conditions that afflict the region. Irrigators on these projects are limited to only one or at most two applications of water
annually -- and in some particularly dry years they receive no water at all (see Chapter 10 of this thesis). Some urban centres are similarly affected by the impacts of drought on streams of local origin and the region’s lakes and reservoirs. Gravelbourg, Assiniboia, and Kindersley (when its pipeline failed) have faced adverse water supply conditions as a result of drought. Even Maidstone, which lies outside the Palliser Triangle, faced a water shortage in 2002 when Maidstone Lake came close to drying up (see Chapter 7 of this thesis).

Another feature of the region’s climate affecting water governance and management are the hot dry conditions frequently experienced during the summer. All of the study communities located in the Palliser Triangle have had to implement outdoor water rationing programs when conditions are hot and dry and residents attempt to keep lawns and gardens watered. The threat of shortages and the need to ration increase when the hot dry conditions occur during a dry period when surface water supplies are stressed due to drought (see Chapter 8 of this thesis).

Implications of climate change

The water scarcity challenges that have confronted residents of the Saskatchewan portion of the Palliser Triangle region over the past century could be exacerbated by the effects of anthropogenic climate change (Sauchyn and Kulshreshtha 2008; RCAD 2012).

Droughts in the future should be at least as severe and prolonged as those that predate agricultural settlement, and could occur with increased frequency and severity as a result of global warming. Studies of the future climate of the Canadian Prairies using climate models suggest an increase in the number of dry days and the dry spell duration during the April to September frost-free period. Even though a small increase in annual precipitation is expected over most of southern Canada, higher temperatures translate into greater evaporation and more intense droughts. (RCAD 2012: 42)
Climate forecasts also suggest that extreme climate events, including intense rainfall episodes, could increase in frequency and intensity. Flooding has occurred in the region historically in conjunction with high spring run off and episodes of abnormally high rainfall. Indeed, when this writer was conducting interviews for the RCAD project in the Maple Creek area, late spring snowstorms followed by heavy rains in June produced record floods in the area. In recent years areas of southeastern Saskatchewan and southwestern Manitoba have experienced flooding which has adversely affected farm operations delaying, and in some locations preventing, spring seeding (Bower 2011).

Coping with excessive moisture conditions has become an important area of activity for the Saskatchewan Watershed Authority over the past several years. This thesis does not focus attention on the various flood monitoring and mitigation efforts underway in the province, rather its focus is on the governance and management of water for consumptive uses. The predominant climatic challenges to consumptive water use in the Palliser Triangle over the past century have been related to drought and dry conditions.

5.3 Sources and consumption patterns

Most of the surface and groundwater utilized for consumptive purposes in Saskatchewan is governed by allocations provided by the Saskatchewan Watershed Authority (SWA). The major exception is on-farm use for domestic purposes and livestock watering. Approximately 150,000 rural residents, primarily farm and ranch families utilize unallocated water located on or under their own properties. Farmers and ranchers are, however, required to obtain allocations if they intend to irrigate or operate an intensive livestock operation (e.g., a cattle feedlot). Irrigation currently accounts for
the largest share, utilizing 67% of the total water allocated. Most of the water used for irrigation (approximately 66%) is supplied by the SSR. Irrigators in the southwest corner of the province account for 34% of the total irrigation allocation. At present, Saskatchewan is using just 11% of the water it is allowed to consume from the SSR under the interprovincial agreement (administered by the Prairie Provinces Water Board) which apportions flows between Alberta, Saskatchewan and Manitoba (Saskatchewan AgriVision 2004: 106, 107).

Municipal consumption accounts for 21% of total provincial allocations (SWA 2012: 18). Most of the municipal allocation (63%) is for domestic household use. Non-domestic users account for 37% of the municipal share (Saskatchewan AgriVision 2004: 106). Non-domestic use includes water used by business and public buildings, watering public parks and golf courses and the water required to operate certain water treatment systems. SaskWater (2007a) estimates that residential water demand in Saskatchewan runs at approximately 333 litres per person per day. The average per capita use for Canada of 343 litres per day.¹

As of 2012, 12% of the total water allocated was used for industrial purposes (SWA 2012: 18). Industrial uses include thermal power generation and water employed in potash mining and milling. SaskWater estimates that 80% of the water allocated to larger municipalities is returned to nature as purportedly treated effluent (SaskWater 2007a: 10, 14). And, some of the water employed for irrigation is returned to surface water bodies by drainage systems. An apportionment of 15% of the surface water available in the province is allocated to ecological uses – sustaining viable in-stream and riparian ecosystems (Saskatchewan AgriVision 2004: 106). Non-consumptive water use
in the province for recreation and hydro-electric generation is not comfortably accommodated within the allocation system. For example, SaskPower, the province’s Crown-owned electrical monopoly requires certain flow thresholds to maintain optimal generation. However, none of the water used to run the turbines is lost to downstream flows. That said, the reservoir holding the water used by SaskPower, irrigators and urban communities (Lake Diefenbaker) produces higher losses to evaporation than would be the case if the river was permitted to flow naturally.²

Municipalities, intensive livestock operations and industrial water users require allocations to use groundwater. However, it is not possible to obtain a groundwater allocation for irrigation. At present the extent of the province’s groundwater resources is not fully understood. SWA is endeavouring to correct that deficiency by completing a groundwater map for the province. Groundwater accounts for only 7% of the water allocated by the province. Figure 5.1 below describes the proportion of the provincial water allocation attributed to each use category.

![Figure 5.1 percentage of total provincial allocation by use category](image)

Source: Saskatchewan Watershed Authority (2012: 18)
**Municipal water sources**

The majority of Saskatchewan’s 476 urban municipalities rely on groundwater supplies. However, the largest urban centres utilize surface water sources. Figure 5.2 provided below indicates the number of municipalities that rely on each of the water sources identified by the Saskatchewan Ministry of Environment: groundwater wells (GW); groundwater under the direct influence of surface water conditions (GUDI); groundwater that is possibly under the direct influence of surface water conditions (GUDI?); surface water (SW) and; pipelines (PL) that service one or more urban centres and neighbouring farmsteads. Figure 5.2, provided below describes the number of Saskatchewan municipalities reliant on each source type.

![Figure 5.2 Percentage of SK Municipalities reliant on each source type](image)

Source: derived from the Saskatchewan Ministry of Environment listing of municipalities by source water type (provided via an email from Sam Ferris to the author July 27, 2009).

Figure 5.3 provided below describes the percentage of the Saskatchewan population reliant on each source type as well as the percentage of the population (primarily farm households) that relies on private water systems – this group is identified as “farm” in the figure.

5.4 Historical overview

The roots of current practices

The first thirteen years of the 20th century correspond with the boom in agricultural and rural-urban settlement in Saskatchewan. Between 1901 and 1911, for example, the province’s population grew from 91,279 to 492,432 (Archer 1980: 360). Important elements of the province’s water governance and management system in operation today were developed during this period. These include the adoption of what Bakker (2010) refers to as the municipal hydraulic paradigm --whereby, local government authorities would construct, own and operate municipal water and wastewater systems.4 Saskatchewan’s nascent urban communities benefited from being able to work from a blank slate, ensuring that most neighbourhoods had access to modern sewer and water service soon after their inception.5 Colligan-Yano and Norton (1996: 44)
report that, “by 1923 Saskatchewan had one of the lowest rates of typhus in all of North America and even Europe, largely due to the provision of good water and waste disposal facilities.”

A second characteristic of today’s system established during the settlement period was the principle that farmers were permitted to make beneficial use of the surface and groundwater located on or under their properties. They were not required to pay any fees for the water they used. Farmers were expected to incur the full cost of developing and maintaining their water systems until after the Prairie Farm Rehabilitation Administration (PFRA) was established and began offering some financial support for on-farm dugout and well construction. While irrigation development was minimal during the first three decades of the 20th century, the systems in operation prior to 1935 were developed by individual farmers and groups of farmers at their own expense.

A third characteristic of the system with roots extending back to the settlement period was frustration and debate related to municipal infrastructure financing arrangements. Rapid expansion of municipal services during the settlement boom required municipalities to raise money in the eastern debenture market. The boom psychology of the settlement period had encouraged some municipal governments to assume (incorrectly as it happened) that fast-paced, virtually limitless growth would more than account for the costs of infrastructure construction. By late 1913, when growth stalled, many municipalities were carrying heavy debt loads. Much of that debt was attributed to the financing of sewage systems and waterworks. The provincial government responded by establishing the Local Government Board (LGB) to more closely regulate municipal borrowing. Borrowing limits were set based on community
size and municipalities had to convince the LGB of the necessity of new infrastructure projects. For some municipalities the oversight came too late.

By the end of the First World War some municipalities were defaulting on their debenture repayments. This affected everyone’s credit as the bond dealers reacted by avoiding all Saskatchewan municipal bonds (Colligan-Yano and Norton 1996: 44). The provincial government and lenders encouraged urban municipalities to make greater use of taxation as opposed to debt to cover the cost of providing services. For their part, the municipalities held that the provincial government should either be doing more to assist the municipalities in financing service delivery or play a greater role itself in providing services such as education, hospitals and unemployment relief (Colligan-Yano and Norton 1996: 33). Similar arguments continue to be made by municipal governments across Canada. Today, the process is referred to as offloading – whereby municipalities carry a heavy burden of responsibility for delivering services and providing infrastructure – while senior governments have greater revenue generating capacity than municipalities (Mirza 2007).

*Politics and the municipal hydraulic paradigm*

Public ownership of water utilities was a near universal practice in the capitalist industrial world of the early 20th century. On the prairies, agrarian populism was a powerful political force which favoured cooperative and community ownership over exploitive private monopolies (Archer 1980: 189-193; Conway 2006 :125-127). And, given the widely held perception that utilities were natural monopolies, public ownership was widely preferred. The province’s Liberal provincial government launched a public telephone corporation in 1909. The government’s involvement expanded over coming
decades with the goal of providing universal service at reasonable rates (Rediger 1996: 3). Similarly, in 1929 the province established a publicly owned electrical utility, which by the 1960s had grown into a province-wide state-owned monopoly (Rediger 2004: 5).

For many municipalities, a subsidiary benefit of establishing public water systems was that the provision of utility services held potential as a source of profit. According to Colligan-Yano and Norton (1996: 47), “Communities tried to follow a policy of public ownership of utilities to ensure stable rates and higher revenue.” Until the 1980s there was minimal impetus behind the establishment of a provincially owned water utility. This was due in part to the presumption by some municipalities that they could operate their own utilities at a profit and therefore many had little if any interest in transferring them to the province (see Chapter 6 of this thesis). Furthermore, the provision of water was, at the time, associated with locally available sources -- unlike electricity which could be generated at a central plant and distributed province-wide over a delivery grid. Water is heavy and costly to convey over long distances. And, with rare exceptions, communities had managed to develop their own local water sources, albeit the quality of water available in some urban centres was poor. It would take several major droughts over the course of the 20th and early 21st century, higher water quality standards and the availability of new treatment technologies to convince Saskatchewan residents that regional water delivery systems were a sensible option.

5.5 Policy windows and policy change

The case of the PFRA

Kingdon (2003: 165-195) has described how radically changing circumstances and crises can produce “policy windows,” opportunities that enable policy entrepreneurs
to make significant changes to long-standing policy regimes. Policy windows serve as complacency disruption events. They contribute to overcoming bureaucratic inertia, requiring path dependent institutions to adopt new ideas (Pierson 2000). Successive years of drought and poor crop yields and a global economic depression that lowered farm commodity prices combined to produce a crisis in prairie agriculture in the 1930s. The magnitude of the crisis, particularly in the Palliser Triangle, constituted a policy window that prompted political champions of prairie agriculture within the federal government (with provincial and municipal cooperation) to launch the Prairie Farm Rehabilitation Administration (PFRA) in 1935 (Gray 1967).

For the seven decades following its inception the PFRA played an important role in rural water management across the Prairies. It was very active in the Saskatchewan portion of the Palliser Triangle where it developed 24 dams and reservoirs. It constructed the waterworks required to support irrigation projects and supplement urban municipal water supplies (see Chapter 10 of this thesis). PFRA engineers and construction crews developed several smaller scale irrigation projects in the southwest corner of Saskatchewan, a region where irrigation would make a significant contribution to the mitigation of the impacts of drought on local livestock feed production. The PFRA also provided engineering and funding support to farmers and ranchers for the construction of more drought resilient domestic water supplies (for both households and farmers’ livestock), including tens of thousands of dugouts across the prairies.

The creation of the PFRA represented a shift in perceptions about the role of the federal government in assisting farmers under economic duress and in sustaining agricultural production on the prairies. The new policy direction was reflected in high
level planning for the South Saskatchewan River Dam (SSRD) project. Planners and local boosters envisioned a dam on the South Saskatchewan River (today’s Gardiner Dam), south of the community of Outlook, Saskatchewan. The resulting reservoir (today’s Lake Diefenbaker) would provide water for Saskatchewan’s first large scale irrigation projects; provide a reliable source of good quality surface water for urban communities (e.g. Moose Jaw, Regina and Saskatoon); and allow for the development of a hydro-electric power generation plant (today’s Coteau Creek Hydroelectric Station).

Construction of the SSRD began in earnest in 1959. The dam was completed in 1969 and by the early 1970s the works required to facilitate irrigation were in place. The PFRA played a prominent role in launching the first irrigation projects associated with Lake Diefenbaker, but eventually turned responsibility for their governance and management over to the province. The province (via the Saskatchewan Watershed Authority and the Ministry of Agriculture) continues to maintain major works such as the Gardiner Dam and some main supply canals. However, operation and management of the irrigation projects has been turned over to producer-managed irrigation project associations (see Chapter 10 of this thesis).

**CCF/NDP influences: 1944-1982**

The election of Saskatchewan’s Co-operative Commonwealth Federation (CCF) government in 1944 is widely reported as an outcome of the severe conditions experienced by Saskatchewan residents in the 1930s. In Saskatchewan, the CCF and its 1961 successor, the New Democratic Party (NDP), constituted a melding of agrarian populist and democratic socialist ideology (Lipset 1971). CCF and NDP governments held office in Saskatchewan for 44 of the 63 years between 1944 and 2007. However,
ideologically distinct the CCF and NDP may have been compared to other mainstream electoral parties in the province, until 2002 CCF and NDP governments did not significantly alter the province’s water governance and management framework. While CCF and NDP governments were in office during periods when irrigation agriculture underwent expansion, they were not responsible for launching many of the projects that they saw through to completion. The most significant impacts that CCF/NDP governments had on water management were related to provincial-municipal revenue sharing arrangements that facilitated infrastructure renewal and expansion in many urban centres during the 1970s. Colligan-Yano and Norton (1996: 119) refer to the revenue sharing schemes developed by the NDP government led by Allan Blakeney in the 1970s as a “revenue sharing breakthrough.” Programs developed early in the decade included property tax rebates to urban residents which purportedly allowed the municipalities the room to claw them back through the property tax. By the late 1970s the provincial government had acceded to lobbying by the municipalities and began providing them with direct operating grants. By 1978 the province was providing $44 million in annual grants to municipalities and additional funding for some infrastructure projects (Colligan-Yano and Norton 1996: 120). Another NDP innovation that would affect water governance and management over the long term was the creation of a provincial department for the environment. Over the course of coming decades the department for the environment (which underwent several name changes) became responsible for legislative initiatives related to source water protection.

CCF/NDP governments also launched projects in support of farm water management. While the PFRA’s activities tended to focus on the development of raw
water supplies, the province extended government support to include the improvement of wells and the installation of pressure systems and water treatment systems. The Family Farm Improvement Branch (FFIB) of the provincial department of agriculture provided farmers and ranchers with advice, wholesale prices for water system hardware, and cost-shared financial support for some water system enhancements (Peck 1964). The FFIB was in operation from 1960 until it was disbanded by a Progressive Conservative government in the 1980s.

**Progressive Conservative influences**

Ironically, the most significant government supported change in Saskatchewan’s water governance and management framework between the creation of the PFRA and the Safe Drinking Water Strategy of 2002 was initiated by the purportedly neoliberal Progressive Conservative government led by Premier Grant Devine (in office from 1982-1991). Despite the Devine government’s famous crusade to privatize Crown corporations and government services developed under previous CCF/NDP, Liberal and Co-operative governments, it actually increased provincial government activity in the area of water governance and management.

The Devine government consolidated the provincial government’s role in managing the province’s water in 1984 through the creation of SaskWater as a non-profit Crown corporation. It also launched several new irrigation projects and constructed the largest dam and reservoir projects built in the Palliser Triangle region of the province since the building of the Gardiner Dam (Hood 1994).

The mid to late 1980s featured some of the driest years experienced in Saskatchewan during the 20th century, 1988, for example, was drier than the worst dry
years of the 1930s (Stewart 2005). One might reasonably speculate that dry conditions and difficult economic times in agriculture contributed to opening the policy window required to encourage government action. Indeed, the impact of drought on community water supplies was one of the factors behind SaskWater’s efforts to develop regional water systems in the 1980s (a process that continued under the NDP from 1991-2007). Regional systems allow groups of urban communities and farmers to share a single source of safe and reliable water via pipeline networks. In addition, the Devine government encouraged the expansion of irrigation development in the Lake Diefenbaker area. Irrigation development had essentially stalled by the late 1970s. The Devine government supported producers in the creation of new projects at Luck Lake and Riverhurst, albeit the implementation period extended into the term of the NDP government that assumed office in 1991.

There are characteristics of the province’s political culture and electoral politics that also played important roles in shaping water policy in the 1980s. The Devine government’s electoral base was located in rural Saskatchewan. At a time when the province’s electoral boundaries gave disproportionate weight to the votes of farmers and residents of towns and villages, the rural vote was decisive in provincial elections. The province’s Progressive Conservatives of the 1980s present an ideological paradox. On the one hand they embraced neoliberalism and privatization, to the extent that they brought Margaret Thatcher’s personal privatization consultant to Saskatchewan to advise them (Pitsula and Rasmussen 1990: 139, 140). At the same time, Progressive Conservative MLAs and their core of rural supporters retained a residual rural populism that valued rural community sustainability. The ideological contradictions manifested by the Devine
government extended to its inability to implement neoliberal maxims related to balanced budget orthodoxy. By the time the Progressive Conservatives were defeated, they had amassed an unmatched record of deficit and debt (Conway 2006: 255).

**The NDP’s post-1991 neoliberal turn**

The NDP were returned to office in 1991 under the leadership of Roy Romanow. The ideological paradoxes that afflicted the Devine government did not similarly afflict the performance of the Romanow NDP. The Romanow government abandoned much of the NDP’s social democratic legacy in favour of a neoliberal policy direction that prominently featured balanced budget fiscal orthodoxy (Brown, Roberts and Warnock 1999; Conway 2006: 315-338; Warren and Carlisle 2005). The demographic reality of rural population decline and the growth of city populations were reflected in the redistribution of provincial electoral boundaries in the 1990s. The influence of rural voters declined accordingly. Argue (1999) suggests that these developments contributed to a significant cut back in rural services and support for agriculture under the post-1991 NDP.

The Romanow government’s efforts to improve the province’s fiscal position extended to significant reductions in funding support made available to municipal governments for water and wastewater infrastructure projects. Revenue sharing schemes were cut back and project specific grants were often difficult to obtain (see Chapter 6 of this thesis). That said, SaskWater continued to support the development of regional pipeline systems and the completion of irrigation projects initiated by the Devine government. In fact, SaskWater appears to have been one of the few government agencies given rein by the Romanow government to expand the scope of its activities.
The most infamous of SaskWater’s expansion activities was an effort to stimulate irrigated potato production and marketing in the Lake Diefenbaker area. Popularly referred to as SPUDCO, the project went bankrupt within a few years at an estimated cost to taxpayers in the neighbourhood of $30 million (see Chapter 10 of this thesis). Nonetheless, the potato storage facilities developed by the Lake Diefenbaker Potato Corporation (SPUDCO) remain in use and have been integral to the development of a thriving seed potato industry in the region.

**The 2001 policy window**

An outbreak of drinking waterborne Cryptosporidium parvum infection in North Battleford, Saskatchewan in 2001 and the subsequent 2002 report of the Laing Commission, generated significant changes in water governance and management policy in Saskatchewan. The response of the NDP government was a policy reconfiguration known as Saskatchewan’s 2002 Safe Drinking Water Strategy. Chapter 6 of this thesis describes the changes associated with the 2002 strategy and the policy objectives that drove it. The 2002 strategy incorporated measures intended to improve the safety of the province’s drinking water. It also contained measures designed to offload a larger share of water infrastructure costs onto municipalities. The implications of the 2002 Safe Drinking Water Strategy and the federal government’s 2008 decision to eliminate the PFRA reflect the neoliberal policy direction that has influenced water governance policy development in the province since 2002. Subsequent chapters of this thesis describe and assess the post-2002 water governance and policy environment reflected in the context of the study communities.
The historical development of water governance and management policy in Saskatchewan from the 1930s to the present reflects a recurrent pattern of reaction to crises. The creation of the PFRA in 1935 and the 2002 Safe Drinking Strategy both coincided with policy windows related to water crises. The predictions of climate change scientists suggest that hydrological crises are likely to increase in frequency and severity in coming decades. The recommendations contained in the RCAD project’s research report call for increased preparedness planning and the adoption of adaptation measures to enhance the resilience of communities in the region (RCAD 2012: 50, 51). When one considers the historical pattern of water governance policy development in Saskatchewan it appears that the resiliency building actions suggested in the RCAD report will require a break with tradition.

Chapter 5 Notes


2) Water loss attributable to power generation is primarily due to evaporation on associated reservoirs.

3) The Saskatchewan Ministry of Environment also employs a small mixed category. This author chose to eliminate this category by identifying communities according to the source type they were most reliant upon. The pipeline designation is something of a problem since it does not indicate what the source of raw water for the pipeline system is. Furthermore the Ministry is somewhat inconsistent in its designations. For example, Moose Jaw is designated as reliant on a pipeline and Regina is listed as a mixed source community. In fact, both Regina and Moose Jaw rely on water drawn from Buffalo Pound Lake which is subsequently conveyed to each city by pipeline. The author designated both Regina and Moose Jaw as reliant on surface water, but notes that Regina does have some functioning wells. That said, Regina is primarily reliant on surface water and was designated accordingly for the purposes of figures 5.2 and 5.3.

4) In some nascent communities privately owned wells, including those established by the Canadian Pacific Railway (CPR), provided residents with water until local population levels and the establishment of local government permitted their transfer to the municipalities. This was the case in Shaunavon where the CPR’s wells had effectively been transferred to the community by the early 1920s. In some communities, private wells on the properties of individual residents operated alongside municipal systems for decades. And, in a few communities located over a high water table, shallow individual household wells were not replaced by municipal systems until the 1990s and early 2000s (the communities of Pilot Butte and White City for example). See Chapters 8, 9, and 10 for additional details.

5) There were notable exceptions, Warren and Carlisle (2005: 36) note that well into the 1920s some working class neighbourhoods in the larger cities lacked household connections, although neighbourhood standpipes were available and waste from outdoor privies was collected.
6) This was also a barrier to the expansion of the Crown-owned electrical and telephone utilities. Encouraging urban municipalities to turn profitable utilities over to the province was a challenging process (Rediger 2003; White 1968). As of today, the City of Swift Current remains one of the last holdouts. The city retains the right to sell electricity and natural gas to its residents.

7) These included prominent federal and provincial politicians who were in office during the period when the federal government was deciding whether to proceed with the project, including: Jimmy Gardiner, Premier of Saskatchewan (1926-1929) and federal Minister of Agriculture (1935-1957); John Diefenbaker, Prime Minister of Canada (1957-1963); Tommy Douglas, Premier of Saskatchewan (1944-1961) and leader of the federal NDP (1961-1971). The decision to go ahead with the project was controversial given that a federal commission had reported that the project was economically unviable and incapable of providing benefits commensurate with projected costs. The backing of prominent politicians from three of the major parties was critical (Gray 1967; Herriot 2000; Saskatchewan AgriVision Corporation 2004; SIPA 2008, 2008a).

8) The author notes that the PFRA was instrumental in launching some of the earliest versions of this model (e.g. the Kindersley-Eston pipeline in the 1960s, see Chapter 7 this thesis).

9) Other Crown-owned utilities did expand the scope of their activities but that expansion was often in the form of new business investments outside the province. Those efforts conformed to the guidelines established under the Romanow government’s 1995-1996 review of the operation of Saskatchewan’s Crown Investments Corporation, an exercise that encouraged the application of NPM principles to the operations of the Crowns, including the Bonbright principles of utility management (Rediger 2004: 163-182).

10) Ironically, the avowedly pro-business and fiscally conservative Saskatchewan Party government elected in 2007 has put more money into developing rural water infrastructure than the previous NDP government. The Farm and Ranch Water Infrastructure Program launched in 2008 is a prominent example (see Chapter 12 of this thesis).
CHAPTER 6: The institutional setting

6.1 Introduction

This chapter provides an overview of the agencies of senior government most actively involved in water governance and management in Saskatchewan. The chapter devotes considerable attention to Saskatchewan’s 2002 Safe Drinking Water Strategy (SDWS) and the associated reconfiguration of the province’s water governance framework. Various measures contained in the strategy reflect elements of market-based water governance. The author contends that this is particularly evident in the re-mandating of SaskWater as a corporatized Crown corporation in 2002. The chapter describes how the SDWS incorporates Renzetti and Busby’s (2009) proposition that user-pay marginal full cost recovery systems could help reduce the reliance of municipalities on grants from senior government; contribute to higher water prices and; incentivize conservation. SaskWater provides water and wastewater services to just 12.4% (59) of the province’s 476 urban communities. However, when the SDWS was launched the government assumed that the corporation’s role in supplying potable water was going to be much more significant. Subsequent chapters of the thesis demonstrate that SaskWater’s failure to meet its growth projections was in large part a reflection of the fact that the neoliberal inspired principles it incorporated did not always conform comfortably to hydrological and socioeconomic conditions at the community level in Saskatchewan.

The chapter also describes the relationships that obtain between the province and municipal government under the SDWS, financial relationships in particular. It also notes
the roles of a number of non-governmental community level organizations with interests and influence in water governance and management in the province.

6.2 Complexity

The literature on water governance in Canada describes a complex and sometimes unwieldy mix of federal and provincial agencies (Bakker 2007, Sproule-Jones et al. 2008, Hurlbert et al. 2009). Johns and Rasmussen (2008), for example, write that overlapping authorities contribute to inter-jurisdictional buck-passing and dropped balls. Water governance and management in Saskatchewan is no exception. It also involves a complex mix of provincial and federal government agencies; municipal governments; non-governmental water user organizations; civil society organizations and individuals (IACC 2009, 2009a; Hurlbert et al. 2009).

Hurlbert et al. (2009) describe how the complexity contributes to stakeholder confusion, frustrating the ability of communities and individuals to gain access to information and support. It also frustrates policy making and program delivery, “There is no doubt that the fragmentation of water governance among different levels of government agencies impedes setting clear policy objectives and processes of monitoring and evaluation” (Hurlbert et al. 2009: 123). To a large extent the complexity is a reflection of Canada’s federal system and history of overlapping authority and activity across a range of policy fields.

Federal agencies

Canada’s constitution assigns control over natural resources to the provinces. Accordingly, among the two senior levels of government the province plays the leading role in the governance and management of Saskatchewan’s water resources.
Nonetheless, Hurlbert et al. (2009: 121) report that 19 federal government agencies are involved in water governance issues across Canada. A handful of those agencies have played important roles in water governance and management in Saskatchewan. From 1935 until 2008, the Prairie Farm Rehabilitation Administration (PFRA) was the federal agency most involved in water management in Saskatchewan. Prior to the dismantling of the PFRA, the second most active federal agency has been Indian and Northern Affairs Canada (and its predecessor ministries) which contributes water management and infrastructure financing on First Nations reserves in the province. As of today, Indian and Northern Affairs is the leading federal water governance agency in the region.

Environment Canada has played a less active role. Its influence is reflected in the willingness of provinces to voluntarily adopt national standards prescribed by Environment Canada in the post-Walkerton period. Environment Canada also plays a role in the monitoring of interprovincial stream flows and facilitates the work of the Prairie Provinces Water Board (PPWB), a multi-government agency which apportions flows between Alberta, Saskatchewan and Manitoba. Trans-boundary flows from Saskatchewan to the US are apportioned under the framework established under the 1909 Canada-US Boundary Waters Treaty. Canada’s representatives on the International Joint Commission, which administers the Treaty, are federally appointed. However, the monitoring of flows on the Canadian side of the border has been delegated to the Saskatchewan Watershed Authority. The activities of other federal agencies with roles in water governance are rather negligible in the Saskatchewan context. Recently, Fisheries and Oceans Canada has been the most active of those less influential agencies.
Provincial agencies and the SDWS

The roles of the provincial government agencies most active in water governance were largely defined under the 2002 Safe Drinking Water Strategy (Government of Saskatchewan, 2002). The two most influential and active agencies are the Saskatchewan Ministry of the Environment and the Saskatchewan Watershed Authority. There are, however, eight other provincial government agencies that have roles in water governance and management. These include the Saskatchewan Ministry of Agriculture which oversees and supports irrigation activity and SaskWater which provides water and sewer infrastructure services to 59 urban municipalities. Several of the respondents interviewed for the IACC and RCAD projects reported the sheer number of agencies involved in water governance in the province produced a degree of confusion and frustration among stakeholders at the community level (Hurlbert et al. 2009: 123). Indeed, even government officials involved in water governance and management would frequently confuse the names and roles of the various agencies involved. The re-mandating of SaskWater and the creation of SWA in 2002 exacerbated the problem. The author notes that when this thesis was close to completion, the Government of Saskatchewan announced a reconfiguration of water governance and management responsibilities in the province, an effort that addresses some of the frustrations associated with complexity. The primary change was the creation of the Saskatchewan Water Security Agency, a Treasury Board Crown corporation which incorporates the functions formerly performed by SWA and the drinking water safety functions performed by the environment ministry. Table 6.1 provided below describes the roles of Saskatchewan government agencies involved in water governance and management prior to October 2012.
TABLE 6.1 Saskatchewan government agencies involved in water governance and management

<table>
<thead>
<tr>
<th>Agency</th>
<th>Principal roles in water governance and management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saskatchewan Ministry of Environment (SME)</td>
<td>Drinking water safety and source water protection</td>
</tr>
<tr>
<td>Saskatchewan Watershed Authority (non-profit Crown corporation reporting to SME and Treasury Board)</td>
<td>Water allocation, monitoring of source water quality (on behalf of SME), monitoring of hydrological conditions</td>
</tr>
<tr>
<td>SaskWater (for-profit commercial Crown corporation reporting to Crown Investments Corporation)</td>
<td>Markets infrastructure design and management services to municipalities; and sells treated water to several communities.</td>
</tr>
<tr>
<td>Saskatchewan Ministry of Agriculture (SMA)</td>
<td>Support for irrigation and on-farm water system development</td>
</tr>
<tr>
<td>Saskatchewan Ministry of Health</td>
<td>Monitoring of water-related health issues</td>
</tr>
<tr>
<td>Saskatchewan Ministry of Municipal Affairs</td>
<td>Administers the agencies that supervise municipal financing</td>
</tr>
<tr>
<td>Saskatchewan Municipal Board (reporting to Ministry of Municipal Affairs)</td>
<td>Supervises the budgeting and borrowing practices of municipalities including the financing of water infrastructure projects.</td>
</tr>
<tr>
<td>Municipal Finance Corporation of Saskatchewan (Treasury Board Crown reporting to the Minister of Finance)</td>
<td>Assists in the financing of municipal water and wastewater projects by purchasing a portion of required debentures.</td>
</tr>
<tr>
<td>Saskatchewan Water Appeals Board (reporting to SWA)</td>
<td>Adjudicates disputes over farmland drainage (under the management of SWA)</td>
</tr>
<tr>
<td>Saskatchewan Ministry of Energy and Resources</td>
<td>Monitors exploration and extraction activities including potential water pollution problems.</td>
</tr>
</tbody>
</table>

The role of the Saskatchewan Ministry of Environment

The report of the Laing commission of inquiry into the contamination of North Battleford’s municipal water supply in 2001 was critical of the performance of Saskatchewan’s environment ministry (Laing 200: 297-301). The SDWS featured measures designed to improve the performance of the ministry and prevent similar incidents. Under the SDWS, the ministry’s responsibilities for water resources were reasserted in an updated *Environment Management and Protection Act* (2002). Part IV of the Act gives the ministry responsibility for: “16 (1) (a) the supervision, control and regulation of all matters relating to water quality; and (b) any impairment to water quality by adverse effect.” Sections 16 (2) and 16 (3) of the Act require the environment ministry
to act in consultation with the Saskatchewan Watershed Authority and the provincial Ministry of Health in meeting its responsibilities under section 16 (1).

Actions taken to improve drinking water safety included increased monitoring of source water quality and the safety of municipal water and sewage treatment. Responsibility for monitoring the province’s natural source waters was to be undertaken by the new Saskatchewan Watershed Authority (SWA), with the costs of monitoring paid out of the environment ministry’s budget. The Ministry of Environment would exercise a degree of control over the activities of SWA by virtue of the fact that the Chair of SWA’s Board of Directors would be the Deputy Minister of the Environment, and the fact that the Minister for the environment portfolio would represent both agencies in the legislature. Most importantly, a more rigorous monitoring and enforcement system for municipal water and wastewater was implemented under the SDWS. The environment ministry hired additional inspection and monitoring staff and required the municipalities to: more regularly submit samples for testing; meet more stringent national water quality guidelines; keep more detailed records, and; have qualified staff managing water treatment plants. Collectively, municipalities would bear a far greater portion of the cost and effort required to meet the new standards established under the SDWS than the environment ministry.

The Saskatchewan Watershed Authority

The Saskatchewan Watershed Authority was established under the 2002 SDWS. Prior to 2002, the responsibilities assigned to SWA had been performed by Saskatchewan Water Corporation, which operated under the name SaskWater. SaskWater was a non-profit (or Treasury Board) Crown corporation established by the Devine government in
1984 as an umbrella agency responsible for several facets of water governance and management. These included: monitoring the quality and quantity of the province’s water resources; operating and maintaining the province’s major water infrastructure assets including 45 dams and reservoirs; approving and licensing the withdrawal of natural source water for municipal, industrial and agricultural use; supporting irrigation agriculture; and, providing water and wastewater treatment and infrastructure solutions to urban municipalities. Under the SDWS, and the Saskatchewan Watershed Authority Act 2002, SWA was given responsibility for all these activities except for involvement in assisting municipalities in dealing with their water and wastewater infrastructure problems. Those responsibilities fell to a new for-profit Crown corporation which retained the name SaskWater.

SWA’s 2006-2007 Annual Report states that its mandate is: “To manage and enhance the province’s water and watershed resources for the environmental, economic and social benefits of citizens.” However, as noted previously, it performs its water quality monitoring functions at the behest of the Ministry of Environment.

Approximately 28% of SWA’s annual revenues ($7.4 million in 2007) are provided by the Ministry of Environment as compensation for its monitoring activities.

Saskatchewan’s raw surface and groundwater resources are considered to be a Crown or publicly owned asset, to be administered in the public interest. Beyond a token one time application fee, SWA does not charge municipalities, farmers and small businesses for the water they consume. And, it does not permit holders of water allocations to sell raw water. In other words, a municipality or irrigation project which receives an allocation from SWA is not permitted to sell any of that water to any other private or public interest.
Nonetheless, it is the case that some urban municipalities sell water to local farmers and neighbouring towns and subdivisions. In these cases, the comfortable assumption is made that the charges are for the conveyance and/or treatment of the water and not the water itself. SWA actually sells water under this assumption. Approximately $15 million worth of water is sold by SWA each year, amounting to around 57% of its annual revenues between 2002 and 2008 (SWA’s Annual Reports 2003-2009). SaskPower, for example, pays annual fees for its non-consumptive allocation for electrical power generation. The rationale behind the fees charged for this water is that SWA is responsible for maintaining the associated dams and reservoirs. Potash mining companies are the other major water users which pay fees (or royalties) for the water they consume. Those fees are justified by the fact various canals and dams operated by SWA support the withdrawals made by mining companies.

While SWA and the Ministry of Environment exercise the constitutionally supported authority of the province over water, they are not the agencies which actually withdraw, treat and distribute the water that most Saskatchewan residents consume. The province’s urban municipal governments along with irrigation associations, regional pipeline associations, individual farmers and some businesses actually do the work and pay the bills. Indeed, the SDWS was applied to many municipalities which had been struggling to deliver water to their residents under the pre-2002 regulatory environment.

6.3 Municipal impacts of the SDWS

Between 1984 and the adoption of the SDWS in 2002, SaskWater and the Ministry of Environment (referred to as Saskatchewan Environment and Resource Management [SERM] from 1993-2007) were the province’s leading water governance
agencies. It is therefore not surprising that SaskWater policy analysts played a prominent role in the planning that produced the SDWS. Two planning documents prepared by SaskWater officials in early 2002 provide insights into the various objectives and strategic considerations that shaped the SDWS: the *Long-Term Safe Drinking Water Strategic Plan* (SaskWater 2002) and the *Provincial Response to the Report on the North Battleford Water Inquiry* (SaskWater 2002a).

SaskWater’s planners cautioned that the new water quality standards envisioned under the SDWS presented significant problems for many of the province’s urban municipalities. It was estimated that at least 70 communities were not meeting the new standards and would not be able to comply without making improvements to their water infrastructure (SaskWater 2002: 7). Another 40 communities were reported to be experiencing infrastructure problems due to drought conditions in 2001-2002. Source water supplies were failing due to drought and many of these communities were faced with the cost of obtaining new water sources (SaskWater 2002: 2). Furthermore, the planners estimated that 90% of communities with populations below 1,000 (some 428 communities) were operating water supply and treatment systems that had passed their life expectancy and required upgrading (SaskWater 2002: 15). The planners estimated that upgrading out of date infrastructure in these smaller communities and ensuring that the new quality standards could be met would cost approximately $315 million with per capita costs ranging from $600 - $2,800 depending on the community. Estimates produced later in 2002 put the total at closer to $1 billion (SaskWater 2002:15; SW1a).

While the province was intent on ensuring that municipal drinking water was made safer in 2002, it was at the same time reluctant to fully fund the necessary
improvements through grants and subsidies (SaskWater 2002a: 2). The major federal-provincial grant program in place to support water and wastewater infrastructure development at the time was the Canada Saskatchewan Infrastructure Program (CSIP). CSIP had only $8-9 million left to dispense and was slated to end in 2006 (SaskWater 2002a: 19). When a previous program expired -- the 1999-2000 Provincial-Municipal Infrastructure Program (PMIP), many municipalities were left without support for their projects. Out of 145 applications by municipalities for PMIP grants totaling $5.34 million only 30 projects amounting to $2.51 million were approved. The CSIP program received 216 applications for $41.43 million in grant support in 2001 out of which only 48, accounting for $11.07 million, were approved (SaskWater 2002: 16). There was simply more demand for assistance than the programs were designed to deliver, and demand was expected to increase due to the higher treatment standards established under the SDWS, ageing infrastructure and drought conditions.

According to SaskWater’s January 2002 strategic plan, the province could mitigate the need to provide grants to municipalities for water system upgrades by encouraging municipalities to adopt “user pay” full cost pricing for water (SaskWater 2002: 18-20, 26).

User pay and full cost pricing are key to ensuring that safe drinking water is appropriately valued and that quality water is made available…A focused commercial utility allows financing of water projects to be put on a financially sustainable basis and removes the pressure to subsidize projects. (SaskWater 2002: 25, 34).

The provincial and federal governments supported this recommendation by ensuring that any grants provided to municipalities for water infrastructure in the future would be made conditional upon their adopting a marginal full cost pricing formula. In
addition, the Saskatchewan Municipal Board and the Municipal Finance Corporation, which oversee and facilitate borrowing by municipalities, would make the adoption of full cost pricing formulas a condition for borrowing (Saskwater 2002: 29; 2002a: 19,20). These measures have been in operation since 2002. Clearly, this approach is compatible with the position taken by Renzetti and Busby (2009) whereby the provision of grants is viewed as a disincentive to water conservation which can be avoided through adoption of the market-based water governance principle of marginal full cost pricing. The principle difference between the objectives of user pay full cost pricing under the SDWS and the Renzetti and Busby approach is the lack of emphasis on water conservation in the SDWS planning documents. Under the SDWS, the promotion of conservation and the value of water played a role in the strategic representation of the SDWS in public relations messaging. They were not, however, presented as key objectives. The core goals of the SDWS were to enhance drinking water safety without foisting all of the associated costs onto the provincial treasury.

**Municipal response to the SDWS**

The officials involved in designing the SDWS had engaged in consultations with the Saskatchewan Urban Municipalities Association regarding the value of user pay full cost pricing and the willingness of the public to accept higher rates. SaskWater’s planners were under the assumption that higher water rates would be more readily accepted by the public than higher property taxes. The planning documents noted that 11 of the province’s cities and larger towns were already operating their water utilities at a profit, suggesting that some municipalities had already perceived the water rate as a viable revenue generating option outside of taxing property (Saskwater 2002: 18). The research
presented in subsequent chapters of this thesis indicates that not all municipal officials view water rate increases as any more palatable by ratepayers than property tax increases.

According to SaskWater, the municipalities were generally supportive of the principle of full cost recovery pricing, although they did not agree that grants should or could be eliminated (SaskWater 2002: 40). There were municipal and provincial government officials interviewed for the IACC and RCAD projects who held that grant funding tended to be administered unfairly. They argued that communities which had been improvident by not saving for capital improvements were nonetheless receiving grants, whereas more conscientious budgeters were funding their own infrastructure improvements, enduring whatever taxes or user fees were required to do so. Poorly managed municipalities facing boil water advisories could free ride by demanding support from government to upgrade their infrastructure, stressing the province’s obligation to ensure public health and get the assistance. A community that taxed and saved at the optimal level would, in theory, be less likely to face the sorts of problems associated with inadequate water systems, but its residents would at the same time be subsidizing the grants provided to less prudent communities through the taxes they paid to the provincial and federal governments (WC2: Para.131; SW3: 161; SaskWater 2002: 39). It was assumed that the adoption of marginal full cost pricing for water and sewer services would contribute to more prudent management including the maintenance of funds for system maintenance and upgrading, and at the same time reduce free riding and cross subsidization.

SaskWater’s policy analysts were somewhat conflicted about the role that borrowing could or should play in financing municipal water infrastructure upgrading.
On the one hand, it was suggested that more flexible rules around how much money the province allowed municipalities to borrow would complement reductions in grant support (SaskWater 2002: 29; 2002a: 12). On the other hand, the planners cautioned that debentures backed by the Municipal Financing Corporation would show up as liabilities on the province’s balance sheet (SaskWater 2002a: 19). As of 2002 the province’s political leadership had a ten-year record of adherence to neoliberal balanced budget orthodoxy (Brown, Roberts, Warnock 1999; Conway 2006). Increasing the size of the province’s debt for most any reason was politically uncomfortable.

Furthermore, the borrowing option failed to address the challenges faced by communities already carrying heavy debt loads. The user-pay component of the strategy ignored the possibility that for some communities the water rates required to achieve full cost recovery had the potential to be in excess of what low-income families and families on fixed retirement incomes could reasonably afford. The planners cautioned that despite the implementation of user-pay systems, some smaller municipalities would not be able to finance their infrastructure upgrades without grant support.

There may, however, be rare situations where users are simply unable to pay the full cost of their drinking water. For example, a community could be isolated such that regional supply alternatives are unavailable, located in an environment where construction is extremely difficult, or suffer water source contamination requiring the development of a new source. These situations could easily exceed the ability of a community to address them with its own financial resources. One solution may be for senior governments to subsidize the rate that the community would be forced to charge its customers for some fixed period of time (SaskWater 2002: 27)

One of the options proposed, but not officially adopted, was to permit smaller municipalities to employ low-cost strategies that fell outside the rigid application of the new standards. One of the ideas suggested was to allow point of entry water treatment in
communities where the municipal treatment plant was incapable of delivering acceptable water. In these situations each household would be expected to have a privately owned and operated reverse osmosis filtration system. While exceptions have been made allowing a handful of very small communities to operate outside the standards, water managers interviewed in for this thesis indicate that the environment ministry is intent on phasing out exceptions (AS2A).

Clearly, the SDWS placed the bulk of the onus and cost for meeting the new drinking water safety on the province’s municipalities. It failed to address the municipalities’ long-held contention that the revenue generating capacity of senior governments was considerably greater than that of municipalities and therefore senior governments should be providing more not less financial support. For the previous two decades, Canadian municipalities had been claiming that the offloading of costs and responsibilities from senior levels of government onto junior levels (also referred to as downloading) had been forcing municipalities to do more with less, and that it was unreasonable to expect them to squeeze more revenue from property taxes and user fees (Colligan-Yano and Norton 1996: 137, Mirza 2007).

The 2007 report produced by Saeed Mirza on behalf of the Federation of Canadian Municipalities (FCM), Danger Ahead: The Coming Collapse of Canada’s Municipal Infrastructure, describes the impact of the revenue and infrastructure challenges facing local governments.

Canadian municipalities build, own and maintain most of the infrastructure that supports our economy and quality of life. Yet for the past 20 years, municipalities have been caught in a fiscal squeeze caused by growing responsibilities and reduced revenues. As a result they were forced to defer needed investment and municipal infrastructure continued to deteriorate, with the cost of fixing it climbing five-fold from an estimated $12 billion in 1985 to $60 billion in 2003.
This cost is the municipal infrastructure deficit, and today it has reached $123 billion. (Mirza 2007: 2)

In 2007, the FCM estimated that the portion of the municipal infrastructure deficit represented by the need to rehabilitate the existing water and wastewater infrastructure stood at $31 billion while the requirements for new construction, including the need to upgrade water and sewage treatment to meet higher regulatory standards was estimated to be $56.6 billion (Mirza 2007: 12).

6.4 The new SaskWater

Under the Saskatchewan Water Corporation Act 2002, SaskWater was re-imagined as a for-profit Crown corporation operating under the authority of the Crown Investments Corporation (CIC). If indeed the SDWS resulted in additional infrastructure challenges for municipalities, a refocused SaskWater would presumably be well-positioned to assist them. The new SaskWater would operate under what Bakker (2010) refers to as a corporatized water utility model. Its main lines of business would be owning and operating municipal water and wastewater utilities and selling water and wastewater treatment services to municipalities. A primary benefit that SaskWater offered prospective customers was that it could build, own and operate the infrastructure. Initial financing costs would conceivably not show up on a municipality’s balance sheet. SaskWater would help find the financing required, including whatever grants or financing arrangements might be available from federal-provincial programs. Municipalities could then apply for the grants and turn any funding received over to SaskWater to cover infrastructure costs. This practice has puzzled some municipal auditors who have wondered how to account for municipal expenditures on assets that they do not own
(apparently it is assumed the value resides in the contracts the municipalities have with the corporation).  

Prior to 2002, the 1984 version of SaskWater had been providing these services to 43 municipalities, presumably on a break even basis. It had also been providing a considerable amount of free advice and technical support to municipalities seeking solutions to their water management problems. Under its new 2002 mandate, SaskWater would no longer be available to provide municipalities with free advice concerning their water infrastructure needs. Its existing water treatment obligations to municipalities and any new contracts it might enter into with communities would have to be profitable, they would hopefully achieve full cost recovery plus a profit. Planners expected that SaskWater would do brisk business and could be profitable within just two years (SaskWater 2002a: 14). After all, the new regulatory standards included in the SDWS would require many municipalities to upgrade their infrastructure. Indeed, the planners suggested that SERM should be encouraged to be rigorous in its enforcement of the new standards: “Strict enforcement of drinking water standards will motivate communities to place greater value on drinking water,” and presumably position them to be better disposed to paying SaskWater the fees required to meet its profit objectives (SaskWater 2002: 16).

As of 2008, the anticipated growth in SaskWater’s customer base had not occurred, leading the corporation’s marketing managers to conclude that even more assiduous enforcement of standards would be required to assist it in attracting new business. Incidentally, the IACC and RCAD project interviews indicated that some
municipal officials took a dim view of being levered by regulations imposed by SERM into dealing with another government agency (WC4: Para. 365; MC4: 3,4; KD4a: 2, 3).5

Unlike the province’s Crown-owned electrical and natural gas utilities (SaskPower and SaskEnergy), SaskWater was not granted province-wide monopoly status. SaskWater would retain the 43 contracts it had with communities prior to 2002, but any new business it attracted would be obtained in a purportedly competitive marketplace. Any advantages that its experience, business history and goodwill might have provided in attracting business was dampened by the government’s insistence that the corporation avoid undercutting the prices being charged by private sector engineering firms for similar work.

SaskWater must not be [emphasis in the original] portrayed simplistically as the low-cost alternative for community water problems…While SaskWater expects the corporation’s good relationship with the consulting engineer industry in Saskatchewan will continue following restructuring, the corporation must actively seek opportunities to contract with private business for services. (SaskWater Jan. 2002: 16).

A senior SaskWater official interviewed by this writer, reported that in practice the restraint on competition was rather stringently interpreted by Crown Investments Corporation, SaskWater’s shareholder (SW1A). For example, SaskWater was sometimes not permitted to seek business arrangements with communities which had established relationships with private sector engineering firms. “Established relationship” was a loosely defined term. It could mean that in the previous several years the private firm had been engaged to provide engineering services to the community.

Efforts by SaskWater management to meet the objectives of its for-profit mandate included increasing the fees it charged its customer communities by 78% between 2001
and 2006 (SaskWater 2007a: 28). Two of Saskatchewan’s other Crown utilities, SaskPower and SaskEnergy, have not been allowed anywhere near the sort of rate increases implemented by SaskWater. The rates charged by the gas and electrical utilities are subject to review by the Saskatchewan Rate Review Panel (SRRP), which has held annual delivery charge increases to below 9% over the past decade. SaskWater’s rate changes have been exempted from review, in part, on the grounds that it does not have a province-wide monopoly and therefore its rates are presumably governed by market conditions. While the rate increases produced more revenue from the existing customer base, they were viewed as counter-productive in relation to SaskWater’s growth objectives. According to the corporation’s marketing managers, the rate increases affected the opinions of prospective customers. They noted that “word of mouth” perceptions about the corporation’s pricing behaviour were inhibiting sales growth (2007a: 28). SaskWater’s 2008-2012 marketing plan states:

In terms of brand ‘SaskWater’ has become synonymous with ‘expensive’ and emerged as a price leader in the marketplace that currently believes the product being sold should be relatively inexpensive. One can argue that the marketplace has undervalued the product, but in a short period of time SaskWater has significantly increased its pricing in pursuit of profitability objectives resulting in significant ramifications on future sales. (SaskWater 2007a: 28).

SaskWater’s municipal customer list has grown modestly between 2001 and 2011. As of 2011, SaskWater had 59 municipal customers (out of some 476 urban municipalities) and supplies water to 81 rural and regional pipeline systems that supply anywhere between two to dozens of customers. While many municipalities have indeed made improvements to their systems over the past 10 years they typically did so without help from SaskWater. Many simply engaged private engineering consultants and
contractors to design and build their systems. And, as will be discussed in later chapters, this has not always produced optimal outcomes for communities (e.g., Maple Creek).

Table 6.2 provided below reports SaskWater’s annual profits and losses from 2001-2011 as well as totals for municipal customers, industrial customers and rural pipeline organizations which are supplied by SaskWater systems.

TABLE 6.2 SaskWater customers and net income 2001-2011

<table>
<thead>
<tr>
<th>Year</th>
<th>Municipal Customers</th>
<th>Industrial Customers</th>
<th>Pipeline Customers</th>
<th>Profit/ (Loss)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>43</td>
<td>33</td>
<td>42*</td>
<td>($4,176,000)</td>
</tr>
<tr>
<td>2002</td>
<td>46</td>
<td>34</td>
<td>42*</td>
<td>($3,291,000)</td>
</tr>
<tr>
<td>2003</td>
<td>48</td>
<td>36</td>
<td>42</td>
<td>($3,384,000)</td>
</tr>
<tr>
<td>2004</td>
<td>49</td>
<td>37</td>
<td>42</td>
<td>($1,534,000)</td>
</tr>
<tr>
<td>2005</td>
<td>50</td>
<td>37</td>
<td>42</td>
<td>($1,139,000)</td>
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<tr>
<td>2006</td>
<td>55</td>
<td>34</td>
<td>51</td>
<td>$295,000</td>
</tr>
<tr>
<td>2007</td>
<td>53</td>
<td>41</td>
<td>60</td>
<td>($602,000)</td>
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<td>2008</td>
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<td>2009</td>
<td>55</td>
<td>44</td>
<td>59</td>
<td>$454,000</td>
</tr>
<tr>
<td>2010</td>
<td>57</td>
<td>14**</td>
<td>85***</td>
<td>$224,000</td>
</tr>
<tr>
<td>2011</td>
<td>59</td>
<td>15</td>
<td>81</td>
<td>$3,513,000</td>
</tr>
</tbody>
</table>

Source: SaskWater Annual Reports 2001-2011

*This figure is an estimate derived from a comparison of 2003 figures for the number of individuals served by pipeline systems and the number of systems. The 2001 and 2002 reports do not list the number of systems but list a total for individuals served by pipelines close to the 2003 figure of 1,300.

**In 2010, SaskWater created a new category of customer referred to as commercial containing 200 water users, leaving only 14 customers in the industrial category.

***The definition of a pipeline organization was changed in 2010 which allowed for systems supplying as few as two customers to be designated as public pipelines (formerly these users were in a separate class of individual farm connections that totaled approximately 300 users).

Regional systems

Between 1984 and 2002 SaskWater participated in the establishment of a number of regional water systems. In 2002, the corporation’s planners assumed that the development of additional regional water networks would contribute to growth. Under the regional system model, a cluster of communities can share the same source water, withdrawal and conveyance infrastructure (e.g., main pipelines) and treatment plant. By sharing infrastructure, fewer facilities are needed, costs are spread among more users and
each of the participating communities is assured high quality water. In addition, farmsteads located in the vicinity of the pipelines supplying participating urban municipalities can connect to the systems, ensuring safe and reliable on-farm domestic water use.

Regional systems had been pioneered by a handful of municipalities prior to SaskWater’s creation in 1984. For example, the PFRA assisted the towns of Eston and Kindersley establish a shared water pipeline system in the 1960s. By 2002, SaskWater had become the leading developer of these systems in the province. Regional projects supported by SaskWater include the Humboldt-Wakaw and Melfort regional systems.

Over the course of the decade following the launch of the SDWS, it became apparent that despite the inherent rationality of regional systems, there were significant barriers standing in the way of their development. For instance, given the varying hydrological conditions affecting communities, not all municipalities in a region face water quality and quantity challenges at the same time. The barriers standing in the way of regional system development are described in greater detail in Chapter 11 of this thesis. The number of regional systems in the province, particularly those serving farmsteads and smaller communities, has increased since 2002. However, at least 16 of these systems were organized and developed independently of SaskWater (SARWP1).

6.5 The role of the Saskatchewan Municipal Board

The process for determining the financing options available to municipalities confronted with the need to pay for significant water or wastewater infrastructure improvements is influenced by decisions made by the Local Government Committee of the Saskatchewan Municipal Board (SMB). The SMB’s authority in this area is laid out
in Section 23 of the *Municipal Board Act* (Chapter M-23.2 of the Revised Statues of Saskatchewan). For decades, municipalities have been required to submit their annual financial statements to the SMB (and its predecessor agencies). This is part of the oversight process intended to prevent urban governments from engaging in excessively risky borrowing and budgeting practices. Since 2002 (and the implementation of the SDWS), the SMB has required municipalities to append a schedule to their annual reports that provides a separate income statement for their sewer and water utilities. In another part of the annual report the municipalities are required to report on the funds they have saved for anticipated capital expenditures including the upgrading of water and sewer infrastructure. In reviewing the annual financial reports, the SMB assesses whether the municipalities are indeed operating according to the full cost recovery model prescribed under the SDWS (*SMB1, MC4, MC6, SH2.1, AS1.1, CN36.1, KD4A, KD41, KD42 MD32*).

In instances where a municipality is determined to be operating its utilities at a loss or failing to set aside enough funds for infrastructure replacement, the SMB may advise the municipal council that it is not following best practices. Municipalities are also advised that communities seeking infrastructure grants are likely to be viewed more favourably than those which do not (this advice can come from the SMB, as well as government agencies responsible for the awarding of grants). Municipal councils are not officially required to amend their utility rates or the proportion of their revenues devoted to savings. Indeed, there is no provision in statutes or regulations that sets out just how much a municipality is required to save.
Exceptions to the usual process arise under two conditions: 1) when the municipality wishes to borrow money beyond the regulated limit of \(1/2\) of its annual revenues (on loans with repayment terms of no more than three years) and; 2) when a municipality wishes to change its water or sewer rates (the rates are assessed to determine whether they conform to the marginal full cost recovery model and are approved or rejected accordingly). As is the case with grant eligibility, communities are not allowed to borrow above their regulated limits to finance water and sewer projects unless they have, or agree to implement, marginal full cost recovery rate systems.

One might reasonably speculate that if a municipality proposed to build a new water treatment plant and employ a full cost recovery rate system, any loans required could conceivably be self-liquidating over the course of the project’s lifespan. In other words, depending on the specific conditions of each case, projects can conceivably be designed to pay for themselves and the costs associated with borrowing. While this may indeed be the case for a given project, it does not guarantee that the SMB will permit the municipality to borrow all or any of the money required. The SMB balances the need for borrowing with several factors besides whether the project appears to be self-liquidating. Additional considerations include assessing the overall financial, economic and demographic condition of the community (Section 23 Municipal Board Act, SMB1). Is the community growing, stable, or in decline? Is the community overextended financially? Is it already close to maximizing its borrowing capacity? Did it recently borrow a significant amount of money to build a new hockey arena, to pave its streets, etc., prior to the arrival of an unanticipated water crisis? In addition, the SMB will assess the availability of alternative and supplementary financing options such as: the
availability of grants; the consolidation of existing debt; the potential for a one-time utility levy on ratepayers and the use of higher water rates to facilitate the more rapid retirement of debt.

The SMB has no authority over the availability of senior government grants but it does have authority over how much a community can borrow and, by extension, whether it will need to impose a special levy and/or higher water rates on its residents. The SMB claims that these determinations are made in consultation with municipalities, suggesting that decisions are made jointly by the parties (SMB 2013). Furthermore, the SMB claims that it takes the affordability of special levies and water rate increases for ratepayers into account when assessing borrowing requirements (SMB1). The research presented in Chapter 9 of this thesis indicates that this is clearly not always the case. Duck Lake’s Town Council, for example, was frustrated and angry when it learned that the borrowing limits imposed by the SMB would require it to charge every ratepayer a one-time levy of nearly $3,000. The research shows that the levy and accompanying rate increase did indeed generate hardship for low-income residents of the community. As will be described in Chapter 9, communities in addition to Duck Lake have experienced significant challenges due to the levels of grant support and borrowing capacity available to finance water and wastewater infrastructure projects.

6.6 Type II/user-based governance systems

Irrigation district associations

There are 24 organized irrigation projects (or districts) in Saskatchewan, each of which has a producer controlled district association. The associations are responsible for maintaining and operating much of the shared infrastructure that supports an irrigation
project, e.g., main canals and pumping stations. The apportionment of operating costs is typically based on the number of acres each association member irrigates. However, costs of some infrastructure expansion projects are shared on a per farmer basis that does not take acreage into account (see Chapter 10 of this thesis). As is the case with the Type II function based systems described by Hooghe and Marks (2002) the operations of the irrigation district associations are nested within the purview of supportive senior government agencies. For example, SWA is responsible for allocating water to the district associations and the management of some of the dams and reservoirs that support the projects. The provincial ministry of agriculture has the authority to determine whether a parcel of land is suited to irrigation, and plays a role in planning district improvements and expansion.

There is some overlapping of provincial and federal responsibilities for irrigation in the province. Both the federal and provincial governments have provided grant support for the development, upgrading and expansion of district irrigation. The provincial and federal ministries of agriculture jointly support the Canada-Saskatchewan Irrigation Diversification Centre located at Outlook, Saskatchewan which provides research support to the industry. The federal government continues to own and maintain a number of dams and reservoirs in southwest Saskatchewan through the AESB (formerly the PFRA), and also provides operational support for several irrigation projects in the southwest. The AESB has indicated its intention to give up its irrigation responsibilities, turning management of its projects over to the farmers and the province by 2017. It is noteworthy that organized irrigation project associations account for only 28% of Saskatchewan’s irrigated acreage. Most of the province’s approximately 1,400 irrigators operate
independently. This is the reverse of the situation in Alberta where over 80% of irrigation is under district association management (see Chapter 10 of this thesis).

The water governance and management challenges confronting irrigation agriculture in the province are discussed in greater detail in Chapter 10 of this thesis. That discussion will demonstrate that the irrigation associations employ a cooperative governance model and use cost sharing and water allocation formulas that are inconsistent with the core elements of market-based water governance and management.

Regional pipelines

The growing number of regional pipeline associations being developed in support of town and country communities and bedroom communities associated with larger urban centres and farmsteads share characteristics with Type II systems. These systems offer cost-effective solutions to the water quality and quantity challenges faced by farm households and small urban communities. Nesting, in the case of pipeline associations, includes supporting legislation and technical advice provided to the associations by senior government agencies such as the PFRA, the provision of allocation licenses when required (from SWA), the approval of municipal governments, and fluctuating levels of grant support. As reported above, SaskWater has played a role in establishing a number of regional systems which provide water to both urban municipalities and farmsteads. However, a number of the associations are operated entirely independently of SaskWater. The fully independent groups are generally focused on the delivery of water to farmsteads, but some, including the Water West network (supplied by the EK pipeline), provide water to both urban communities and farmsteads. Some associations purchase water from SaskWater but are otherwise independent.
There are approximately 75 regional system associations operating in the province. Many of them belong to the Saskatchewan Association of Rural Water Pipelines (SARWP), which provides advice on technical and governance matters. Chapter 11 of this thesis describes the operation of rural and regional pipeline associations and the potential they present for addressing the water challenges faced by municipalities and farmers in the future. The discussion in Chapter 11 indicates that the construction cost allocation practices of the regional pipeline associations are inconsistent with the principles of marginal full cost recovery and the avoidance of cross subsidization that are at the core of market-based water governance. As is the case with district irrigation associations, the pipeline associations typically employ cooperative cost sharing practices to finance infrastructure.

6.7 The role of NGOs

Watershed committees

The SDWS called for the development of community-based watershed committees to facilitate ongoing stakeholder feedback and participation in source water protection (SaskWater 2002: 30, 35). This initiative reflected the adoption of elements of IWRM and met some of the demands being made by environmental activists, including the Saskatchewan Environmental Society. Initially, planners assumed that municipalities would provide the membership for the new organizations. In practice, participation was broadened to include institutions from civil society and interested individuals. SWA led the organization of most of the watershed groups and supplied them with start-up funding. There are currently 12 watershed stewardship committees operating in the province, one of which is focused on groundwater resources.
An initial objective for most of the watershed committees was the development of source water protection plans for their respective watersheds. SWA provided most of the financing and technical support required to develop the plans. Since the committees lack regulatory authority and financial capacity, they rely on government agencies to implement their source water protection recommendations. While SWA, along with municipal and private sector donors, provided seed money to launch the new organizations and produce the source water protection plans no provisions have been made to provide the stewardship groups with a permanent source of operational funding (Hurlbert 2009; Hurlbert et al. 2009; SWA6 Para. 169). Grants in support of committees’ operations have nonetheless been provided, but on an ad hoc basis as opposed to a more permanent system of support. The committees have frequently been able to secure funding by acting as delivery agencies for various water programs offered from time to time by senior governments. However, committee officials have questioned whether “grant chasing” is the most appropriate use of their staff resources; particularly when the relationship between program objectives and the goals of the stewardship groups may not always be well aligned (Out 1 Para. 126-143WC3 Para. 215-219).

There is a divergence of opinion among watershed committee members interviewed in association with the IACC and RCAD projects as to what their long-term role should be and how permanent core financing might be secured. Some observers have suggested that the committees should be granted regulatory authority over some aspects of water use and management within their respective watersheds (IACC 2009; RCAD 2012; SH6). The capacity to regulate or license activities, it is held, could provide the
committees with a permanent revenue stream with which to finance their core operations and engage in local source water protection activities.

On the other hand, some participants argue that Saskatchewan does not need an additional layer of quasi-governmental bureaucratic authority in the field of water governance or any new taxes or fees. It has also been suggested that without some assurance that the committees’ suggestions will be taken up by government, activists will conclude their efforts are wasted and participation could decline (Hurlbert et al 2009: 25, SWA7 Para. 53).

Another issue affecting the long-term sustainability of the committees is the capacity of locally based institutions and individuals to participate. Some of the IACC and RCAD respondents reported that traditional levels of volunteerism are declining in rural Saskatchewan (e.g. WC1: Para 25-34). This is attributed to a declining and ageing population and the busy schedules of agricultural producers who frequently hold off-farm jobs. As respondents noted, there is a handful of people who play an active role in community affairs. There are limits to the number of new organizational obligations that these, already busy, municipal councillors and employees can undertake. In addition, many Saskatchewan watersheds cover large areas. For example, representatives on stewardship committees associated with the South Saskatchewan River can be required to travel over 100 kilometres to attend meetings, expensive in terms of increasingly scarce resources of both time and money.

Other agencies

In developing the 2002 SDWS provincial planners noted the roles, interests and influence of non-governmental stakeholders including Ducks Unlimited Canada (DUC)
and two additional NGOs: the Saskatchewan Environmental Society (SES) and Nature Saskatchewan. DUC has played an active role in preserving and developing wetlands in the province. Its activities have included the construction of waterworks and obtaining ownership of wetlands. Government planning documents and interviews with SES officials and the comments of water governance practitioners presented later in this thesis describe the influence of the SES in promoting the adoption of IWRM principles in the governance and management of water in Saskatchewan. The SES is also arguably the most prominent organization opposed to supply focused water management in the province. SES has called for a demand focused, or conservation based, response to water infrastructure challenges and has opposed the construction of large dams and reservoirs (SES1: Para. 8).

Chapter 6 Notes

1) As Hurlbert et al. (2009) and other writers note, water safety issues became more urgent among the public and policy makers following the 2000 Escherichia coli contamination of drinking water at Walkerton, Ontario. Public alarm over the Walkerton incident was supplemented by the contamination of North Battleford’s drinking water in 2001 and the evacuation of the Kashechewan First Nation in Ontario in 2005 due to unsafe drinking water.

2) The discussion of provincial agencies involved in water governance and management included in this chapter describes the situation that obtained prior to October 15, 2012 when the provincial government announced a reconfiguration of its water governance and management framework and the creation of a new Treasury Board (not for profit) Crown corporation, the Saskatchewan Water Security Agency (WSA). The WSA was established following an extensive public consultation process launched in 2011, under the auspices of SWA, to develop a 25 year water security plan for the province. The planning document developed, 25 Year Water Security Plan Consultation Document, provided the basis for the subsequent reconfiguration of water governance and management responsibilities in the province. The new WSA retains the functions formerly provided by the Saskatchewan Watershed Authority (which effectively ceased to exist Oct. 2012) as well as the drinking water safety functions formerly managed by the Saskatchewan Ministry of Environment. This reconfiguration, in part, constitutes an effort to deal with the complexity issues dealt with in this chapter. As the discussion in this chapter suggests, during the 2002 to 2012 period there was a significant amount of confusion among members of the public and some water management officials about which agencies were responsible for which issues. The creation of the new agency reflects a widespread demand for rationalization, or, what was colloquially referred to as greater access to “one stop shopping,” for individuals, agencies and communities dealing with water governance issues. For further information, the reader can consult the Saskatchewan Water Security website at www.wsask.ca.
3) There is a paucity of text devoted to environmental concerns including the ecological health of instream and riparian ecosystems in either SaskWater 2002 or SaskWater 2002a. The six page Government of Saskatchewan brochure (Government of Saskatchewan 2002) describing the province’s SDWS contains as much text dealing with environmental issues including water pollution than either of the two planning documents which contain 56 and 48 pages of text respectively. However, the strategy documents note the potential for opposition to the SDWS from the Saskatchewan Environmental Society, which is portrayed as a public relations issue. Also of interest is the fact that the six page brochure devotes a full page to promoting the value of water, a concept which is linked to the likelihood that some Saskatchewan residents will be paying more for water. The six page brochure is the only publicly disseminated document made available by provincial government agencies in association with the SDWS. An electronic version of a modified version of the document, also six pages, was available on the Saskatchewan Watershed Authority and SaskWater websites as of July 2008; Government of Saskatchewan, Safe Drinking Water Strategy www.saskwater.com (accessed July 16, 2008).

4) In a follow-up interview September 10, 2013 in Regina, IACC respondent SW1, a former SaskWater executive, reported that SaskWater’s success was hampered by the fact that the corporation lacked the ability to finance projects. As noted in this chapter, the provincial government restricted municipal borrowing to avoid adding to the province’s deficit and debt. Similarly, the provincial government was reluctant to allow SaskWater to incur debt that would appear on the province’s balance sheet. As a result SaskWater was often limited to assisting the municipalities in locating grant money, which was frequently in short supply, to finance projects.

5) An official interviewed for the IACC project who was responsible for supervising enforcement reported that while some municipal officials were reprimanded for falsifying records, as of 2008, no one had been charged for providing water that fails to meet SERM’s standards (SE5: Para. 101, 113).

6) The author served as technical writer for the Saskatchewan Rate Review Panel from 2007 until 2010, During that time he asked both Panel Chairs who served over that period (Alison Renny and Kathy Weber), as well as the Panel’s principal technical consultant, Gerry Forrest, for their assessments as to why the province did not require reviews of rate changes for SaskWater or indeed any municipality wishing to adjust rates. They assumed that SaskWater was exempted because it did not have province-wide monopoly status. However, they all agreed that for the municipalities with which it did business a monopoly relationship existed, which suggested that rate review was actually in order.
CHAPTER 7: Municipal Experience I - unanticipated water crises

7.1 Introduction

This chapter describes how the implementation of market-based water governance practices prescribed under the SDWS to accommodate water and wastewater infrastructure improvements without increasing the demand for grants can be frustrated by the appearance of unanticipated water crises. The rationales provided in support of the market-based model under the SDWS, and the expectations they generate, simply fail to take certain forms of water crisis into account, a situation which this chapter identifies as a significant failing of the SDWS.

The rationales provided in support of market-based water governance and marginal full cost pricing were described in Chapter 3 of this thesis. The author indicated that Bonbright (1961) encourages the development of rate structures that are predictable and relatively stable, with large rate increases spread out over a number of years to avoid rate shock (see Chapter 3 of this thesis and SRRP 2007, 2008). Optimally, the rates a municipality sets will return the full cost of providing service along with allowances for meeting future costs related to infrastructure replacement and system expansion (for a growing community). A prudent utility will plan for the replacement of infrastructure as it exceeds its lifespan, and for the sorts of system breakdowns and problems that can be reasonably anticipated in the regular course of utility operations. The fiscally prudent utility is expected to recognize and plan for the need to periodically replace pumps, water mains and treatment plants equipment. On the other hand, utilities are not expected to save for unlikely eventualities. A municipality that told its ratepayers that it needed to
raise water rates to save for a possible terrorist attack would probably be criticized for engaging in an unnecessary tax grab as opposed to sound forward planning.

In this chapter the author contends that some of the municipalities studied have encountered circumstances that could not have been reasonably foreseen. Consequently, they lacked the savings required to make infrastructure improvements. Even when a municipality has a full cost recovery rate structure in place, it can be hard-pressed to meet the infrastructure costs associated with these circumstances. Given the restrictions placed on municipal financing in association with the SDWS, these communities were required to rely on government grants (which were available only sporadically) and substantial water rate increases to address the water crises they faced. This chapter sets the stage for Chapter 9 of the thesis, which describes how in some of the studied communities the magnitude of these fee increases produced rate shock effects. There were adverse social equity outcomes associated with introducing the sorts of rate increases required to meet unanticipated water infrastructure crises. In addition, in the absence of adequate financial resources, unanticipated water infrastructure crises can threaten community sustainability.

This writer acknowledges that the adoption of marginal full cost pricing for water may, indeed, encourage greater fiscal prudence on the part of some municipal governments. However, the adoption of marginal full cost pricing has not eliminated the need for grants and government backed financing in support of municipal water infrastructure projects. This is because even when full cost recovery pricing schemes are in effect, they alone are not always sufficient for addressing a variety of unanticipated municipal water system crises. Chapter 9 of this thesis describes how low levels of grant
support and restrictive borrowing regulations can require municipalities dealing with water crises to set rates that are politically and socially unpalatable.

Water crises are defined here as system failures associated with supply depletion, threats to drinking water safety and infrastructure failure. All but one of the urban communities studied in support of this thesis has confronted a water system crisis since 2002 – Shaunavon being the sole exception. The cases described in this chapter were distilled from IACC and RCAD project interviews and interviews conducted independently by the author with elected municipal officials, town managers, public works and waterworks managers and employees. References are provided which refer to the particular interview transcripts consulted.

7.2 Support for the full cost pricing model

Support among Saskatchewan’s municipal officials for full cost pricing rests primarily on the proposition that pricing formulas which allow for the accumulation of savings to provide for system maintenance and upgrading constitute prudent long-term financial management. It is widely assumed that failing to accumulate the necessary capital to self-finance water and wastewater infrastructure projects is often the result of inept management, overzealous efforts to constrain municipal taxes and fees, as well as the fact that grants from senior governments are frequently made available to the imprudent. Indeed, the authors of SaskWater’s January 2002 strategic planning document held that the existence of grant programs was a disincentive for municipal self-financing (SaskWater 2002: 39). Some of the municipal officials interviewed claimed that it was unfair when municipalities who failed to properly plan and save for water infrastructure projects received grants, while those who had been more prudent paid the full cost for
their projects. This can be discouraging for municipal officials who have taken a more prudent approach (R1: Para 113; AS2: 16; SW3: Para. 161). An elected municipal official from the Kindersley area described a case in which a neighboring community had made itself grant dependent through what he considered to be imprudent financial management.

A community north of Kindersley, which is very similar in size to ours, has not, in their wisdom, done any setting aside of funds to upgrade their treatment plant – to do anything with their infrastructure. And right now they are facing the fact their water treatment plant has to be replaced which is probably going to be three or four million – or they have no water supply...Their infrastructure, their sewer and water lines are all in very bad shape and they have got continuous water breaks, sewer breaks in the community. And I don’t know how they are going to be able to afford it. Well I know they can’t. And the regulations in the Municipal Act that govern how much money we can borrow, they can maybe borrow ten per cent of what they need. But no more than that. There is just no way. So what is the alternative for them [other than grants]? (R1: Para. 131)

In other words, providing grants to municipalities that do not attempt to accumulate the capital required for infrastructure financing rewards bad management and encourages free riding. Renzetti and Busby (2009) have identified the underfunding of water infrastructure as a calculated financial strategy employed by some municipalities.

It is quite possible and rational for some Canadian municipalities to “game” the system by delaying or even avoiding needed maintenance and repairs. A municipality would do this if it anticipated that political or economic circumstances would likely lead a senior government to provide funds for infrastructure repairs. (Renzetti and Busby 2009: 34)

Not all of the municipal administrators and elected officials interviewed in connection with this thesis endorsed marginal full cost pricing by itself as the best method for financing utility operations and future infrastructure needs (MC5, MC6, AS3, DL1, DL2, DL3). Seven of the study communities relied on a combination of fixed fees
and volumetric rates to achieve their revenue objectives. The exception is Shaunavon, which uses fixed fees alone to generate revenue from residential water use (see Chapters 8 and 9 of this thesis). One town manager argued that bureaucrats from the Ministry of Municipal Affairs were infringing on local autonomy when they required municipalities to submit utilities budgets and rate schedules for approval. “It’s really none of their business whether we decide to finance infrastructure upgrades from water rates or the property tax…We should have the autonomy to make that decision” (AS3: 1).

7.3 Unforeseen water problems

The cases described below demonstrate how the reasonable expectations of prudent water utility managers can be overtaken by unanticipated events. There have been unwelcome surprises that produced significant water problems for seven of the study communities. Officials in each of these communities assumed they had an effective full cost recovery strategy in place before the unforeseen crisis occurred. Those unforeseen challenges fell within the following four categories:

1) severe drought can deplete a community’s water source (e.g., Maidstone, Gravelbourg, Assiniboia);

2) the imposition of unanticipated regulations can render existing systems redundant (e.g., Maple Creek 2001, Gravelbourg 2006, Duck Lake 2006);

3) unanticipated infrastructure and equipment failures can occur (e.g., Kindersley 2002); and

4) combinations of any (and possibly all) of the above.
7.4 The impact of drought and flooding

Maidstone

The experience of the Town of Maidstone provides an example of unanticipated source water depletion due to drought. Maidstone is a community with a population of 995 which lies outside the Palliser Triangle in a wetter region which generally experiences crop yields above the provincial average (RCAD 2012: 52, 53). It was selected for inclusion in the RCAD project to determine how the adaptive capacity of communities that rarely experience drought compared with the resilience of more drought-prone regions from within the Palliser Triangle (RCAD 2012: 5). Farmer respondents from the Maidstone area reported that the drought of 2002 was the first severe drought they had experienced in their farming careers. Indeed, local memory has it that the area escaped the impacts of the severe droughts of the 1930s and 1980s.

While moisture conditions improved after 2002, it was not before water levels on Maidstone Lake became low, threatening the town’s ability to withdraw water. The solution adopted by the town was to drill new wells approximately 15 km northwest of Maidstone, near the neighbouring community of Waseca. A pipeline was built to convey the water to Maidstone’s existing water treatment plant. The well and pipeline project were completed in 2005. It was financed with a combination of grant support, borrowing and water rate increases. After decades of experience with a secure water source, the impacts of the drought of 2002 came as something of a surprise to Maidstone’s town council. Prior to 2002, Maidstone assumed that its water supply was secure and had designed its water rates accordingly. Before the drought, the community had no reasonable grounds to expect it would be required to develop an entirely new water
source. The water rates did not reflect the need to accumulate the funds that were required to construct the Waseca well and pipeline project. However, that does not necessarily suggest that the town was imprudent or that it did not have a prudently conceived full cost pricing system prior to 2002. The rate structure in place prior to 2002 was assumed to be capable of accommodating future infrastructure expenses that fell within the range of normal experience, but not an unanticipated climate crisis.

Gravelbourg³

The town of Gravelbourg, Saskatchewan experienced significant water supply and quality challenges from the 1980s until 2010 that were the result of both drought and the implementation of new water quality standards. Gravelbourg is a community of 1,187 located within the Palliser Triangle, approximately 100 kilometres southwest of Moose Jaw. Gravelbourg’s water source is Thomson Lake reservoir which is fed by the Wood River. The Wood River is a stream that originates within the Palliser Triangle. Its flows are supplied primarily by spring run off. In years when there is below average snowfall and low spring run off, there is less water flowing into the reservoir. The water entering the reservoir carries high concentrations of minerals and fertilizer residues. In warm weather the high nutrient content of the water contributes to algae blooms in the reservoir. This is particularly troubling during drought years because when reservoir levels are low, and the water is warm, the concentrations of organic and non-organic solids increase, making effective water treatment more difficult.

In 2005 the Town of Gravelbourg was informed that its water was failing to meet the Saskatchewan Environment and Resource Management’s new (post-2002) standards for concentrations of trihalomethanes (THMs) in drinking water. THMs are produced
when chlorine comes in contact with organic solids suspended in treated water. Regulatory concern over THM concentrations is a relatively new development in Saskatchewan. It was not until after the launch of the SDWS that Saskatchewan Environment and Resource Management (SERM) took action in relation to Gravelbourg’s levels. Since the town had sold its water treatment plant to SaskWater in 1997, finding a solution was partly SaskWater’s responsibility. SaskWater managed to obtain a series of one-year exemptions from SERM while it worked on a solution. In 2010, SaskWater completed a $6.3 million upgrade to its Gravelbourg water treatment plant. Project financing included over $5 million in grants obtained by the town. The Town transferred the bulk of the grant financing it received to SaskWater (GB1A: 4, 5, 18). Even with that grant support, significant water rate increases were imposed: to help meet costs not covered by grant funding; to provide for long-term infrastructure maintenance and; to pay SaskWater for treating the community’s water. The new treatment system employs “super nano-filtration,” which requires the periodic replacement of filters which can cost up to $100,000 every few years. The town needed to prepare for those costs as well as anticipated water main and sewer line replacement projects.

Communities in the Palliser Triangle have had more frequent experience with drought than towns such as Maidstone and most have developed water systems that are relatively drought resilient. That said, there are ample grounds for caution with respect to the resilience of water sources for some of the communities studied in association with this thesis, particularly when one considers the potential impacts of climate change over coming decades. Officials in most of the study communities (Kindersley and Assiniboia
being the exceptions) have not engaged in the sort of preparedness planning that would assist them in dealing with drought induced water shortages that exceed the experience of the past 100 years.

Mixed assessments of long-term drought resilience

Gravelbourg

There is disagreement among residents, town officials and water management practitioners from the Gravelbourg area regarding the security of the town’s water supply in response to multi-year drought. Some of the interview respondents were confident that Thomson Lake had the capacity required to withstand a major drought. Others, including people who remembered the droughts of the 1980s, were less certain. The reeve of a nearby municipality who is also active on the Wood River Utilities Board, a regional pipeline association that relies on water supplied by Thomson Lake, recalled that in the 1980s Thomson Lake had become dangerously low (GB3:1). Another respondent (GB40) remembered that in 1988 he had taken an all terrain vehicle trip across the dry bed of Old Wives Lake. Old Wives Lake is normally a large body of water covering over 100 km². It is fed by the Wood River and is downstream from Thomson Lake. This respondent suspected that droughts severe enough to dry up Old Wives Lake had occurred previously. “We found buffalo bones scattered over the lake bottom which tells me it was dry enough to allow buffalo to travel over it in the past. I would imagine that kind of drought could happen again” (GB40:1, 2) (Notwithstanding the compelling illustration provided by the anecdote, the author wonders whether the bison might have fallen through the ice.)
Irrespective of the system improvements that have been made, Gravelbourg’s senior administrator remains unconvinced that the town has the long-term drought resilience it requires. While the new plant deals more effectively with low reservoir levels than the previous plant, it cannot deal with a circumstance in which there is no water at all in Thomson Lake. The town administrators from Gravelbourg, Coronach and Assiniboia contend that a long imagined plan to convey water via pipeline from the Qu’Appelle River (which is supplied by Lake Diefenbaker) would provide the area’s communities with greater water security in the event of severe multi-year droughts. Apparently, the expected cost of that plan has been the major barrier to serious consideration. That said, administrators from Gravelbourg, Coronach and Assiniboia speculated that the multi-million dollar expenditures being made to upgrade each individual community’s water systems on a piecemeal basis might turn out to be as expensive as a regional system that relied on more secure water sources (AS1.1, AS1.2, GB12A, CN36.1).

Assiniboia

Water managers and municipal officials from the Town of Assiniboia, have mixed assessments about the resilience of the town’s water supply in the event of a protracted drought. Following a series of dry years in the 1980s and the early 2000s, and a major fire in 2008 which severely taxed reservoir levels, Assiniboia has obtained a more reliable water source and upgraded its treated water storage capacity. The pre-existing system relied on a combination of wells and the relatively small Perrin Reservoir. In the early 2000s the town constructed a 10 km pipeline to the Willows Reservoir, a much larger body of water constructed by the PFRA some decades previously. One senior
public works official with the town speculated that since the reservoir filled, following wet years in 2010 and 2011, it could withstand 25 years of drought (AS1.2). Another town employee interviewed is less optimistic and assumes the reservoir is “good for” no more than five dry years (AS2.2). Notwithstanding the divergent assessments of reservoir capacity, the town does have a backup plan in the event that a lengthy drought caused the reservoir to become fully or partially depleted. The plan involves making use of the wells that were used in conjunction with the Perrin Reservoir. The plan has a potential weakness in that the well water is high in minerals and the existing treatment plan may not be capable of treating it to today’s standards without expensive upgrading. Again, it could be the case that the construction of a regional water system that relied on a more resilient source could be of benefit to Assiniboia as well as the nearby communities of Gravelbourg and Coronach. However, given their confidence in the reliability of the Willows Reservoir, Assiniboia’s water managers do not currently see the need for a regional solution.

Maple Creek

Most respondents from Maple Creek were relatively confident that the springs and wells supplying the community’s water supply were relatively drought proof. This is despite the fact that the Ministry of Environment categorizes the town’s supply as groundwater that is possibly under the direct influence of surface water (GUDI?). Respondents held that the Cypress Hills contain many water bearing formations which the town could access in an emergency through the drilling of new wells. One elected official suggested that the various irrigation reservoirs on the north slope of the Cypress Hills could be incorporated into a backup supply system (MC4: 9). A discussion of the
resilience of those irrigation systems is provided in Chapter 10 of this thesis. That discussion suggests that the reservoirs would not necessarily be reliable during a severe, protracted drought. While town officials could offer off the cuff solutions to a hypothetical drought problem, their assumptions were not based on scientifically generated hydrological data or a comprehensive preparedness plan for adapting to the impacts of droughts that exceed past experience.

Kindersley

The Town of Kindersley enjoys one of the more drought resilient water sources among the communities studied. A combination of poor quality local surface water and groundwater resources prompted the neighbouring towns of Kindersley and Eston to construct a pipeline to the South Saskatchewan River (SSR) in the 1960s.

Notwithstanding the quality and quantity advantages provided by the SSR, town officials remain aware of the need for preparedness planning. In 2002, severe drought and equipment failure combined to produce a water supply crisis for the town. That crisis prompted the town to investigate its options in the event of similar or worse problems in the future. As a result of that effort, the town embarked on a multi-million dollar upgrade of its wells, pipeline system and reservoir capacity. The various projects undertaken between 2002 and 2012 cost approximately $22 million, of which $10.15 million was provided through grants from senior governments.

Kindersley is located within what Marchildon, Pittman and Sauchyn (2009: 39) refer to as the Dry Belt, a particularly dry sub-region within the generally dry Palliser Triangle. The drought of 2001-2002 was followed by dry conditions in 2008 and 2009 which had a particularly harsh impact in the Kindersley region. People living in this area
are understandably aware of the devastating impact of severe multi-year droughts. As a result town officials and patrons of the various regional rural pipelines supplied by the EK pipeline suspect that the SSR may not be as drought proof a source as some observers might assume. Interview respondents reported that river flows had declined in 2001-2002 and imagined the possibility that the SSR could fail to provide adequate supplies in the wake of a catastrophic multi-year drought. While the town continues to rely on the river, officials have realized the need to expand reservoir capacity and are prepared to make use of a variety of local ground and surface water resources in an emergency.

**Impacts of flooding**

Drought is not the only climate hazard that can threaten the water supplies of the study communities. Assiniboia barely avoided a water crisis in 2011 when abnormally high run off levels due to a deep snow pack and high spring rainfall generated overflows at the Willows Reservoir, the community’s water source.\(^8\) The Willows Reservoir lies in a prairie coulee, just downstream from a smaller reservoir and dam owned by the local rural municipality. Flows in 2011 exceeded the capacity of the RM reservoir and washed out its spillway infrastructure. At the Willows Reservoir, water levels rose well above the top of the overflow conduit and were only a few feet below the top of the dam. Had the water topped the crest of the dam and produced a washout, the town would have been scrambling to meet its water needs.

Flooding affected a number of communities and frustrated agricultural production in parts of the Palliser Triangle in 2010 and 2011. However, compared to the frequency of severe drought, flooding is relatively rare. For example, PFRA hydrologists estimate that the flood experienced by Maple Creek in 2010 was a once in every 1,000 years
event. That sort of assessment diminishes the sense of urgency that communities might otherwise have for engaging in preparedness planning for floods. However, the projections produced by climate scientists for the region suggest that extreme rainfall events are likely to be more common in coming decades due to climate change. Among the more significant impacts of flooding in the Maple Creek area in 2010 was the destruction of a weir that supplied water to the Maple Creek irrigation project. The failure of the PFRA and its successor agencies to repair the damage is discussed in Chapter 10 of the thesis.

**Efforts to implement full cost recovery**

All of the municipal governments discussed thus far in this chapter claim that they have attempted to implement full cost recovery pricing systems for their water and wastewater utilities. Notwithstanding their preferences regarding pricing systems, they were required to have marginal full cost recovery frameworks in place in order to qualify for the grant funding they received. A water project manager from the Kindersley area commented on the irony of the full cost recovery requirement. She remarked that government claims to the effect that the adoption of full cost recovery was a prophylactic for preventing grant seeking appeared somewhat disingenuous, given that grants continue to be made available. The ongoing availability of grants, she argued, constituted the tacit admission that marginal full cost recovery cannot solve everyone’s water infrastructure problems.

The [grant] programs all come with the provision that the communities must have full cost recovery rate structures to qualify. This is somewhat ironic because if full cost recovery was actually in operation why would anyone be looking for a government grant and why would the government be providing it? Obviously, there is an assumption that even when full cost recovery is in place – a community
can have difficulty financing infrastructure, especially when a major crisis appears. (KD4A: 2)

As noted above, there were officials from all of the municipalities studied who indicated that they had been operating under a full cost recovery system prior to their water crises. None of the municipal officials interviewed reported being advised by the SMB that their rate structures were insufficient prior to the onset of their water crises. That being said, there were some municipal employees who suspected that their town councils were not saving enough to provide for long-term infrastructure replacement under normal conditions, let alone in the event of a major crisis. A public works manager from Kindersley, for example, reported that he had been challenging the Town Council to put more money aside for infrastructure renewal and emergencies prior to the crisis in 2002 (KD5). Similarly, officials from Shaunavon admitted that while they were purportedly operating under a full cost recovery model, it was quite possible that the town would need to increase its water rates and savings to fully fund anticipated water main replacement projects (SH2.1, SH2.2). A public works manager from Assiniboia claimed that there was a general failure on the part of urban communities in Saskatchewan to raise and put aside the funds required to pay for infrastructure renewal. He said this was primarily due to the hidden nature of water sewer infrastructure, it is underground, out of sight and out of mind (AS1.2A).

Notwithstanding the qualifications just noted, it remains legitimate to suspect that even with prudent full cost recovery systems in place, municipalities can fail to have the financial resources in place to contend with unforeseen water crises. Assuming otherwise would appear to be rather naïve.
Climate forecasts

The forecasts of climate scientists suggest that severe drought is likely to become a more common occurrence in the Palliser Triangle region over the course of coming decades. The RCAD project included a climate forecasting component that provided a number of predictions regarding drought and the occurrence of droughts in the Palliser Triangle over the course of the upcoming century (see Chapter 5 of this thesis and RCAD 2012: 48,49).

The authors of the RCAD report acknowledge that the projections suggested above are accompanied by a degree of uncertainty.

Clearly, there is no absolute assurance that any of the climate projections presented will prove accurate, or that the climate patterns and moist-dry cycles of the past will repeat themselves. However, the past climate patterns presented and the projections provided constitute the best we can provide given what we know about the region’s climate and climate change. (RCAD 2012: 49)

The climate observations provided in the RCAD research report suggest that without additional research and preparedness planning, it would be naïve to assume that the full cost recovery water pricing models currently employed by Saskatchewan communities will in all instances be sufficient to account for depletion of municipal water sources due to drought or extreme rainfall events and the associated damage to infrastructure. In other words, it would be incorrect to assume that those full cost pricing systems designed to meet current needs, which are based on the past performance of water sources, will in all cases be sufficient to meet community needs over the long term. This suggests that the encouragement of full cost pricing as a means to eliminate the demand for water infrastructure grants is unlikely to be entirely successful, unless planners take climate change into account. And even then, the uncertainty associated with
climate forecasts makes planning difficult. Constructing full cost pricing systems capable of accommodating any and all eventualities is clearly a practical impossibility.

7.5 The impacts of regulation and contamination

**Maple Creek**

In 2001, SERM put the Town of Maple Creek under a boil water order following a positive test for E. coli contamination of the town’s drinking water. In order to have the boil water order lifted, SERM required that the town upgrade its water withdrawal and treatment systems. Town officials and residents alike were amazed that following a single positive test result, Maple Creek would be required to undertake a multi-million dollar water system improvement project. Many residents viewed the requirements as an overzealous reaction on the part of SERM officials who were still reeling from the North Battleford water crisis. Some residents were particularly disturbed by the fact that all subsequent tests of the town’s drinking water failed to test positive for E. coli. Community members were aware that the residents of the household which produced the positive test were in the habit of keeping goats in their basement. People speculated that this might have had something to do with the contamination of positive test sample.

According to the town’s water manager, SERM was concerned that the spring and wells located in the Cypress Hills that supply Maple Creek’s water could be subject to contamination by cattle on nearby ranches (*MCI: 3*). Some town residents countered that the community had been taking water from the spring for decades with no apparent ill effects. Notwithstanding the widespread skepticism, the town has a hospital, nursing home and schools as well as businesses which rely on tourism. Operators of these facilities demanded that the improvements required to lift the boil water order be made.
The withdrawal systems at the spring and wells were upgraded, new pipelines were laid, a new reservoir for treated water was built along with a new water treatment plant that employs a nano-filtration system. The cost was approximately $3.7 million. The town was reluctant to borrow the funds required. Indeed, as of 2001 the community was already approaching its allowable borrowing limits and had plans in the works for a new hockey rink and hospital. Financing for the water project included a grant of $1.25 million and a one time levy of $2,036 on each residence and business in the community and a general water rate increase.

The costs of the water system upgrade encouraged the town to revisit its water and sewer rates to ensure that revenues would more closely reflect anticipated expenditures in the future. Despite the Town Council’s effort to match rates to the costs it could reasonably anticipate, its plans continued to be frustrated by uncomfortable surprises. For example, following the completion of the water treatment system, the town learned it would require approximately $1 million to upgrade its sewage treat system. Significantly more frustrating was the discovery that the higher water pressures provided by the upgraded system combined with changes to the chemistry of the more thoroughly treated water resulted in hundreds of expensive water main and household connection failures. The current mayor expects the cost of leak repairs will approach the cost of the plant upgrade. A member of the Town Council reported:

It [water from the new plant] cleaned up the waterlines right, because it was clean water, and so it took out all the mineral deposits out of the waterlines…The minerals disappeared. Then all the holes, in all the couplings started to appear. There were some problems because we have some cast iron lines and you have copper going into the house, and then they put an aluminum coupler on…. So the couplers were just gone…when all that corrosion came off [the steel bolts]…they were gone. I cannot remember how many water leaks the guys did that year. It was astronomical…. It was like in the … hundreds. And all together over a couple
of years it was 400 or so water leaks. And we still get them. We just had a big run here last week. I think the guys did three or four... now they are starting to do both sides of the street... The guys have the technique down pretty good... (MC6: 9,10)

Neither the Town Council, nor the engineering firms which designed and built the new treatment system, predicted the explosion in leaks that occurred. Given that the engineering consultants hired by the town to design and construct its new treatment plant failed to flag the potential for a significant leak problem, it is somewhat unreasonable to expect that town councillors and town employees would have the expertise required to anticipate the additional costs and inconvenience that would arise following the expenditure of $3.7 million on the system upgrade. The Maple Creek example again demonstrates that the implementation of a full cost recovery model does not in all cases account for circumstances that are difficult for communities to foresee.

Duck Lake

Duck Lake’s town council was surprised to learn in spring 2006 that its drinking water no longer met the quality and safety standards emanating from the SDWS. Apparently, high concentrations of ammonia in the town’s raw well water were threatening the effectiveness of chlorination. The town was informed that it would be placed under a permanent boil water order. However, if meaningful steps were taken to deal with the treatment issues, the boil water order would be lifted. Consultations with SaskWater and other municipalities suggested a number of solutions including: 1) expanding the capacity of the town’s treated water reservoir to ensure longer contact time between the treated water and the chlorine; 2) installing a reverse osmosis or nano-filtration system at the treatment plant 3) constructing new wells that would supply water
that was more amenable to treatment; and 4) a combination of some of these options. In July 2007 the town signed a memorandum of agreement with SaskWater whereby SaskWater would drill the required new wells and construct a pipeline to convey the water to the Duck Lake treatment plant. SaskWater would purchase Duck Lake’s water treatment plant for $350,000 and ensure any required upgrading of the treatment system was completed at SaskWater’s expense. In turn, Duck Lake would purchase water from SaskWater at the rate of $8.45 per 1,000 gallons over 20 years. SaskWater would be permitted to increase its water charges by up to 7% annually, purportedly to account for inflation. Duck Lake would convey the water to its residents and impose water rates that enabled it to capture the revenues required to maintain and periodically replace water mains.

In March 2008 the Town Council was informed by SaskWater that it had unilaterally changed the original 2007 agreement. The purchase price for Duck Lake’s water treatment plant was reduced from $350,000 to $100,000 and the wholesale water rate would be $11.49, not $8.45. SaskWater’s decision to unilaterally change the agreement was met with opposition from the Town Council. Members of the community attending a public meeting on September 29, 2008 held in Duck Lake to discuss the altered agreement were angry. Some suggested that an exercise in civil disobedience was in order, that the community should refuse to upgrade its water system.

Community members echoed concerns expressed by residents of Maple Creek when confronted with a costly system upgrade. Some residents argued that since the existing wells and water treatment had provided apparently safe and effective service for decades there was no urgent need to upgrade the system, regardless of whether or not a
boil water order was imposed. Residents and officials noted that SaskWater had taken much longer than anticipated to get the new system configured and had been granted the necessary extensions by the Ministry of Environment. If the water was indeed hazardous to health, residents asked, why was SaskWater allowed to delay completion of the project without penalty?

According to the town’s mayor, SaskWater’s revised agreement would have resulted in minimum monthly water bills in the neighbourhood of $200 per resident. In order to terminate the arrangement with SaskWater the town was required to purchase the newly constructed wells at a cost of $305,000. The town faced significant challenges in finding the financing required to proceed on its own. It had already depleted its approximately $100,000 in savings to purchase new water meters (at the insistence of SaskWater). The town’s inability to borrow the funds required to fully fund the project, as prescribed by the SMB, resulted in levies and water rates that some residents found excessive. That being said, the rates were still less than those which would have been required under SaskWater’s revised proposal. The challenges related to obtaining financing and the impact of the new water rates will be described in Chapter 9 of this thesis. With respect to the topic at hand, the relationship between unanticipated situations on water price management, Duck Lake experienced three interrelated challenges. First, it was surprised to learn its water treatment system did not conform to the new regulatory standards imposed under the SDWS. Secondly, it was, in the mayor’s words, “blindsided,” by SaskWater’s unilateral alteration of the original agreement.12 Thirdly, it was surprised by the challenges it confronted in obtaining financing including its inability to garner more than the $500,000 it received in the form of government grants.
7.6 Infrastructure failure

In some respects the water challenges which confronted Maple Creek, Gravelbourg and Duck Lake involved infrastructure failure, insofar as these communities’ water infrastructures failed to produce treated water that met the regulatory standards established under the SDWS. In the case of Maidstone the existing system failed to supply water in adequate quantities due to drought. In Gravelbourg’s case the depletion of source water supplies due to drought contributed to quality problems. The towns of Kindersley and Coronach, on the other hand, faced infrastructure challenges that involved both drought and acute equipment failure.

Kindersley\textsuperscript{13}

Kindersley’s 2002 water crisis involved the combined effects of drought conditions in 2001 and 2002, which contributed to reduced reservoir levels, and the breakdown of the pumping equipment that conveyed water from the SSR to the Eston and Kindersley water treatment plants. The loss of the pumping station meant that until repairs were made reservoir levels had to be carefully monitored and controlled. All outdoor watering was banned in the community. Then, almost immediately after the pumping system had been repaired the main pipeline ruptured. The rupture occurred in a very inconvenient location, at a point where the pipeline ascends the steep side of the SSR valley. Repairing the pipeline required specialized equipment and resulted in another significant delay in returning the reservoirs to a safe level, a level that would ensure the town could meet both basic indoor demand and fire protection requirements. As indicated above, the 2002 experience encouraged the Town of Kindersley to make a significant infrastructure upgrade and engage in a proactive preparedness planning exercise. At the
time of the crisis, the town lacked the savings required to improve its system and had to rely on borrowing, government grants and increased water rates to make the necessary changes.

Coronach

Coronach’s economic sustainability was enhanced in the 1970s when SaskPower, the province’s publicly owned electrical utility, constructed a power generating station and established a coal mine near the town (the power plants went into operation in the early 1980s). A dam and reservoir constructed on the East Fork of the Poplar River would provide the cooling water required by the plant. The Poplar River and its tributaries originate in the Palliser Triangle and its flows are largely dependent on spring run off. As was noted in relation to the Wood River, which supplies the Thomson Lake reservoir, run off can be in short supply in the region during droughts. SaskPower is able to mitigate the impacts of drought on its reservoir by making use of groundwater. SWA will not approve groundwater allocations for irrigation but does make allocations for industrial uses and intensive livestock operations. The coal mining process employed at the mines that supply the power plant requires “dewatering” wells. These wells withdraw groundwater from the formations associated with the coal to permit strip mining. The dewatering wells also provide the backup water required in the event that the cooling water reservoir is depleted by drought.

Shortly after the dewatering wells went into operation, approximately one dozen farm wells and one of the wells supplying the Town of Coronach went dry. Community members assumed that this was the result of SaskPower’s wells reducing the level of the area’s water table and demanded compensation for their loss of water. SaskPower
responded by allowing the town to make use of one of its dewatering wells. The town accepted this offer and, at its own expense, constructed the pipeline required to convey the water to its treatment plant. Area farmers claiming damages succeeded in convincing SaskPower to construct the pipelines required to deliver the water and to ensure ongoing delivery, all at SaskPower’s expense.

The need to construct the pipeline was an unexpected burden for the town and required it to obtain the required financing at a time when grants were in short supply. The current town administrator and his predecessor recall that the council at the time was not inclined to force SaskPower to incur the costs of the new pipeline. The corporation was viewed as an economic lifesaver by the community. Coronach, like many other small sized town and country communities in the Palliser Triangle region, was threatened by population loss and the loss of businesses and services prior to the construction of the power plant. According to a former administrator, the council wasn’t anxious to antagonize the town’s major employer (CN1.2).

Town officials remain somewhat concerned about water supplies in the Coronach area. They are uncertain about the long-term implications of groundwater withdrawals on the water table. The current administrator contends that Coronach would benefit from the construction of a regional pipeline supplied by a reliable water source such as the Lake Diefenbaker-Qu’Appelle system. Several barriers stand in the way of this sort of project. One challenge is the fact that nearby communities such as Gravelbourg and Assiniboia have recently made significant and expensive upgrades to their locally sourced systems. Another challenge, mentioned above, is the sizable cost that the pipeline system would undoubtedly involve. An additional problem is that moving water from the SSR
watershed would involve an inter-basin transfer of water to the Missouri River Basin and inter-basin transfers are widely thought to present ecological hazards. Given that the Poplar River and its tributaries are international streams that ultimately flow into the state of Montana, U.S. opposition to such a transfer is anticipated.

7.7 Other unanticipated challenges

The fact that seven of the eight communities studied for this thesis have encountered significant water management challenges over the past few decades is perhaps not all that remarkable. Indeed, one of the communities, Duck Lake, was selected for study partly because it was undergoing a well publicized water crisis. The drafters of the January 2002 strategic plan supporting the SDWS estimated that at least 40 communities were experiencing water challenges due to drought and that, “…over 90 per cent of all communities with a population under 1,000 (428 communities) required improvements to their infrastructure and quality management to meet health-related drinking water objectives” (SaskWater 2002: 15). The impacts of drought and the need to meet new standards can be interpreted as unanticipated events largely because many communities had not planned for them within their water management and pricing models prior to their introduction. Contamination of a community’s water in the cases of Duck Lake, Gravelbourg and Maple Creek was a function of new regulatory requirements. Prior to the imposition of the new regulatory and enforcement regime these communities’ treatment facilities were acceptable.

There are potential sources of contamination that do not appear to have registered on the planning radar for some communities. For example, the Town of Shaunavon takes considerable comfort in the high quality of its well water and its apparently abundant
Shaunavon is a town and country community in the southwest corner of the province with a population of 1,756. Currently, the Shaunavon area is experiencing an oil boom, the result of higher oil prices and the application of new advanced drilling and extraction technologies. Municipal officials interviewed for the RCAD project reported that energy sector activity was making a significant contribution to the local economy. Jobs in the energy sector are providing work for residents of the town as well as farmers in need of off-farm employment. And, farmers with oil or gas wells on their land receive annual surface rights payments which contribute to the sustainability of their farming operations. Interviewees from the Shaunavon study area indicated that there had been some concern expressed in the community about oil companies using town water in their processes. However, few of the respondents indicated concern about the potential for pollution of the local aquifer due to energy company activity. One might speculate that, as in the case of Coronach, area residents may be reluctant to appear critical of an industry providing significant economic benefits to the community. It is perhaps a case of “not wanting to look a gift horse in the mouth.” Regardless of the cause, concern over possible groundwater contamination is not being expressed by municipal officials or the local watershed advisory committee, the Swift Current Creek Watershed Stewards. Indeed, more concern was expressed by interviewees about the impact of local hog barns on groundwater than was directed at energy companies.

One might reasonably speculate that there are other potential threats to source water and water infrastructure systems that have yet to emerge as prominent issues in rural Saskatchewan.
7.8 Summary observations

The cases presented in this chapter of the thesis suggest that the implementation of full cost pricing models as a means to ensure prudent management and significantly reduce the reliance of municipalities on infrastructure grants is somewhat more efficacious in theory than it has proven to be in practice. Among the eight communities studied, all except Shaunavon, have sought and received grant support since the SDWS came into effect. Having a full cost pricing formula in place was not a prophylactic against demand for grants. Given the unequal distribution of water resources in southern Saskatchewan, the impacts of drought, and the top down introduction of new water standards, it is not surprising that even prudently managed communities claim they lack the resources required to self-finance water projects. Proponents of full cost pricing might be expected to counter that claims about a lack of financial resources remain largely unfounded because communities always have the option of charging their residents for the cost of infrastructure improvements regardless of what those costs might be. In Chapter 9, the thesis will address the issues of rate shock, equity and fairness that can arise when residents of town and country communities are required to shoulder a significant portion of the costs of their water infrastructure challenges. Chapter 9 also describes the political and financial barriers operating at the community level that prevent municipalities from simply raising rates over the short term to meet costs. Some of those barriers reflect Bonbright’s (1961) admonition against rate shock and the need for rate stability (see Chapter 3 of this thesis).

No less important than equity and financing issues in ensuring that infrastructure can be financed, is the lack of awareness and preparedness planning around the potential
impacts of climate change on southern Saskatchewan’s water resources. The absence of concern about climate change among elected officials in senior and local government, including outright climate change denial, is a problem identified by the IACC and RCAD projects. The available science on the potential impacts of climate change in Saskatchewan suggests that water management systems which rely on full cost pricing to provide for future infrastructure needs could prove far from adequate over the course of the upcoming century.

Chapter 7 Notes

1) According to SaskWater (2002: 40), the Saskatchewan Urban Municipalities Association (SUMA) announced its support of the proposition that marginal full cost recovery systems were a prudent water management practice. At the same time SUMA maintained that grants would still be required in many instances. Thus, the support for full cost pricing came with a substantive qualification.

2) The material presented under the Maidstone sub-heading is supported by RCAD project interviews and one follow-up interview conducted by the author (MD12.1, MD12.2, MD22, MD 26 and MD 32).

3) The material presented under the Gravelbourg sub-heading is supported by RCAD interviews and one follow-up interview by the author (GB1A, GB3, GB6, GB8, GB11, GB13, GB17, GB19, GB23, GB31, GB37 and GB39).

4) Ibid.

5) The material presented under the italicized Assiniboia sub-heading is supported by three interviews conducted by the author and an interview conducted by the author and Dr. Harry Diaz (AS1.1, AS1.2, AS2 and AS3). Comments regarding the drought resilience of the Willows Reservoir were provided by AS2 and in a conversation between the author and Assiniboia’s water treatment plant manager on September 14, 2012 which was not recorded and transcribed.

6) The material presented under the italicized Maple Creek sub-heading is supported by RCAD interviews (MC1, MC4, MC5, MC6 and MC8).

7) The material presented under the italicized Kindersley sub-heading is supported by RCAD interviews and follow-up interviews by the author (KD4, KD4A, KD5, KD6, KD6A, KD16, KD36, KD40, KD41).

8) Interview respondent AS2, a senior public works official with the town of Assiniboia, described the flooding and overflow problems in an interview with the author and took him for a tour, on September 14, 2012, of the still unrepaird damage.

9) The once every 1,000 years estimate for the 2010 Maple Creek flood is contained in a document dated June 22, 2010 presented to the Maple Creek Town Council by Perry Ludwig on behalf of PFRA. The document is entitled Maple Creek 2010 Flood Background. The author has a pdf version of the document in his possession.

10) The material presented under the Maple Creek sub-heading is supported by RCAD interviews (MC1, MC4, MC5, MC6 and MC8).


13) The material presented under the Kindersley sub-heading is supported by RCAD interviews and follow-up interviews by the author (KD4, KD4A, KD5, KD6, KD6A, KD16, KD36, KD40, KD41).

14) The material presented under the Coronach sub-heading is supported by RCAD interviews and follow-up interviews conducted by the author (CN4, CN5, CN16, CN19, CN32, CN36, CN36.1, and CN36.2).

15) The material presented which describes conditions in Shaunavon is supported by RCAD interviews (SH1, SH2.1, SH2.2, SH3, SH4, SH5, SH6.1, SH6.2, SH7).
CHAPTER 8: Municipal Experience II – conservation contradictions

8.1 Introduction

This chapter describes the circumstances that give rise to water conservation efforts on the part of municipal water managers in the study communities and the measures municipalities employ to encourage conservation. As noted in previous chapters, Renzetti and Busby (2009), among others, assert that the encouragement of water conservation is facilitated by the adoption of marginal full cost pricing and a reduction in the availability of infrastructure grants. Indeed, the achievement of conservation objectives through government regulation runs counter to core neoliberal principles which eschew regulation by government in favour of regulation via markets and price signals. Those who favour the “unseen hand” of regulation via markets, often claim that state-made regulation is accompanied by excessive transaction costs associated with monitoring and enforcement, and misallocated water resources. However, the experience of the municipalities studied for this thesis suggests that an eclectic mix of strategies which incorporate regulation, pricing and innovative local solutions are preferred over the dogmatic expectation that market signals alone are sufficient means through which to achieve conservation objectives.¹

8.2 The need to conserve

In the previous chapter we observed that drought has had an adverse impact on source water supplies for some communities – Gravelbourg, Maidstone and Kindersley, for example. That being said, the depletion of natural water sources due to severe drought has not been the most common cause of water supply challenges in the study communities. From the perspective of municipal water managers, the need to conserve
water most typically arises due to the inability of a community’s water infrastructure to cope with the peak demand challenges associated with outdoor watering during summer months. It is noteworthy that hot dry summers in the region are not always associated with hydrological drought – drought which adversely impacts source water supplies. This is because the stream flows that feed reservoirs (and sustain GUDI wells) are supplied by spring run off. Therefore, a hot dry summer may or may not produce a source water shortage, depending on conditions such as the community’s reservoir capacity. In the case of Shaunavon, which relies on a groundwater aquifer that appears relatively immune to multi-year drought, conservation efforts have never been initiated in response to well failure due to drought. Nonetheless, Shaunavon often needs to conserve water during hot dry summers because its water withdrawal and treated water storage infrastructure cannot always keep up with demand.

In each of the six study communities located in the Palliser Triangle the need to conserve water most commonly arises when the municipal water infrastructure proves unable to keep up with demand during hot dry summers. More specifically, it is the inability of pumps, pipelines, water mains and treated water reservoirs to service high summertime demand that most typically motivates conservation. Hot and dry summertime conditions do, however, contribute to increased outdoor use as residents strive to sustain parched lawns, gardens, park and golf courses. But again, the adverse conditions are most commonly due to infrastructure limitations and higher usage rather than source depletion.

According to the water managers and municipal officials interviewed, there are two criteria that signal the need for water managers to implement conservation measures.
One of course is the need to ensure there is enough treated water available to meet basic non-discretionary indoor needs. The second is to ensure that water reservoir levels and water pressures remain high enough to support fire fighting. During hot, dry summers and droughts, water managers monitor treated water reservoir levels to ensure they do not fall below critical levels. The water system manager for Maple Creek was assured that his reservoir monitoring system was satisfactory in 2009 when the local fire department was able to fight a major fire which destroyed a local business, Maple Plumbing & Heating, without running the town short of water for meeting basic non-discretionary needs (MC1). In another instance, the 2008 fire which destroyed the historic Franklin Hotel in Assiniboia demonstrated that the town’s water infrastructure and management system was insufficient. In that case the treated water reservoirs virtually ran dry. This resulted in sediments from the bottoms of the reservoirs entering the water mains. Total outdoor rationing and a boil water order were put in place until Assiniboia’s two reservoirs could be brought to back to satisfactory levels (AS1.2, AS2). The long-term solution for Assiniboia was to increase system capacity and ensure outdoor use was restricted during hot, dry summer days.

The summertime rationing systems employed by the study communities include the even-odd system whereby residents with odd numbered houses water one day and those with even numbered houses water the next. Some communities restrict watering to evenings and nighttime only and some have combined even-odd and nighttime only rules. In emergencies such as the equipment failures affecting Kindersley in 2002 or the fire in Assiniboia, all outdoor water use can be temporarily banned. One of the subsidiary benefits of rationing summertime use is that it mitigates the need to upgrade
infrastructure. If a community was obliged to provide residents with all the water they wanted whenever they wanted it the municipal systems in all of the study communities located in the Palliser Triangle would require infrastructure upgrading in order to meet summertime peak demand. Obviously, the least expensive type of water infrastructure is infrastructure that does not have to be built.

8.3 The contradictory conflation of conservation and pricing

While rationing may indeed diminish the pressure on a community to upgrade its infrastructure, in communities that rely on volumetric rates it can also have the effect of reducing the revenues available to operate, maintain, replace and expand infrastructure. Elected officials from the Town of Maple Creek, for example, have been concerned about the revenue impact of reduced consumption (MC4, MC6). The revenue challenge presented by rationing arises because when it does what it is supposed to do use rates decline. If a portion of customer billings is determined by the amount consumed, revenues could decline as well. Similarly, abnormally wet and/or cool summers can result in reduced outdoor demand and reduced revenues. Elected officials from Maple Creek noted the challenges they confront when attempting to reduce consumption and sustain revenues.

We have a user pay system, but it’s a double-edged sword. One year we had a wet spring which contributed a bit to it [use reduction], but still we had a dry summer and the water usage dropped by 1.8 million gallons [in response to the imposition of rationing and, possibly, price increases], something like that. It is a user pay system but it [declining rates of consumption] cuts back on the revenue because water conservation means that there is not as much going through the plant. So in theory if there is not as much going through it shouldn’t cost us as much to run it because we are not using as much chemicals to treat that water. So really it should be a balancing act. We should be running at a zero balance but the thing is that we are not. At this point, until we raise the water rate [particularly the fixed connection fee], that is the way it is going to be. (MC6: 5)
Contrary to market environmentalist principles, Maple Creek’s council determined that resolving the problem required placing greater emphasis on the fixed per connection fee component of water bills as opposed to relying on higher volumetric charges or marginal full cost pricing alone to produce the revenues required to cover system costs.

So we tried to conserve by thinking that [higher prices would balance use reductions]. But we were kind of shooting ourselves in the foot too because on one hand we have the facility with bills over $4 million so what we have been looking at is in our rates. We still have the variable [volumetric] rates, but we have also put on a flat rate for everybody that is connected to the system. And through that flat rate we can hopefully save a little money to replace [infrastructure components] …. if the water plant needs filters every so often, and they are very expensive, and the chemicals keep going up -- so it is tweaking that flat rate more than the adjustable [volumetric] rate even though the adjustable [volumetric] rate is still in there. (*MC4*: 2)

The town council decided to rely on raising the fixed or flat bi-monthly connection fee as opposed to raising only the volumetric fee because it suspected that relatively high volumetric fees could be contributing to use reductions. Maple Creek had increased volumetric rates and imposed a special water utility levy to help pay for its post-2001 water system upgrade. While the $2,032 per connection levy was described as a one time charge, residents were allowed to pay it over ten years. Town councillors suspected that the combination of bi-monthly levy installments plus the higher volumetric fees could be producing a rate shock effect. Indeed, for 20% of households who chose the ten-year payment option, water bills increased by approximately 30% over the period when the levy was being paid. Even though the levy and volumetric portions of water and sewer charges were listed separately on customer invoices, councillors sensed that some residents did not appreciate the distinction. Based on ratepayer feedback, they suspected
that the reaction of some customers was to reduce consumption even though most of the troubling rate increase was due to the levy and not volumetric charges. Putting greater emphasis on the fixed connection fee helps assure the municipality that its revenue projections can be met in the event of a wet summer, rate shock effects and/or or rationing.

One might speculate that Maple Creek’s council could have developed a seasonally adjusted volumetric rate structure or some other volumetric rate formula that would have garnered the required revenues. However, coming up with the sort of formula that might work appeared inordinately complex and was considered something that would not necessarily be understood or welcomed by ratepayers. In addition, the council had no assurance that volumetric price increases would have the desired effect. What if it only made things worse? Maple Creek’s experience suggests that reliance on marginal full cost pricing models alone may not be the most appropriate means to solve the revenue-conservation contradiction experienced by some communities. From the town council’s perspective, employing rationing to reduce consumption and increasing the fixed fee to support revenue stability was the most appropriate form of demand management.

8.4 What transaction costs?

One might suppose that in theory an appropriately constructed pricing formula could be employed to ensure that water consumption declined appropriately during periods of peak demand. This assumes that the relatively high rate increases required to produce the effect, given the relative inelasticity of water demand (see Chapter 3 of this thesis) would be affordable and politically acceptable to residents. While relying solely
on price signals to manage demand might appeal to a market fundamentalist, it is not something that municipal officials in the town and country communities studied are all that interested in applying.

A water manager from Assiniboia explained that municipal employees in rural Saskatchewan often lack the education and training required to manage solutions recommended by experts (AS1.2, AS2). This can apply to technologically complex water treatment systems as well as water pricing methods prescribed by economists. While municipal administrators may be well trained and proficient in a host of local government management functions, they could conceivably lack the expertise required to develop water rates that can manage peak demand issues while at the same time sustain the revenues required to meet other full cost pricing objectives, e.g., meeting the revenue requirement. In addition, Bonbright (1961) cautioned that for utility rates to be accepted by consumers they need to be transparent and to be transparent they should not be overly complicated. Indeed, the water managers interviewed shared a preference for rationing as a method for dealing with peak demand over pricing because it was a simple solution, readily understood by both citizens and administrators and because it produced the desired effect.

As noted in Chapter 3 of this thesis, some economists have suggested that the transaction costs associated with regulated conservation and rationing schemes make them less cost-effective than price signals as demand management tools (Olmstead and Stavins 2008: 15). This is a proposition that puzzled the water managers and municipal officials interviewed in support of this thesis. They considered rationing schemes to be rather simple to design, monitor and enforce. For example, monitoring reservoir levels in
some communities involves things as uncomplicated as visually inspecting the reservoir to see if the level has fallen below a marked line, most have digital monitoring systems and alarms that alert managers to low reservoir levels (MC1, SH1.2, AS2). The following exchange between this writer and the manager of Maple Creek’s waterworks describes the rationale for rationing and the management of a rationing scheme.

Respondent: Yeah, I would definitely say there have been some times when we’ve wondered whether we’ve had enough water. A few years ago we did an experiment where we just let everybody water at will, within a month we couldn’t keep up. We were losing our level at the plant [in the treated water reservoir]. We just couldn’t keep up.

Interviewer: So you have this big tank or reservoir adjoining the plant and you measure water levels in that tank?

Respondent: This big tank out here, we were losing the level in that tank.

Interviewer: So you have an idea where the level should be?

Respondent: Actually it’s all automatic the way it’s designed it drops down to about 7 meters then it starts up [pumping system] and tries to get up to 7.5 meters so it just sits in there.

Interviewer: So if it’s not keeping up?

Respondent: …We were down to 6 meters, 5 meters, when I pulled the pin on the experiment we had a few years ago. We were at 4.5 meters -- this is not good. If there was a fire you could be in real trouble.

Interviewer: So what did you have to do?

Respondent: We had to pull the pin and just tell people you can’t water around the clock. There is a restriction in place in town.

Interviewer: So what does a restriction or rationing look like?

Respondent: People can only water outside every other day plus certain hours and we go by the calendar. Like if your house, say like my house, is 729 I would be watering on the odd days.

Interviewer: So how do people hear about that?

Respondent: We have a newsletter we send out and we put it in the paper [local weekly newspaper]. We have a bylaw officer that periodically goes around if he’s standing at the door, you know.

Interviewer: So since you did that experiment have you had to impose rationing most years?

Respondent: We have been doing rationing as long as I have worked for the town [26 years]…I can’t remember when there were not some sort of restrictions. (MC1:2, 3)

Rationing rules were understood among residents of the study communities interviewed, although respondents indicated there were occasions when people
“cheated.” Implementing a rationing program in the study communities typically involves placing notices in local weekly newspapers and posting notices on community bulletin boards. Word of mouth communication assures that those who miss the notices are informed. In one study community when an emergency that required immediate rationing arose, town officials delivered handbills to each residence (AS2). Enforcement is similarly uncomplicated and hardly a significant cost issue. The following exchange with this writer and Assiniboia’s public works manager describes the town’s low cost rationing enforcement system.

*Interviewer:* When you're rationing, do you have a bylaw enforcement officer involved?
*Respondent:* We monitor compliance with our staff. The guys from the water plant as well as the Public Works foreman watch for people watering when they shouldn’t be, when they're out working. They'll drive around and check on things.
*Interviewer:* How frequently do you come across someone trying to take a little more water than they should?
*Respondent:* Most people are really good about it. It depends on what conditions are.
*Interviewer:* What if someone has just put in new sod? Do you give them a break?
*Respondent:* If a request is made we'll look at it and monitor it. Using your example, guys would bring in the water truck from the farm to water the sod because they don't want to use chlorinated water on the sod.
*Interviewer:* Do you get neighbors informing or squealing on each other when someone tries to cheat and water when they shouldn’t be watering?
*Respondent:* We always [emphasis is the respondent’s] have neighbors squealing on each other. (AS2: 16)

Bonbright (1961) described the contradictory effects that can arise between full cost pricing objectives and conservation; evidence provided by the interviews which support the thesis confirm this. For the study communities, the conservation versus revenue sufficiency contradiction is managed rather simply, efforts to conserve water are primarily handled outside of the rate structure through rationing; and efforts to garner sufficient revenues are facilitated by employing flat fees in addition to volumetric fees.
8.5 Conservation is not universally urgent

The water and wastewater management practices employed by the Town of Shaunavon illustrate the important influence that the distribution of natural capital has in shaping a community’s water use practices. Shaunavon’s experience suggests that the need for source water conservation can be viewed as less urgent by some communities than it is by others. Indeed, Shaunavon’s water managers have been reluctant to adopt volumetric pricing, in part, because their source water appears to be immune to depletion under current and historical use rates (SH2.1, SH2.2).

Despite being located in the Palliser Triangle, Shaunavon enjoys an abundant supply of high quality water. The wells that supply the community continued to provide water through all of the more memorable droughts of the past century. According to SWA’s hydrological estimates, the recharge rate for the aquifer supplying the town far exceeds the town’s withdrawals (SH7A: 1). Community boosters have promoted the town’s highly palatable well water for decades (SH5:2). RCAD project interviewees reported widespread local indignation when provincial government regulators insisted that the town add chlorine to its water in the 1980s (SH2.2 SH5). Unlike other RCAD study communities, which have multimillion dollar water treatment plants, Shaunavon relies on relatively inexpensive chlorine dispensers installed in pump house shacks.

Shaunavon’s wastewater system is among the more environmentally-friendly sewage management systems operating among the study communities. As is the case with many town and country communities Shaunavon’s effluent is “treated” in accordance with Ministry of Environment regulations by allowing it to settle in a lagoon for 180 days prior to discharge. What distinguishes Shaunavon’s system from many
others is that the effluent is discharged into a large semi-natural wetland. Evaporation rates ensure that the effluent rarely flows beyond the wetland. On the other hand, many Saskatchewan communities discharge treated effluent into natural water courses and water bodies. Regina, for example, discharges its sewage lagoon effluent into Wascana Creek which in turn flows into the Qu’Appelle River.

Shaunavon is the only study community that provides residents with unmetered water for a flat monthly fee. Metering is limited to some of the larger businesses and institutional water users such as the schools and hospital, primarily to facilitate revenue generation. Despite the fact Shaunavon has not fully implemented the volumetric pricing methodology that market environmentalism contends is key to conservation, the community’s water source is not in danger of depletion. Furthermore, Shaunavon’s lack of volumetric pricing has not jeopardized the financial integrity of its water and sewer utilities.\textsuperscript{4} Shaunavon regularly earns a profit from its utility operations and has made some effort to earmark accumulated earnings for the replacement of aging infrastructure and system expansion (see Table 9.2). Shaunavon’s experience suggests that full cost recovery does not necessarily depend on volumetric pricing.

The promotion of water management practices based on market environmentalism in Canada typically relies on two axiomatic assumptions: 1) water is scarce; and 2) Canadians do not pay enough for their water (Renzetti and Busby 2009). It is difficult to see how these maxims apply to Shaunavon. Shaunavon has the lowest water rates of any of the study communities, yet its utilities manage to operate in the black (see Table 9.2). And, the community’s water use rates are apparently not compromising the sustainability of the aquifer (\textit{SH7A: 1}). Conservation efforts in response to peak summertime demand
are managed effectively through rationing (in the absence of metering, residential demand management through volumetric pricing is not an option). This is not to say that supply issues will not arise in the future, perhaps in response to droughts that are more severe than those experienced over the past century. It is perhaps also conceivable that significantly increased usage due to residential and industrial growth, or the development of intensive livestock operations in the area, could eventually compromise the aquifer. A potentially more significant threat to Shaunavon’s water, noted in the previous chapter, is the relatively unassessed danger of contamination from oil and gas industry activity.\(^5\)

Notwithstanding the need to significantly reconfigure its water management practices suggested by these possibilities, Shaunavon’s existing system is delivering safe water to its residents and has not required the same level of government grant support since 2002 that other study communities have had to seek. Shaunavon’s situation suggests that market-based models and market environmentalist prescriptions for water management are not essential in certain contexts, if indeed, one’s objectives are to conserve water and finance operations and infrastructure.

### 8.6 Innovative demand management strategies

A number of the study communities have addressed their water conservation challenges with methods other than pricing and rationing. These include methods employed in other dry regions of North America such as encouraging the adoption of low flow appliances and abandoning lawns in favour of xeriscaping.

Gravelbourg, for example, provided grants to residents for the purchase of low flow toilets. Innovative local solutions have also been developed, by both individual community residents and town councils. Some Maple Creek residents have drilled their
own backyard wells to use for outdoor watering. This has occurred with the support of the Town Council (MC4: 6). Another water saving innovation adopted by Maple Creek has been to store treatment plant filter back-wash water in a dugout from which it can be withdrawn to irrigate the town’s golf course. Assiniboia and Gravelbourg have programs that subsidize the purchase of rain barrels. In Gravelbourg’s case, the town purchased dozens of used canola oil tanks from a processing company ideally suited to the purpose and made them available at a low cost to residents (GB1A: 18). Xeriscaping is becoming increasingly common in the region as more residents realize that attractive landscaping does not require green grass (MC6: 8, 9).

One might reasonably speculate that the development of volumetric rate regimes has had some influence in encouraging these developments. That being said, in the absence of additional research it is not possible to identify the relative importance of education and cultural shifts versus pricing. What can be said is that the local conservation initiatives have occurred in conjunction with the existence of summertime rationing and volumetric water rate increases.

**8.7 Environmental conservation**

Protecting natural ecosystems, including insteam and riparian ecologies, received greater attention in some study communities than others. Shaunavon, Kindersley and Maidstone are located in areas where community-based watershed committees are in operation. The Town of Gravelbourg and neighbouring RMs have retained the services of a riparian ecologist. The town plans to participate in the new committee being formed for the Old Wives Lake Watershed (GB1A). Interview respondents associated with the watershed committees demonstrated greater interest in ecological issues related to water
than many other respondents. These groups contribute to raising awareness about source water protection issues in the watersheds where they are operating. Their activities constitute the application of features of integrated water resource management (IWRM). The watershed protection plans developed by these groups take a holistic approach to water use and protection issues, recognizing downstream impacts and the need to sustain reservoir levels and stream flows in the interest of riparian and aquatic ecosystems.\(^6\)

Notwithstanding their educational and advisory activities, the watershed groups lack the authority required to translate their concerns into policy. What influence they are able to exercise is limited to advising government agencies and educating watershed residents. The former manager of a watershed committee located in the region noted that the committees encourage farmers to make use of federal grants for environmental farm planning to enhance source water protection on their land. He also reported that the committees often ran into stiff opposition from farmers whenever it was suggested that farm chemicals were responsible for deteriorating source water quality and that efforts to minimize their use and impact were desirable (SSGA1). Given that representation from RM councils is a requirement of board composition for all of the province’s watershed committees, one might reasonably wonder how aggressively these groups will promote initiatives aimed at reducing the impact of farm chemicals on watersheds, particularly when those initiatives suggest major changes to farm practices and threaten to adversely impact farm incomes.

Irrigators in the southwest corner of the province are reasonably well informed regarding stream flow management (see Chapter 10 of this thesis). However, a number of the interviews conducted with irrigators suggest that the economic benefits of water use
are given greater attention than the impacts of water use on ecosystems and threatened species (e.g. MC14.1, MC15.2). Outside of whatever influence the watershed committees bring to bear on policy formation, the delivery of water related environmental protection in the Palliser Triangle region remains dependent on monitoring and enforcement conducted by the Saskatchewan Ministry of Environment, SWA, Fisheries and Oceans Canada and the Saskatchewan Ministry of Energy (which governs the activities of oil and gas companies). For the purposes of this thesis the assumption has been made that these agencies do an adequate job of ensuring healthy source water and related ecosystems. This may or may not be the case. The writer acknowledges that an actual assessment of the performance of government environmental protection measures related to water was not conducted in association with this thesis.

8.8 Summary observations

Contrary to the expectations of market environmentalists, the adoption of marginal full cost pricing has not by itself solved the water conservation problems experienced by the study communities. Conservation has been achieved through a combination of administrative measures (municipal rationing), price increases and encouraging the adoption of water saving appliances and new outdoor water use practices. Renzetti and Busby’s (2009) assumption that the adoption of marginal full cost pricing can simultaneously provide the capital required for infrastructure management and solve water conservation problems is not reflected in the experience and management preferences of the study communities. Indeed, efforts on behalf of conservation can decrease revenues, underlining the value of using fixed monthly connection fees in addition to volumetric rates to produce the desired revenue outcomes. In the study
communities, regulated rationing is achieved with minimal administrative cost and is widely understood and accepted by residents. Addressing water related ecological issues is largely reliant on regulations developed and enforced by senior governments.

**Chapter 8 Notes**

1) As was the case for Chapter 7 of this thesis, the material presented in this chapter is derived from IACC and RCAD project interviews and interviews conducted independently by the author with: elected municipal officials; municipal administrators; waterworks managers and waterworks employees; employees of senior government agencies, with a water management mandate located in the study communities; and other residents of the study communities. A full listing of respondents is presented in Appendix 1.

2) Mkhabela et al. (2010) and Wheaton et al. (2005) recognize that there are different forms of drought (meteorological, hydrological, agricultural, and socioeconomic) which do not necessarily coincide in any single drought event.

3) Maple Creek, Coronach, Gravelbourg, Assiniboia and Kindersley employ even-odd rationing. Shaunavon uses an even-odd and nighttime only system.

4) Shaunavon’s Town Manager and Public Works Manager (*SH2.1 and SH2.2*) speculated that metering all residences would facilitate leak monitoring. And since leaks suggest a wasteful use of the energy required to convey water, fixing them would have the potential to reduce their water utility’s operations costs.

5) A number of respondents from the Shaunavon study area noted the economic benefits of the oil and natural gas exploration and extraction activity in the region. Municipal administrators noted the increased tax revenues available, which were assumed to supersede the damages that oil and gas companies caused to municipal roads (*SH1, SH3*). Numerous respondents noted the boost to employment that the energy industry brought. And farmers indicated that surface rights payments and off-farm job opportunities contributed to the sustainability of family farms. At the same time very few respondents indicated concern about the possibility that oil and gas wells and exploration activities could adversely impact water quality in the area. Respondents *SH2.1, SH2.2 and SH5* noted that a number of test wells had been drilled to monitor the quality of water in the aquifer. However, there was a general lack of concern about the potential for groundwater pollution.

6) The committees operating in the study communities are: The Swift Current Creek Watershed Stewards, whose purview includes the Shaunavon study area; the South Saskatchewan River Watershed, whose area of focus includes the Kindersley study area; and, the North Saskatchewan River Basin Council, whose region of focus includes the Maidstone study area. Respondents with comments that pertain to the operations of theses committees include: *GB3, GB19, SH6.1, SH6.2, KD6, KD16, KD36, WC1, WC2, WC3*.

7) An example of the priority irrigators sometimes give to economic over ecological uses is provided by a number of respondents from the Maple Creek study area who objected to the hold put on plans to build a dam and reservoir on Battle Creek in the 1990s. Respondents were under the impression that the project was killed because a rare bird was found nesting in the area (*e.g. MC14.1, MC25.1*). Another group of respondents objected to the arguments made by environmental activists who opposed the construction of the Meridian Dam project (*MC15.1, MC15.2, MC15.3*). These respondents held that, contrary to the case being made by environmentalists, the proposed dam would improve conditions for aquatic life. At the same time the dam would have opened up new areas in the dry southwest for irrigation.
CHAPTER 9: Municipal Experience III – offloading and inequity

9.1 Introduction

This chapter describes the inequitable outcomes for municipalities which result from offloading, the top down imposition of water safety regulations and constraints on municipal financing. Inequitable outcomes include water rates and infrastructure levies that are unaffordable for some households. Inequity is also evident in the awarding of infrastructure grants; some municipalities receive much more assistance than others. The chapter also describes how the lack of an advisory agency that could assist municipalities in dealing with water and wastewater issues, combined with a lack of senior government support for the development of low-cost municipal water infrastructure solutions, contributes to the affordability challenges facing residents of municipalities in the study area.

9.2 Offloading

The discussion in Chapter 6 of this thesis suggests that Saskatchewan’s SDWS echoed a pattern of offloading that had been a prominent concern of Canadian municipalities as far back as the 1980s. Colligan-Yano and Norton’s (1996) history of urban government in the province describes how the province’s municipal governments have perceived the offloading process.

When provincial and federal governments started to become concerned about their annual deficits and accumulated debts in the late 1980s, transfer payments were one of the first things they considered cutting. Municipal governments were stuck at the end of the line when the whip was cracked because provincial statutes did not permit local councils to budget for an operating deficit. Provincial politicians gave speeches chastising the federal government about cutting provincial transfer payments more than its own expenditures, but they then turned
around and took the same approach with local government grants in order to balance provincial budgets. (Colligan-Yano and Norton 1996: 128).

Provincial government grants to municipalities were cut in Saskatchewan in the early 1990s and the province’s purse strings remained tight into the 2000s. Offloading was evident in the imposition of fees for services that had previously been covered by the province, such as RCMP policing for smaller communities (Colligan-Yano and Norton 1996: 128). Municipal governments chafed at the offloading effect produced when the province developed new regulatory standards and then passed responsibility for the costs of compliance onto the municipalities. According to Colligan-Yano and Norton (1996), the province’s environment ministry was notably active in coming up with new rules and costs for municipalities.

As federal and provincial governments introduced more comprehensive forms of environmental protection, communities faced increasing costs of compliance and enforcement. This was particularly true in the case of solid waste management and storage of hazardous substances. One “burning issue” of the early 1990s was the stricter prohibitions on fires at municipal landfills, which left municipal governments facing increased waste management costs. (Colligan-Yano and Norton 1996: 129)

Coping with the emerging environment of higher costs and reduced transfer payments was frustrated by the municipalities’ comparatively limited revenue raising and borrowing capacity. The province’s municipalities were required to share the property tax pie with school boards. Urban governments demanded that the province increase its share of school funding relative to the locally raised portion to take some of the pressure off property taxes. In the late 1980s, opposition to high municipal tax rates in some cities took the form of a business tax revolt which led to the province-wide elimination of certain business taxes. The province’s various revenue streams appeared comparatively
less constrained. Colligan-Yano and Norton report that “between 1971 and 1989, sales tax revenues in Saskatchewan grew more than twice as fast as property taxes, and income tax revenues increased more than three times as fast” (Colligan-Yano Norton 1996: 130).

As described in Chapter 6, when the province developed new regulatory standards for drinking water its expectation was that the lion’s share of any associated costs would be the responsibility of the municipalities. The developers of the SDWS assumed that the municipalities’ ability to charge user fees for water was a more publicly palatable way to increase revenues than other forms of revenue generation, either property taxes or the sorts of taxes that the province could collect, e.g., income tax or sales taxes (SaskWater 2002: 18). Municipal officials interviewed in support of the RCAD project and this thesis took a different view. For example, town councillors from Maple Creek explained that ratepayers did not always appreciate the distinction between property taxes and user fees. Both measures tended to be viewed by ratepayers as taxes imposed by local government. A former mayor indicated that the provincial government had taken some pressure off the school portion of the property tax in 2008 which was a boon to the council when it subsequently increased water rates. “With this last go around [of water rate increases] the blessing is that the school tax went down so people think that their [municipal] taxes actually went down last year” (MC4: 5).1

9.3 Financing challenges

The provincial government’s assumption that municipalities could readily pass the costs of infrastructure upgrades necessitated by the SDWS onto water users was frustrated by the fact that residents of towns and villages could lack both the disposable income and sense of urgency required to pay for large projects. Maple Creek, for
instance, has approximately 1,100 residences connected to its water system. It is reasonable to assume that presenting each of those residences with its approximately $3,336 share of the $4 million cost of its water system upgrade in advance of construction would not immediately generate all of the revenue required. Maple Creek, like other town and country communities in Saskatchewan, has a significant number of retirees on fixed incomes, as well as low-income households. It is reasonable to assume that not all households would be capable of making a lump sum payment of over $3,000 on short notice. As was observed in Chapter 3 of this thesis, Bonbright’s (1961) admonition against rate shock suggests that there are challenges associated with surprising customers with large abrupt rate increases. The urgency associated with the boil water order in Maple Creek meant that waiting until the community could save enough cash to pay for the project was an unattractive option. Similar time constraints confronted Duck Lake in regard to its ammonia problem, Maidstone in relation to source depletion, and Gravelbourg due to its THM problem.

These communities lacked adequate time to save. They were also unable to garner all of the funding they required from grants. The commonly adopted approach is to hope for as large a grant as possible, then cover the shortfall through borrowing, one time levies and rate increases. Borrowing scenarios include obtaining loans from commercial lenders and/or the Municipal Finance Corporation (MFC) through its municipal debenture program. As noted previously, solutions that involve borrowing can be frustrated by provincial regulations which limit the borrowing capacity of municipalities. Under The Urban Municipalities Act, The Municipal Board Act and accompanying regulations administered by the SMB, municipalities are confined to borrowing no more
than one-half of the amount of the annual revenues they raise and cannot undertake loan obligations in excess of three years without the permission of the SMB. None of the municipalities studied in support of this thesis was able or willing to borrow all of the funds required to fully cover major water infrastructure project costs. A member of Duck Lake’s Town Council provided a summary of these challenges and their impact on the community’s residents.

I think in a larger center with a bigger population you might have more of an opportunity to raise the money. But we're very small and we have lower income earners. To be told we need a complete new water system and be given a time frame, one year, which was totally unreasonable. And to be pressured to meet the deadline and make decisions … We tried to get the government to give us money for that $780,000 [shortfall after accounting for grants and borrowing] because we felt it was an undue hardship to our seniors on a fixed income and very low-income earners. And it was a real hardship. Some of them actually sold their houses. (DL3: 9, 12)

The grant lottery

Some of the municipal administrators interviewed in support of this thesis compared the process of garnering government grants in support of municipal water infrastructure projects with the chances of winning a lottery or being struck by lightning (DL1, DL2, DL3, CN36.1, MC4 AS1, GB1A, KD4A). The ability to obtain grants was attributed to an opaque alchemy thought to include elements such as fortuitous timing; good political connections; or urgent need (as in the case of a permanent boil water order). Maple Creek’s mayor indicated that having good connections with influential provincial politicians helped his community obtain grant funding in 2002 (MC4: 4). In the case of Duck Lake, the town’s efforts to obtain grant support included an unsuccessful political lobbying effort and advocacy campaign designed to encourage the government to do more on the town’s behalf (DL1). As described in Chapter 6, over the
past few decades there have been significant fluctuations in the amount of grant funding available. Grant programs came and went in response to funding and election cycles or, as was the case with the Building Canada Fund, appeared in reaction to a crisis (i.e., the global recession that began in 2008).

Table 9.1, provided below, reports water and wastewater project costs incurred by four of the communities studied for this thesis and the amount of grant funding from senior governments that each project received. The table demonstrates the wildly fluctuating levels of grant support that have been available over the past decade to town and country communities studied in support of this thesis.

TABLE 9.1 Water and wastewater project costs and proportion of funding provided by senior government grants

<table>
<thead>
<tr>
<th>Community</th>
<th>project</th>
<th>Approximate cost</th>
<th>Approximate Grant(s)</th>
<th>% of cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duck Lake</td>
<td>Major system upgrade post-2006 ammonia problem</td>
<td>$2.3 million</td>
<td>$500,000</td>
<td>21.7%</td>
</tr>
<tr>
<td>Maple Creek</td>
<td>Major system upgrade post-2001 E. coli incident</td>
<td>$3.7 million</td>
<td>$1.25 million</td>
<td>34%</td>
</tr>
<tr>
<td>Kindersley</td>
<td>Phase #1 post-2002 water crisis improvements to EK pipeline and Kindersley’s infrastructure.</td>
<td>$22 million</td>
<td>$10.15 million</td>
<td>46%</td>
</tr>
<tr>
<td>Gravelbourg</td>
<td>Treatment plant upgrade post-2006 THM problem.</td>
<td>$6.3 million</td>
<td>$5.9 million*</td>
<td>94%</td>
</tr>
</tbody>
</table>

Sources: Interviews with senior administrators and town councillors from each of the communities (DL 1, DL2, DL3, MC4, MC6, KD4A, KD 40, KD 41, KD 42, GB1A).

* Gravelbourg’s town administration has referred to the entire $5.9 million as grant support. However, a portion of the funding (approximately $2.7 million) was provided by SaskWater and the town recognizes that SaskWater will likely attempt to recoup the amount it contributed through the fees it charges the town for water over coming years. Nonetheless, from the town’s perspective, SaskWater’s contribution was tantamount to grant support given that it was in the form of funding provided without any formal acknowledgement of indebtedness or repayment terms as would be the case with a bank loan or financing through the MFC and, therefore, it does not appear as a liability on the town’s balance sheet. This form of financing is, indeed, one of the attractions associated with P3 arrangements.

As noted above, the level of grant support a community receives to finance water and wastewater infrastructure projects can determine the amount it is required to borrow
as well as its subsequent water and wastewater fees, including one time levies, fixed connection fees and volumetric rates. One time levies were imposed in Maple Creek and Duck Lake. The levies were required because the total funds available in the form of savings, grants and borrowing were not sufficient to pay for their infrastructure upgrades. In Maple Creek’s case, coming up with the $3.7 million required to upgrade its water treatment system required a onetime levy of $2,032 per connection in combination with higher fixed and volumetric charges ($MC4: 6$,$MC6: 2$). The reluctance and/or inability of some residents to pay the levy on short notice is evident in the fact that approximately 20% of households chose to finance the levy over 10 years at a 7% interest rate ($MC 4: 6$,$MC6: 2$). In the case of Duck Lake, the one time levy was $2,850. The levy was accompanied by rate increases which raised the town’s lowest block sewer and water fees from $22.00 per month to $208.75 per month (at a modest household monthly use rate of 3,000 gallons).² Only 35% of Duck Lake’s households chose to pay the $2,850 levy in one upfront payment. Those who paid the levy upfront would pay $121.75 per month for 3,000 gallons of water. Those who chose to finance the levy over three years paid an additional $87 per month on their water bills raising them to over $200 per month (for households with a use rate of 3,000 gallons per month) ($DL1: 7$).

Challenges associated with borrowing capacity and the availability of grants are especially daunting for smaller towns and villages, such as Duck Lake, which lack the population base over which to spread infrastructure costs. A municipal official interviewed for the IACC project described the plight of smaller centres confronting major water infrastructure upgrades.

The villages are virtually in free fall. They just stumble from one crisis to another whether it is water quality or collapsing infrastructure. There is no strategic
planning. There is no thinking. There is no technical expertise. They have nothing – most rural municipalities, same thing…So capacity is their biggest issue. So in the rural [communities] you just sort of flop around and hope something [e.g., grant support] shows up. (WC4: Para. 630)

9.4 Equity, fairness and the ability to pay

Proponents of Bonbright’s BMPs, including policy makers in Saskatchewan, hold that the utility rate structure is not the appropriate place to administer social welfare policy. According to Bonbright, if high rates actually impose hardship on low-income residents, the problem should be resolved through the progressive tax system or social welfare agencies, not by utility rate setters. Renzetti and Busby (2009) are supportive of market-based water governance precepts, such as marginal full cost pricing and the elimination of grant funding, for municipal infrastructure projects. However, Renzetti and Busby (2009: 35) concede that there is value in establishing lifeline rates. In other words the problems of equity, fairness and affordability may not always be suitably addressed outside the rate structure. While the case studies conducted in conjunction with this thesis did not include an in depth analysis of the challenges confronting low-income households, pensioners or recipients of social assistance, they do suggest that a number of social problems can arise as a result of significant water and wastewater rate increases.

The experience of some residents of Gravelbourg indicates that large rate increases can indeed produce financial hardship. Notwithstanding the relatively high level of grant support it received to finance the new water treatment plant, the Town of Gravelbourg implemented significant rate increases in 2010. The need for higher revenues was in large part due to higher rates imposed by SaskWater and the need to accumulate the savings required to maintain and replace water mains and sewage system
components. The new rate schedule abandoned what had been an increasing block system which included a lifeline rate in favour of a single volumetric fee of $28 per 1,000 gallons, a 41% increase in the volumetric rate. This is by far the highest volumetric fee charged by any of the study communities. For example, the highest volumetric rate charged by Kindersley is $17.00 per 1,000 gallons; Duck Lake’s top rate is $11.00 per 1,000 gallons; Maple Creek’s highest rate is $5.75 per 1,000 gallons; and Coronach’s top rate is just $5.00 per 1,000 gallons. In addition, the Town of Gravelbourg implemented a fixed connection fee of $55.83 that would accommodate the first 2,000 gallons of water used, but which was applied whether a connector used any water at all in a given month. On top of the fixed water connection fee there would be a fixed monthly domestic sewer fee of $21.75 and a flat storm sewer fee of $2.10 per month. The net result was a minimum monthly customer billing of $105.58 on the first 3,000 gallons of water used. Again, the 3,000 gallons per month use rate corresponds to the amount that Environment Canada attributes to conservation-conscious households. In the case of Gravelbourg, use above 2,000 gallons would be charged at the relatively high rate of $28.00 per 1,000 gallons.

Interviews for this thesis indicate that many of Gravelbourg’s residents were unpleasantly surprised by the size of their post-rate increase water bills. Some residents were clearly not prepared for the price impact of faulty fixtures, especially running toilets, and excessive outdoor watering on their water bills. One of the town’s officials joked about having to learn the lesson “the hard way.”

My water bill two months ago was $460….there was a leak in my house. And I'm the guy who writes the articles in the paper [that tell people to] “check for leaks!” …My wife and my son told me the toilet downstairs occasionally runs and I said I'll fix it someday. Then I got the bill. $460 later the toilet was fixed. We get some
cases in the community where the monthly water bills have been $2,000, $3,000. (GB1A: 7)

Some residents were less amused. Two respondents reported that there was a parade of disgruntled ratepayers appearing at the town office disputing their water bills, apparently there was some yelling. One respondent recalled a $2,700 water bill, another recalled a bill over $3,000 (GB3: 4, GB1A). For a family with an above average income, a $460 water bill might constitute an affordable lesson about the need to conserve water. For seniors living on fixed incomes or low-income families, a $3,000 water bill for a single month might be viewed as a financial catastrophe. The impact was softened somewhat given that the town allowed residents with shockingly high water bills to pay them off over time.

Residents of Duck Lake faced affordability issues when town council dramatically increased water rates in 2008. Over five dozen households had fallen into arrears on their water bills in Duck Lake by March of 2009. The town officials interviewed said that they appealed to the Ministry of Social Services to ensure that the bills owed by people on social assistance would be paid because the town planned to disconnect residences with bills over 90 days in arrears. A town employee reported that she faxed a list of residences in arrears and the amounts owed to the ministry’s office in Prince Albert (DL2:9). According to the Duck Lake officials interviewed, the Ministry of Social Service’s Prince Albert office responded to the town’s request for payment by explaining that its policies required individuals receiving assistance to take responsibility for their own utility bills. Those people who were in arrears would have to personally fax or otherwise contact Social Services in writing to request additional support. Exasperated
by what it perceived to be “a bureaucratic run around,” the town eventually disconnected the water service to approximately one dozen residences including those of some people receiving social assistance.

This was not something the council was comfortable doing, but councillors stated they nonetheless felt that the implications of the rate hike on low-income households should not be offloaded on the town when it is the province that has responsibility for looking after people in need, particularly when the province had not provided the town with the support it requested to help cover its infrastructure costs (DL2: 9; DL3: 9).

Town of Duck Lake officials reported that some seniors found the new water rates so troubling that they sold their houses and left the community. For some, the rate hike was apparently the last straw forcing them to leave their houses and enter a nursing home (DL, DL2, DL3).

The interviews conducted for this thesis provided a range of opinions regarding the fairness and affordability of water and wastewater charges. Not everyone felt that water rate increases were unreasonable. Gravelbourg has the highest water rates among the town and country communities studied. One of that town’s officials commented on the ironies involved in people’s perceptions about cost, “While people complain about their water bills they think nothing about paying over $100 per month for satellite television. Water is necessary for life; you can live without cable” (GB1A: 20). Of course this assumes that all households can afford or choose to purchase cable.

A public works employee from Assiniboia explained that the objections people raise about the cost of water today arise because for decades communities have failed to adequately maintain their water and wastewater infrastructure. He observed that in the
past they chose lower taxes and low water rates over a more forward thinking approach to their infrastructure needs. He reasoned that this attitude is encouraged by the fact much of the infrastructure is underground, “out of sight and out of mind.”

These systems were put in during our grandparents time and they basically haven’t been thought of until recently. No work was designated for it [water infrastructure] nor was there money put aside to repair or replace it. No one looked at it until it started to break. (AS2: 13).

**Psychological stress**

Economic arguments favouring market-based water pricing do not typically account for the psychological impact of higher water rates on the municipal officials responsible for their implementation or the residents whose pocketbooks are affected. The planning documents developed in support of the SDWS recognized the public relations challenge presented by the water rate increases expected as a result of the SDWS. Provincial government agencies developed “value of water” promotional campaigns describing water as a scarce and valuable resource that required conservation management and more responsible rate structures. A skeptic might reasonably speculate that these campaigns were as much about softening up the public for rate increases as they were about promoting water conservation. The findings of the field research conducted for this thesis suggest that the public relations campaigns in support of higher water rates were not entirely successful. There were municipal officials and community residents who were less than happy with their higher post-SDWS water rates.

Interviews with elected municipal officials, who were in office when significant water rate increases were implemented, shed some light on the emotional costs associated with rate shock. In Maple Creek, for example, officials faced opposition from residents
who objected to the size of the price tag for the 2002 water system upgrade. They were also confronted by widespread skepticism about the validity of environment ministry claims about the potential health hazards posed by the existing system. One official remembered:

We took a lot of crap...It was my biggest challenge. It actually caused me so much stress that I quit [Town Council]. It wasn’t just the E. coli, it was the new plant, the supply, the ranchers, drought, it was the whole schmear. My kids still bug me about my famous television interview with CTV when I had a meltdown over the way provincial government agencies had been dealing with the community. (MC4: 6, 10)

Duck Lake’s dispute with SaskWater over that company’s unilateral alteration of the 2006 agreement and the $300,000 bill for wells that it was forced to pay, was similarly stressful for town councillors. In 2008 the mayor told a newspaper reporter that the community had been “blindsided” by SaskWater when it changed the terms of the agreement. Town councillors were shocked when the president of SaskWater dared the mayor to sue the corporation. According to the mayor, SaskWater’s CEO said “go ahead and sue us, we have deeper pockets than you do” (DL1: 11). Council members also felt abandoned by their MLAs and provincial cabinet ministers whose constituencies were located near Duck Lake. They devoted considerable effort to a lobbying campaign and were disappointed that it had very little, if any, effect on the provincial government. A member of Duck Lake’s council reported that her experience in dealing with the province over the community’s water problems and subsequent issues altered her perceptions about what small communities could expect from their provincial government.

It was an awful time to get on the council. I had to learn about being on council and then having to make decisions about the water issue. I said more than once, $2 million, oh my gosh! We are asking all the people in our community to bear this. Any decisions we make as a council we are legally responsible for... It's very difficult when you're faced with a situation like this and you have no background
in dealing with the issues. I was very concerned about that as we felt that we had been betrayed by SaskWater… They thought they were going to hold us to ransom as far as I’m concerned… We were given information and were quick to accept it because it was a good deal… I'm sorry if I sound bitter and skeptical but I have a different view of government now… We don’t take for granted that the government is looking out for our interests. It's tread carefully. Even though they are our government you still have to be responsible for yourself. Because sometimes I think there are agendas. We just finished dealing with Highways [the provincial Ministry for Highways] and the highway coming in [Highway #11 was being widened at Duck Lake in 2012]. Having finished with the water and it being settled to where we knew what we were doing. Highways came in, purchased a piece of property and we had to redo everything and that was a process again. I think dealing with SaskWater has educated us as a council. We're more diligent, we ask more questions… (DL3: 12,13)

9.5 Taxation and community sustainability

While there may be reasonable rationales available in support of water rate increases in certain situations, communities are nonetheless challenged by issues of affordability. Some of the RCAD respondents indicated that there was a point when the costs associated with living in a community, including property taxes and utility rates, become onerous enough to encourage people to think about moving (MC8A: 2; MC 27:1). This appears to have been the case in Duck Lake. High taxes and fees can also discourage people from moving to a community. Historically, town and country communities in Saskatchewan have relied on retiring farmers moving into their communities as a factor supporting population sustainability. Respondents from Maple Creek reported that their community is engaged in a competition with the nearby city of Medicine Hat, Alberta to attract new residents, particularly retiring farmers and ranchers. Some respondents reported that property taxes in Maple Creek are not all that different from those in Medicine Hat. There is no sales tax in Alberta, and Medicine Hat has a larger hospital, more doctors, more services and greater shopping opportunities. A
number of respondents reported that over recent decades many area retirees had indeed been choosing Medicine Hat over Maple Creek, and that taxation rates played a role in their decision making (MC8A: 2; MC 27:1). At a certain price point small town living can lose its appeal.5

While water rates are just one component of the cost of living for residents of town and country communities, they nonetheless contribute to total costs and perceptions about the relative cost of living in any particular community over others. The research suggests that the combined effects of property taxes, water rates and other fees may in certain contexts operate as a barrier to population growth and retention.6

9.6 Water rate systems

The study communities employ a variety of water and sewer rate structures. In the case of Shaunavon, the bulk of the water delivered is consumed by unmetered households which pay a flat $34 fee regardless of the amount of water consumed. Shaunavon’s larger businesses and public institutions (e.g., hospital, nursing homes and schools) are metered. However, the same volumetric rate of $5.15 per 1,000 gallons applies to all levels of consumption. All of Kindersley’s water utility customers pay the same volumetric rate regardless of the amounts consumed. Five study communities all make use of some form of increasing block rate system that begins with a lower priced lifeline block rate. The amount of water consumption allowed within the first, or lifeline, block varies. Maple Creek, Maidstone, Coronach and Assiniboia’s first block rates all cover the initial 3,000 gallons of consumption. In Duck Lake the first block covers 1,000 gallons. The fact that 3,000 gallons is the most popular first block consumption limit corresponds with the conservation-based consumption limits identified by Environment Canada. Figure 9.1
provided below describes water rates in the study communities at various consumption levels. The 3,000 gallon value reflects the most commonly employed first block consumption limit among the study communities. The 10,000 gallon value reflects indoor use by a large family or a small household that does a modest amount of outdoor watering. The 20,000 gallons per month amount is consistent with use levels that reflect the highest block rates and reflects heavier outdoor use by households or use rates for institutions and some businesses.

**FIGURE 9.1**

![Figure 9.1 Residential Water Rates for Study Communities](image)

*The rates for the Wood River Utility Board have been included to illustrate one of the higher rates encountered by this writer. The high rate is largely attributable to the fact that the Wood River Utility purchases some of the water it provides to its members from the SaskWater water treatment plant in Gravelbourg at a high wholesale rate.*

There are differences among the communities using block rates with respect to the degree that rates accelerate as one moves through the various blocks. In Assiniboia, for
example, the highest consumption block rate is lower than the rates charged for the second block (the rate per units consumed increases from block one to block two, but decreases for the third and highest block rate). In 2010 Maple Creek increased the rates for its lower consumption blocks by $0.25 per 1,000 gallons but did not apply the increase to its highest consumption block.

The data provided in Table 9.2 below suggests that there is no clear relationship between the size of a community’s assessment base for taxation purposes; its water rates and the profitability of its water and sewer utilities. This is the case despite the fact that seven of the communities obtained loans approved by the SMB and grants for their water or wastewater infrastructure projects (Shaunavon is the exception). In accordance with provincial regulations governing municipal borrowing and the requirements of provincial-federal grant programs these communities have all implemented full cost recovery water and sewer rates. Nonetheless, we find that for some communities the full cost pricing formulas have failed to generate revenues in excess of expenditures.

**TABLE 9.2 Population tax assessment and net water utility revenue**

<table>
<thead>
<tr>
<th>Community</th>
<th>Population</th>
<th>Assessment</th>
<th>Water, Sewer Revenue</th>
<th>Water, Sewer Expense</th>
<th>Profit (loss)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maple Creek</td>
<td>2,176</td>
<td>$68.7 million</td>
<td>$726,000</td>
<td>$1,092,850</td>
<td>($332,850)*</td>
</tr>
<tr>
<td>Shaunavon</td>
<td>1,756</td>
<td>$36.9 million</td>
<td>$457,800</td>
<td>$302,854</td>
<td>$154,946</td>
</tr>
<tr>
<td>Kindersley</td>
<td>4,678</td>
<td>$204.3 million</td>
<td>$2,469,170</td>
<td>$2,341,102</td>
<td>$128,068**</td>
</tr>
<tr>
<td>Gravelbourg</td>
<td>1,116</td>
<td>$21.2 million</td>
<td>$480,713</td>
<td>$520,309</td>
<td>($39,596)+</td>
</tr>
<tr>
<td>Coronach</td>
<td>711</td>
<td>$12.6 million</td>
<td>$231,982</td>
<td>$206,970</td>
<td>$25,011</td>
</tr>
<tr>
<td>Duck Lake</td>
<td>577</td>
<td>$8.0 million</td>
<td>$476,079</td>
<td>$414,309</td>
<td>$61,770</td>
</tr>
<tr>
<td>Maidstone</td>
<td>1,156</td>
<td>$38.8 million</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Assiniboia</td>
<td>2,418</td>
<td>$55.6 million</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

Sources: see note 7

In at least some of the instances in which study community utilities have lost money the losses can be attributed to the emergence of unforeseen circumstances related
to either new regulations imposed by the province or equipment failures. For example, Maple Creek did not anticipate the need to repair hundreds of water breaks in the wake of upgrading its treatment facility in 2003. Similarly, in 2008, Maple Creek was informed by the Environment Ministry that it would need to upgrade its sewage lagoon at a cost of over $1 million. These were surprises not previously accounted for within the rate structure.

A previous chapter included comments by a water manager from the Kindersley area who pointed out the irony involved in relation to the requirement that communities seeking grants needed to adopt full cost pricing to be eligible. Obviously, she reasoned, full cost pricing doesn’t really work as advertised since even communities that have adopted it continue to seek and receive grants. The adoption of full cost pricing is not a guaranteed prophylactic against grant seeking. That being said, one might reasonably argue that efforts to operate a full cost pricing system that accounts for those cost factors which can be readily foreseen is a sensible approach to utility management.

9.7 Gold plating

SaskWater’s 2008-2012 Marketing and Sales Strategy states that communities with fewer than 500 residents are unattractive sales prospects because they lack the financial capacity to afford the corporation’s services (SaskWater 2007a: 17). SaskWater’s principal line of business involves owning and operating water withdrawal and treatment infrastructure and selling potable water to municipalities under long-term agreements. If smaller centres cannot afford SaskWater’s services, one might reasonably wonder whether they can afford making necessary improvements to their water infrastructure at all. Another question prompted by SaskWater’s lack of enthusiasm for
doing business with smaller centres is whether the water treatment solutions being made available to communities by for-profit suppliers are actually the lowest cost options available. Comments provided by some of the interview respondents suggest that both SaskWater and private engineering firms may have, in some instances, oversold communities, selling them infrastructure that was more costly and more technologically complex than required. A marketing manager with SaskWater reported the following:

The engineers tend to gold plate projects. Maybe it is just something that engineers generally feel they need to do. They want to make sure anything they design is top-notch and they are keen to work with the latest state of the art technology. The problem is if a community wants a shed built to house their pumping system, the engineers design the Taj Mahal. Instead of this inexpensive little shack they expected to get, they get this elaborate high cost building. *(SW4: 1)*

A water plant manager, who is active in the Saskatchewan Water and Wastewater Association (the professional association for treatment plant operators), said that smaller communities and First Nations bands are being oversold. Engineering firms sell them treatment facilities that their staff may have difficulty operating. An excerpt from that interview is provided below.

Respondent: They [small communities] are being oversold and then who do they get to operate it [the water treatment plant]. I'll use the town of Rockglen for an example. [operator’s name]… is their water plant operator, he's their Public Works employee and they have a part-time employee who helps check on the water system to ensure it's operational. And they're both responsible for clearing snow off the streets. They have a UV [ultraviolet light] treated system for their water. It's not operational at this time. The local contractors -- local plumber or electrician don't understand the technology so they can’t get the system up and running. They got this system and are bypassing a lot of stuff in order to make it work but still meet water quality requirements. The City of Estevan had the same system and it took them two or three years to actually meet requirements.

Interviewer: To them it seems like you need a rocket scientist to figure out how to make it work?
Respondent: Yes, the engineering firm had a few assumptions, when they were designing the system, to make it work, but their assumptions were pretty far off. *(AS2: 13)*

Another instance where one might question the quality of service and advice provided by consulting engineers is the massive leak problem experienced by Maple Creek. Town officials were surprised by the eruption of approximately 400 waterline leaks which occurred after the new treatment plant went into service. In his interview with this writer, the current mayor jokingly speculated that the cost of repairing leaks could exceed the $3.7 million cost of the new plant *(MC6: 9)*. One wonders whether the potential for leaks due to the different chemistry of the water produced by the new plant was something which consulting engineers, experts supposedly familiar with water systems, might have forewarned the community about.

From the perspective of some residents from communities which required expensive infrastructure upgrades, the drinking water safety regulations emanating from the SDWS were being gold plated by overzealous bureaucrats. There were residents of both Maple Creek and Duck Lake who argued that the regulators were excessively risk averse. Some residents at a town hall meeting held in Duck Lake to discuss the town’s water problems argued, “let them put us on boiled water. We've been drinking this water for 40 years and we're not dead” *(DL1: 12)*. Some residents of Maple Creek held that since there was no conclusive proof that anyone had been made ill by their town’s water, they really didn’t need the infrastructure upgrades *(MC8A: 1, MC27: 2)*.

Officials and residents from both communities reported making rough calculations that suggested providing every household in town with reverse osmosis water filtration systems could have provided residents with safe water and been a far less
expensive option than multi-million dollar upgrades of their treatment plants. However, the Ministry of Environment’s drinking water safety regulations do not permit that sort of solution. This is presumably because of the challenges presented by monitoring water quality in each and every household. Monitoring water at a single plant is obviously less challenging.

The planners who designed the SDWS recommended the adoption of low cost options for small communities. The “point of connection” option they suggested would allow smaller centres to provide sub-standard water to households which would then be responsible for their own personal water treatment systems (see Chapter 6 of this thesis). However, this option has never been officially endorsed as an option by the Ministry of Environment. IACC respondents indicated that as of 2008 a handful of small villages and hamlets that had been placed on permanent boil water were making potable water available to residents from centrally located reverse osmosis filtration systems. Apparently, Ministry officials had not prevented these communities from making non-potable water available to households for purposes other than human consumption, but had not officially endorsed the practice either (SE1 Para. 50-74, SW1A). This writer encountered conflicting messages and rumours about whether the Ministry of Environment was planning to tighten up on the application of water treatment rules or officially relax the standards and allow some smaller communities to develop point of entry systems (AS1.2A, GB1A).

The demand for innovative low cost options can be expected to increase as more small centres encounter water crises and are required to replace or upgrade their infrastructure. However, it does not appear that developing less expensive treatment
options is a high priority for the provincial government, SaskWater, or the province’s private sector engineering firms. For example, Communities of Tomorrow, a public private partnership (P3) based in Regina, mandated to support the development of innovative water and wastewater treatment and management technologies does not see its mandate as extending to the provision of solutions for communities of less than 5,000 population. “We just don’t see how our private sector partners can develop technologies for smaller communities. The scale required to generate the revenues required for profitability just isn’t there” (CT1).

9.8 SaskWater’s role

A number of interview respondents suggested that Saskatchewan’s town and country communities could benefit from having access to unbiased consultation provided by an honest broker who could advise them on how to most cost-effectively meet their water challenges (AS2, DL2, KD4A, MC4). A town councillor from Duck Lake reported that she was disappointed that SaskWater did not play a more supportive mentoring role when dealing with her community (DL2: 12). Indeed, a number of interview respondents suggested that for-profit suppliers, including the post-2002 SaskWater, were not well disposed to providing low cost alternatives for communities.

A municipal official involved with a South Saskatchewan River watershed stewardship group ascribed rather mercenary characteristics to the post-2002 SaskWater. He described the situation of the Town of Elbow, Saskatchewan which entered into an agreement whereby SaskWater would purchase the town’s existing water treatment plant, do the necessary upgrades and then sell the treated water to the town. The respondent felt
that the town had been led to assume they had found an affordable solution, but

SaskWater subsequently raised the rates to a far less attractive level.

Oh my God man! You gotta have your chequebook out to talk to Water Corp. [SaskWater]. They are worse than the phone company. Elbow took them on and they virtually bankrupted Elbow...they bought the water system from Elbow, which was good for the first three payments and since then they are like a slave. Water Corp. does that for a profit. Don’t even kid yourself that this is some benign provincial agency that has come to help you. They are in this for the money, straight and simple and they pay well [their employees] and they charge you [communities] through the nose. So most of these villages run the other way when you say Water Corp. (WC4: Para. 365-358)

Whether or not these comments accurately reflect the situation at Elbow is unclear. They do, however, provide an indication of how some elected municipal officials in southern Saskatchewan perceive SaskWater. In Maple Creek’s case, the town council was discouraged by the problems it experienced working with the Ministry of Environment. That experience, combined with what a former mayor referred to as, a “redneck” attitude about dealing with government agencies in general, left it reluctant to surrender control of its water plant and go into business with a government agency, SaskWater (MC4: 4, 6).

A regional water pipeline association official interviewed by this writer reported that in its pre-2002 incarnation, SaskWater had, indeed, been providing the unbiased expert advice that communities needed. She held that communities would benefit if SaskWater abandoned its for-profit model and returned to its former pre-2002 advisory role.

There currently isn’t an honest broker provincial agency that sees its role as solely advisory or supportive. SaskWater is one among a number companies that hope to sell communities services. PFRA was another matter. Its role involved helping rural people deal with water and drought issues. There is a recently retired PFRA water specialist who was very highly thought of in this area. He was capable of creatively interpreting PFRA’s mandate, which was to support farmers and
agriculture. If a project designed to benefit towns, villages or hamlets – also provided greater access to water for farms the PFRA could get behind it and help find funds to support it…In its earlier non-profit version SaskWater played a consultation role and attempted to assist communities in getting projects launched. That assistance took the form of technical advice and help discovering and dealing with government grant programs. When it was transformed into a for-profit corporation it became just another engineering firm looking to make money providing water to communities. In fact the size of projects that SaskWater is interested in doing are beyond the scale that smaller communities require or can afford. When a SaskWater official did a presentation to Water West [a regional water pipeline organization] supporters that included a slide that depicted its profit objectives, people were really turned off. The Water West members, including town officials assumed that there was no longer any real advantage to working with SaskWater over any other engineering firm. Asking SaskWater if you need to spend money on your water system, is like asking a barber if you need a haircut. (KD4a: 2,3)

9.9 Municipal autonomy

The SDWS imposed a number of regulatory conditions on municipalities wishing to obtain grants and government-backed financing. These include the adoption of user pay marginal full cost pricing. The author interviewed a number of municipal officials who objected to the erosion of municipal autonomy represented by these measures (e.g., AS1A, DL1, DL2, DL3, MC4,). Some of these officials claimed that prudent financial management of a water utility could be achieved without relying solely on marginal full cost pricing. Maple Creek’s officials had, for example, determined that adjusting the fixed monthly connection fee produced the revenue effect they required.

The administrator from one of the study communities resented the erosion of local autonomy that submitting water utility budgets to the SMB symbolized (AS1A). He wondered what bureaucrats who lacked experience with his community’s water issues could effectively contribute. The need to submit material to Regina for approval was described as an inordinately lengthy and essentially useless process. He agreed that municipalities should ensure that money is put aside to fund infrastructure projects.
However, he proposed that a community should have the ability to determine how those savings are generated. For example, a community with a number of large and profitable businesses with highly assessed property may see benefit in deriving a greater share of the revenue required for water and wastewater infrastructure upgrading from the property tax as opposed to relying solely on water rates. Assiniboia’s administrator reported that until recently his community had a combined increasing and decreasing block rate system. There was a lifeline rate and a higher price for second block use after which the third block rate declined. The rationale for the rate structure was the community’s desire to ensure that its largest water users, the hospital, nursing homes and schools remained financially sustainable. Bonbright would undoubtedly describe these strategies as involving inappropriate cross subsidization. Community officials, on the other hand, might describe them as means to ensure water rates are affordable for all residents, including those with low incomes. Or, in Assiniboia’s case, as the sort of decision a municipality should have the autonomy to make in support of overall community well being and sustainability.

9.10 Conclusions

Issues of equity and fairness feature prominently among the various challenges confronting water governance and management in the study communities. The imbalance between the roles of various levels of government and the financial resources available at each level is an issue that underlies many of these challenges. Offloading has required municipalities to do more in the absence of greater access to revenue streams controlled by senior governments. New rules around water safety and infrastructure management
were imposed on municipalities in 2002 without a corresponding increase in availability of financial resources.

The financial challenges that affect municipalities endeavouring to improve their water systems in response to crises and new standards have generated socially inequitable outcomes. The research presented in this chapter shows that affordability of basic water services by low-income households has been adversely impacted in some communities. Increasing taxes and fees for municipal services, including sewer and water service, also have the potential to adversely affect the sustainability of some town and country communities. No less troubling is the largely unfathomable process involved in the awarding of government infrastructure grants and loans. Some municipalities clearly receive better treatment than others.

The current system leaves municipalities vulnerable to excessive costs as a result of gold plated technical solutions and overly rigorous regulation. For smaller communities, in particular, greater emphasis on low cost solutions and more flexible standards could improve social outcomes and enhance the sustainability of rural urban centres.

**Chapter 9 Notes**

1) The municipalities contended that the public tended not to discriminate between the agency sending out the combined tax notices – which was the municipality, and the agency primarily responsible for tax increases – the local school board (Colligan-Yano and Norton 1996: 130, 131).

2) Duck Lake developed a rate schedule in 2007 that includes a lifeline rate block that allowed for 1,000 gallons per month. The other study communities with increasing block rate schedules place the maximum consumption allowed in the first block at closer to 3,000 gallons per month. The 3,000 gallon figure corresponds to what Environment Canada suggests is the use rate for households that employ measures to conserve water such as installing low flow appliances, etc. Environment Canada provides an assessment of use rates in its website article “Wise Water Use,” www.ec.gc.ca/eau-water/default.asp?lang=En&n=F25C70E-1 The 3,000 gallons per month amount has been employed as a rule of thumb for setting lifeline rate block maximums in Assiniboia, Coronach, Maidstone and Maple Creek.
3) This writer was unable to get an official explanation as to how these sorts of situations are resolved. In response to a written information request, the author was referred to the Ministry’s website which provided some information regarding the rules that apply to families on assistance – but did not indicate what happens when adherence to the rules is frustrated by events – such as a steep increase in water rates. What the implications of intergovernmental confusion over responsibility for unpaid water bills at Duck Lake were for the families impacted remains unclear. It would require additional enquiries and the cooperation of the residents impacted and the Ministry of Social Services to determine the degree of difficulty some families may have faced.

4) For example, the six-page publicly distributed brochures promoting the SDWS featured a full page “value of water” message encouraging consumers to conserve water because it is a scarce and valuable resource (Government of Saskatchewan 2002). Swyngedouw (2006) suggests that these campaigns serve to prepare citizens for more expensive water and facilitate the privatization of utilities and the higher water rates needed to facilitate profitability.

5) In 2007, Maple Creek’s Town Council developed a 32-lot serviced subdivision, hoping to attract new residents. Town officials had been encouraged, in part, by an apparent trend whereby people from regions of Canada where housing prices and the cost of living were high (e.g. Vancouver and BC’s Lower Mainland) were cashing out and moving to small communities in Saskatchewan. As of November 2012, when this writer conducted follow-up interviews with town officials, only one of the serviced lots had been sold. The anticipated wave of migration had not materialized. Interviewees attributed this to the fact that rural Saskatchewan communities like Maple Creek were no longer viewed as a low cost alternative (MC4, MC6: 11, MC8, MC27).

6) The author notes that not all community officials are concerned about the impacts of taxes and user fees on community sustainability. A senior municipal official from Assiniboia was less alarmed about cost of living increases in rural communities. He commented that it was unreasonable for a person building a $400,000 home in Assiniboia to expect their taxes and municipal fees to be any lower than those paid by people in Regina or Saskatoon for a similar home (ASI.1).


8) Gold plating has recently received attention from policy makers and in media commentary related to environmental regulation in the EU. The term has been applied to the tendency for overzealous regulators at the national level to develop environmental regulations that are stricter than those required by the European Commission. The European Commission’s Better Regulation Glossary defines gold plating as follows:
In the EU context, 'gold plating' refers to the transposition of EU legislation, which goes beyond what is required by that legislation, while staying within legality. Member States have large discretion when implementing EC directives. They may increase reporting obligations, add procedural requirements, or apply more rigorous penalty regimes. If not illegal, 'gold plating' is usually presented as a bad practice because it imposes costs that could have been avoided…


This author uses the term to refer to both overzealous regulation and infrastructure projects which exceed community requirements.

9) Reverse osmosis (RO) systems capable of filtering drinking water for households with 1-10 members range from $300 - $400 (45-90 gallons per day). Systems capable of treating all household water range from $1,650 to $2000. Whole house ultra violet (UV) systems range from $550 - $700. Based on prices available through APEC Water. www.freewatr.com; Culligan www.culligan.com and Water Group www.watergroup.com (accessed March 12, 2013).
CHAPTER 10: District irrigation

10.1 Introduction

This chapter describes how the major water governance and management paradigms described in the literature are reflected in the operation of Saskatchewan’s irrigation districts. In particular, the author identifies those features of irrigation governance and management in Saskatchewan that are inconsistent with the principles of market-based water governance. For example, the field research indicates that there is opposition among irrigation farmers to the development of private property rights in source water. It also demonstrates that district irrigation associations engage in cross subsidization when building major infrastructure components, an anathema under the Bonbright (1961) model. The chapter also describes the mercurial behaviour of senior government in relation to the subsidization of irrigation in Saskatchewan. The author presents a recent example of federal offloading in southwest Saskatchewan which threatens the survival of irrigation agriculture in that area. The chapter also describes the debates associated with the application of soft path principles in relation to irrigation in Saskatchewan.

Irrigation activity in Saskatchewan involves a mix of relatively small private systems operated by individual producers as well as multiple user projects, typically referred to as irrigation districts or irrigation projects, where major infrastructure components are shared. The Saskatchewan Ministry of Agriculture (SMA) reports that most of the irrigated acreage in Saskatchewan is located outside of district systems and managed by 895 individual farmers and ranchers. Individual irrigators and the districts are required to obtain surface water allocation licenses from SWA and are responsible for
their own water withdrawal and application systems. Both private and district systems rely on withdrawals from surface water sources because the Saskatchewan Watershed Authority (SWA) does not permit the use of groundwater for commercial irrigation.

Individually operated systems tend to be scattered intermittently along streams and adjacent to small reservoirs throughout much of the agricultural portion of the province, whereas district irrigation systems include groups of irrigators who share infrastructure within comparatively compact areas. Most of Saskatchewan’s district systems are all located within the Palliser Triangle. However, one of the largest districts, the South Saskatchewan River Irrigation District, straddles the boundary between the Palliser Triangle and the moister portion of the prairies. According to the Saskatchewan Irrigation Projects Association (SIPA) (2008), individual irrigation operations account for 72% (238,900 acres) of Saskatchewan’s irrigated acreage, while 28% (94,533 acres) is allocated to multiple user projects. There are approximately 632 producers participating in multiple user districts (SIPA 2008: iii, 36). The province’s largest irrigation districts are clustered in the vicinity of Lake Diefenbaker, which is their water source (See Map 4.1, Chapter 4).

In Alberta, by way of comparison, multiple user irrigation projects account for 95% of the province’s irrigated acres and only 5% of Alberta’s irrigated acres are irrigated by individuals outside of projects (SIPA 2008: 148). The emphasis on multiple user projects in Alberta has been credited with contributing to the concentration of irrigation development, which has in turn fostered considerable added value food processing and cattle feeding activity in the principle irrigation areas of the province. In Saskatchewan, the predominance of individually operated systems has been described as
an institutional weakness that is both a cause and effect of a slower and more erratic pace of irrigation development (Saskatchewan AgriVision Corporation 2004: 11-18; SIPA 2008: 148).

In southern Alberta, surface water is now considered fully allocated and the expansion of irrigation activity has essentially stalled. This is also the case in the southwest corner of Saskatchewan (RMs 111, 51 and 49), where local streams and reservoirs have been deemed fully allocated. Conversely, only 11% of the water available from Lake Diefenbaker has been allocated, suggesting there is ample opportunity to expand district irrigation in that area (OL3: 4).

10.2 Multiple irrigator districts

In Saskatchewan, multiple user irrigation district associations obtain a single water allocation license from the Saskatchewan Watershed Authority (SWA) on behalf of all participating irrigators. The South Saskatchewan River Irrigation District (SSRID), for example, has an annual allocation of 94,000 acre feet of water which it distributes to 95 farms. Project participants share the costs for the operation and maintenance of the water withdrawal and conveyance infrastructure that delivers water up to the boundary of each participant’s land. To apportion these expenses, participants are charged a fixed per connection fee plus a volumetric fee for the water they consume. The volumetric fee is based on the number of acres a participant irrigates. Once the water is delivered to their property lines, participants are typically responsible for their own water application and drainage systems. However, in districts employing border dike and back flood methods, district employees, referred to as ditch riders, control water application. Individual
irrigators operating outside of organized districts do not pay any fees for the water they consume.

Multiple user projects are governed by irrigation district association boards elected by participants. The operations of the district associations are nested within a regulatory framework administered by senior government agencies. For example, SWA, in consultation with SMA officials, is the authority which grants water allocations for irrigation. Similarly, if a water intake on Lake Diefenbaker is being built or reconfigured, the district is required to meet standards set by Fisheries and Oceans Canada (OL4: 11).

The governance structure is consistent with the nested arrangement which Ostrom (2008) ascribes to community-based CPR systems and Hooghe and Marks’ (2003) characterization of Type II systems.

SMA, determines whether a parcel of land is agronomically suited to irrigation, and SWA awards or denies allocations on the basis of SMA’s assessment. However, the district associations have some ability to decide whether or not they will accept new participants and can withhold water from previously accepted participants. For example, the delivery of water could be withheld if a participant failed to stay current on water delivery fees, or if a severe salinity problem had developed on a previously approved parcel of land (OL2: 7). Both SWA and the district associations have the authority to adjust allocation amounts annually in response to the availability of water. The province’s capacity to adjust allocations in response to low stream flows and reservoir levels was confirmed in 1984 when, in conjunction with the creation of SaskWater, the provincial government formally abandoned the principle of first in time, first in right water allocation in favour of a system that gave SaskWater (SWA after 2002) authority to
adjust allocations in response to changing hydrological conditions (SH7A: 1; OL2: 8). This means that should a water shortage arise in a particular watershed, SWA has the authority to determine how the shortfall is shared among user groups (e.g., irrigators, urban centres and industries) (SWA1: Para. 96-98). Under a first in time, first in right system water users with historical precedence could in theory be allowed their full allocation while other users might not receive any water, a particularly troubling prospect if one of the user groups happened to be an urban municipality. District associations are subject to allocation reductions imposed by SWA, but have the ability to determine water sharing arrangements within the district.

In both Saskatchewan and Alberta multiple user irrigation projects have traditionally been provided with financial support, as well as engineering and agronomic advice by senior governments. In this respect, nesting extends beyond regulatory authority to include support for project development, maintenance and improvement. The PFRA (AESB as of 2008) has played an important role in supporting the development of irrigation in both provinces, but provincial governments have also made significant contributions. Irrigation district officials interviewed for the RCAD project from both Alberta and Saskatchewan maintained that the contributions of the Alberta government have been far larger and delivered with greater consistency than has been the case in Saskatchewan. Furthermore, Saskatchewan irrigators have argued that inconsistent provincial government support, and a lack of assurance regarding the province’s long-term commitment to irrigation, have been barriers to irrigation development in the province.

[In Saskatchewan] …we kind of developed irrigation and then quit for a while and then we develop a bit more and then we quit. And there is no constant,
continuous development that people can see it is going to happen. Quite frankly if a government person said, “Yeah, we are going to develop this 100,000 acres over here,” people won’t believe it until the pipe is in [the ground] or the canal is in. We have got to develop ongoing development policy. (SIPA: Para.106-108).

The significance of inconsistent levels of government support for irrigation development in Saskatchewan was described by Saskatchewan AgriVision Corporation in its 2004 publication, Water Wealth: A Fifty Year Water Development Plan for Saskatchewan.

The financing of water development in Saskatchewan has been an intermittent process… These programs [government financial assistance programs] were often stopped at the change of governments and the financial continuity would disappear… This interrupted financing profile over time has become a significant disincentive for water investment by the private sector farmer and others. As programs would start to “lure” in farmers with the expectation of financial assistance, a few years later programs would be cancelled and the financing base for further investment would disappear. (Saskatchewan AgriVision Corp. 2004: 125)

Political considerations

Data provided by SIPA (2008) and Saskatchewan AgriVision (2004) suggests that, historically, irrigation projects were more likely to be launched by Liberal and Progressive Conservative governments than by CCF/NDP governments. However, completing the projects launched by liberals and conservatives often fell to CCF/NDP administrations following changes in government. The government spending record and the timing of expansions suggest that CCF/NDP governments have been somewhat less enthusiastic about expanding irrigation than the Progressive Conservatives (SIPA 2008: 4; Saskatchewan AgriVision 2002: 125). But, the correlations can be misleading. The RCAD interviews indicate that the lack of greater uptake of irrigation on the part of farmers following the completion of the Gardiner Dam probably had as much to do with
the reluctance of producers in the Lake Diefenbaker area to adopt irrigation as it did with reluctance on the part of the NDP to provide funding support in the 1970s (Suderman 1966; OL2).6 However, when comparing the levels of support for launching new projects on the part of the Progressive Conservatives in the 1980s with the NDP in the 1990s and 2000s, and the Saskatchewan Party government since 2007, the differences in commitment levels appear more pronounced. Figure 10.1 provided below illustrates the growth of Saskatchewan’s irrigated acreage from 1901 – 2005.

![Figure 10.1 Irrigation acreage expansion in Saskatchewan by decade](image)

Sources: Derived from SIPA (2008: 4); SIPA reports its figures were provided by SaskWater.

With the exception of the ill-fated SPUDCO venture, and modest support for the completion of the Luck Lake and Riverhurst irrigation projects, which were conceived and launched under the Progressive Conservative government led by Grant Devine, NDP governments did not provide significant support for new irrigation projects. In fact irrigation expansion in Saskatchewan under the Romanow and Calvert NDP governments fell to the lowest levels experienced since the 1950s (SIPA 2008: 4). As Argue (1999)
demonstrates, the fiscal conservatism of the NDP government in the 1990s resulted in significant cutbacks in funding support for rural services and agricultural support programs. An interview respondent who worked for SaskWater in the early 2000s referred to the direction of irrigation policy under the Romanow NDP as “a policy of unfunded irrigation development” (SW1A). This may be something of an overstatement given that the province spent several million dollars launching the SPUDCO project and several millions more settling accounts following its bankruptcy, for an estimated total of $30 million (SW3). Officials with two irrigator associations based in Outlook attribute SPUDCO’s collapse to inexperienced management, the gold-plated excesses in the design of the operation’s potato storage facilities, and overly optimistic marketing expectations (OL2, OL3). Despite SPUDCO’s tumultuous financial history the storage sheds built by the company have subsequently facilitated growth of a thriving seed potato industry in the Outlook area (OL2, OL3).

10.3 Private versus public source water

A few prominent voices from within Saskatchewan’s agricultural policy community have spoken favourably about the privatization of source water and the establishment of water markets in the province. In its 2004 publication, Water Wealth: A Fifty Year Water Development Plan for Saskatchewan, Saskatchewan AgriVision Corporation, an agricultural policy think tank, maintains that the lack of private tradeable water rights is standing in the way of optimal water management and the expansion of irrigation activity in Saskatchewan.7 Saskatchewan AgriVision (2004) describes the “success” of the Chilean model,” in making its case.

…the absence of pricing, timely information and a water rights system that are not tied to markets cannot create the conditions for efficient water use…Thus, as long
ago as 1980 and modified in 1988, Chile established secure, transferable water rights with the freedom to buy, sell or rent water. Experience with that process has given farmers greater flexibility to shift crops according to market demand. Efficiency in the provision of urban water and sewage has increased without any increase in prices. Water trading can have important efficiency effects in agriculture and on its value added chain. (Saskatchewan AgriVision Corp. 2004: 179-181)

The “success” of the Chilean model is presented apodictically, without supporting citations, as though the success of the 1981 Water Code was an accepted fact applauded by many. On the other hand, Galaz (2002) Bauer (2004), Budds (2010), and IACC (2009) provide evidence to the effect that Chile’s experiment with private water rights has been far less successful than its neoliberal promoters predicted. According to these assessments, the 1981 Water Code has resulted in the inequitable treatment of small rights holders and small communities (Galaz, 2002, Budds 2010); failed to encourage the anticipated increase in private sector investment in water infrastructure (Bauer 2004); and failed to provide the level of IWRM required to effectively manage conflicts between upstream and downstream users or to protect sensitive ecosystems (IACC 2009; Budds 2010).

While Saskatchewan AgriVision (2004) provides many observations and proposals that are supported by irrigators and agricultural development organizations in Saskatchewan, its recommendations with respect to private tradable water rights have not been embraced by the organizations representing irrigators or any of the irrigators interviewed for this thesis. The chair of the largest irrigation district association in the province (the South Saskatchewan River Irrigation District (SSRID), for example, said that while he generally supported market principles, his support did not extend to private ownership of source water.
… my own personal bias would be to say no to private ownership of source water. Water is such a valuable resource that it should be owned and controlled by the public, provided you give me some guarantees [with respect to an irrigation allocation] and let me go from there. But maybe that is the mentality I grew up with. I have been on credit union and cooperative boards where it is assumed the good of the public has to be primary. (OL2: 9)

The President of the Saskatchewan Irrigation Projects Association (SIPA), the industry development organization representing the province’s irrigators, reported that neither he nor SIPA supported Saskatchewan AgriVision’s position on the private ownership of water and water markets.

SIPA does not support that [private tradeable water rights] and I don’t know if we’ll ever want to go there. I don’t see the benefit. That’s not to say that at some point in the future we wouldn’t move in that direction. But, if there was a transferable water right that wasn’t tied to beneficial use on the land, it could result in people who don’t farm purchasing water rights for speculative purposes. I don’t see a value in having out of province speculators down east or in Calgary owning and potentially hoarding water. We are currently dealing with competition for land from out of province buyers. That’s driving up the price of land. Now, I suppose it depends on your situation, if you want to retire or get out of agriculture that might seem okay. But if you are currently farming and want to expand it is a problem. It is also a problem for a young person who wants to start farming. It seems that at least some of the people entering the farmland market are speculative buyers. They don’t seem to worry about the relationship between the price of land and the farmer’s ability to pay for it through production. People are paying more for land than what it can produce – its actual productive value. I don’t think we want to see a similar situation with water rights – to where wealthy investors who aren’t earning their living farming can buy water rights and price the average or smaller producer out of the market. (OL3A: 1, 2)

The case for private tradeable source water rights made by Saskatchewan AgriVision (2004: 11, 180-181) also draws support from the claim that Alberta has already been moving in that direction. There is an implication that given Alberta’s success in expanding irrigation and attracting added value business to irrigation areas, privatizing water is something that leading water managers are adopting. Academics, including Horbulyk (2007: 212-214) and Christensen and Lintner (2007: 223), have also
reported that the Alberta government amended its *Water Act* in 1999 to allow for the transfer of water rights outside of land title transfers. From the perspective of water activists opposed to the commodification of water (e.g., Maude Barlow) this might constitute a rather alarming development. However, based on this writer’s interviews with irrigators and irrigation management officials in Alberta, the extent and implications of water rights trading in Alberta may have been overstated by both privatization proponents and detractors. Respondents who are responsible for the management of irrigation water in southern Alberta reported that the relaxation of rules around water transfers allowed for a very limited practical response to severe drought from 2000 to 2002 by enabling irrigators within districts to shift water use between participants and from low value to high value crops (*TA1, TA2, TA3*).8

In Saskatchewan and Alberta the allocation of water for irrigation is tied to the beneficial use of that water on a specific parcel of land. In Saskatchewan, SWA typically transfers water allocations in conjunction with the transfer or sale of the irrigated land. However, the district associations have some authority over the status and distribution of those allocations. For example, an irrigator failing to stay current on association fees could be denied water. The association has the ability to reallocate a forfeited allocation provided it is applied to a parcel of land within the physical parameters of the district which the province’s ministry of agriculture has deemed to be suited to irrigation (*OL2*). Outside of these sorts of exceptional circumstances, water is not separated from the parcel of land to which the allocation applies.

The foregoing suggests that the control of water for irrigation in Saskatchewan is in large part a matter of land tenure. Trading in irrigated land can produce an effect
somewhat similar to what might occur if source water were privatized and traded in markets. A number of RCAD respondents expressed concern over the relaxation of legislation around the ownership of Saskatchewan farmland by non-residents. They held that wealthy absentee owners threatened the social character of town and country communities and presented a barrier to young people from Saskatchewan who wanted to enter agriculture. The comments that follow below were provided by an irrigator from southwest Saskatchewan.

I do believe in free enterprise too but there is one thing I don’t approve of and that is these Alberta guys coming in and buying up all our land and then buggering off and not coming back. I really don’t believe in that. [the Government of Saskatchewan eliminated restrictions on absentee Canadian ownership of Saskatchewan farmland in 2002] They are more or less speculating as opposed to ranching. They come in and buy up land at exorbitant prices and there is no way that the land will ever go back to a ranch kid or a rancher. There is only one guy that can afford to buy it and that is another guy of the same breed. It is impossible for the young guy starting out to compete for one thing and furthermore they are not our neighbours. I mean if a fire breaks out where are they? (Warren and Diaz 2012: 119)

10.4 Governance and equity

Some irrigation association officials from Saskatchewan expressed concern about the possible impact that new investment in irrigated farmland could have on the governance of their district associations and the sustainability of smaller production units. Irrigation district associations in Saskatchewan typically base decision making on equal votes per production unit regardless of the number of acres any unit has under irrigation. The one farm one vote system mirrors the voting structure traditionally employed by consumer and producer cooperatives and credit unions on the prairies (referred to as “the second Rochdale principle”). However, irrigators in some districts have been debating changes to voting rules that would alter the traditional cooperative governance model.
Basically for a husband and wife, if you signed a long-term water agreement you get two votes but if you are a big corporation it is basically one [vote for the] entity. We just went through this last fall at our last election, thinking okay now is this right? We were talking to [irrigation districts in] Alberta and they were saying if you have a husband and wife and they have two parcels then each has a vote versus if you are just a husband and wife and have one parcel then you only get one vote. We have not run into this yet but we are trying to pre-plan. Suppose one big corporation came in here … and thought well we own all this land, we should have 40 percent of the votes. (OL2: 10)

There is concern among current irrigators that abandoning the principle of equivalent voting status between production units in favour of an acreage based voting system could enable wealthy investors to squeeze out smaller producers. For example, the district associations have the ability to set volumetric water rates and assess levies for system upgrading and expansion. The worry is that if expensive upgrades are undertaken at the behest of larger participants, smaller producers may be unable to pay the resulting levies. And, if they fell into arrears they would be in danger of losing their water allocations, thus jeopardizing the survival of their farms. As smaller units fail or cease to irrigate, the larger operators would be in a position to acquire their land and/or allocations. Regardless of how reasonable these fears might be, they represent how some of the irrigators understand their situation. The comments presented below were provided by the chair of the SSRID.

We had a discussion this morning after our [SSRID board] meeting talking about the fact there is so much money sitting out there. I mean suppose somebody wants to come in and buy 10,000 acres. Well our irrigation district put the thinking hat on….We have to be prepared to attract somebody like that. On the other hand we also want to have the ability to protect smaller producers. If you want just one quarter section with a pivot we want to allow you to survive too. But if somebody comes in and buys most of our district up then floods our board with his representatives and they jack the price of our water up to $100.00 per acre -- well the little guy like me is a goner. $100.00 per acre to pay for water, well I’m out of here. There is that potential. They could get everybody out. They buy the land and they have control. It is an issue at Riverhurst and especially at Luck Lake. There is going to be a lot more land sold to people who are not going to live there… I
am glad that surfaced down there before it hit up here because we have a chance to prepare for it. I am hoping. (OL2: 9, 10)

Irrigators from the Lake Diefenbaker area are conflicted regarding the relative costs and benefits of attracting new irrigators to the area. While there is concern about threats to cooperative governance, there is at the same time a wide consensus around the idea that all producers would benefit if irrigation activity in the Lake Diefenbaker area were expanded. High density production of high value irrigated crops in Alberta has allowed for the development of a significant value-added processing industry, centred on the communities of Lethbridge and Taber where irrigation is most concentrated. Publications describing the potential for similar levels of activity in Saskatchewan have been produced by Saskatchewan AgriVision (2004) and SIPA (2008). The two volume publication A Time to Irrigate (SIPA 2008, SIPA 2008a) proposes that higher concentrations of irrigation production would attract value-added processors to the Lake Diefenbaker region. This would provide local markets for crops of higher value than those traditionally produced by the area’s irrigators. It would also provide additional employment opportunities and other associated economic spin-offs, benefiting the region’s town and country communities.

10.5 The case for cross subsidization

In both Saskatchewan and Alberta, irrigation district associations have relied heavily on senior governments to fund and construct core components of irrigation district infrastructure. In Saskatchewan, for example, the federal government paid for the Gardiner Dam and a significant portion of the cost for the main irrigation works which support the districts, main canals and water intake and pumping systems. In Alberta the districts enjoy long-term financial agreements with the province whereby 50% to 75% of
the cost of major system upgrades and expansion are covered by the province (TA2, TA3). However, beyond support for these major infrastructure components the district associations in both provinces are expected to cover their regular operations and maintenance costs.

While there is a volumetric component to the fees charged by the irrigation districts in Saskatchewan, they do not typically apply marginal full cost pricing principles to pay for infrastructure built in support of major expansion and upgrading projects. Historically, grant support was typically found to cover the cost of expansion projects, but since the early 1990s grants have rarely covered the full cost. The districts are therefore required to partly finance expansions by passing a portion of construction costs on to participants. And, contrary to the Bonbright principles and the precepts of market-based water governance, the system for apportioning costs employed by the districts typically involves cross subsidization.

Adding new irrigators to a district system in Saskatchewan is achieved by expanding infrastructure to service new areas which have not previously had access to irrigation, and by what is referred to as “infill.” Infill involves adding new irrigators whose land is located within the physical parameters of existing system infrastructure. If new participants can be supplied by an existing canal or pipeline (as in an infill connection) there is no major added expense to the association and therefore no need to charge the new producers fees that differ from the existing fee structure. However, when a major system expansion requiring new project infrastructure requires the association to pick up all or a portion of the cost, the association has to determine how those costs will be apportioned among participants. Under Bonbright’s (1961) marginal full cost recovery
model, the district would be expected to pass the costs of a system upgrade or expansion on to each of the producers who benefit from the expansion in proportion to the costs incurred to provide each of them with service. Notwithstanding Bonbright’s utility management maxims, the districts only rarely employ full marginal cost pricing in association with infill and expansion projects.

To illustrate why the full marginal cost system is typically not employed, imagine a system expansion which extends a pre-existing pipeline or canal several miles to service several new producer connections. Let us further assume that those new connections are located at irregular distances along the line extension. One can reasonably assume that the cost of extending service to a new connection located close to the pre-existing pipeline or canal, or to a cluster of other new connectors, will be less than the cost of extending services further out to an isolated connector. The association will incur higher costs extending service to a distal new connector located miles from the nearest connection than to a proximal connector located close to the nearest connection. Under the full marginal cost recovery model, distal connectors would be expected to pay a higher portion of construction costs than proximal connectors. In addition to the construction costs, the new irrigators would also be required to pay any additional energy costs required to convey the water the extra distance to each new connection. But, as noted above, this is not what the district associations typically do.

District officials with experience in organizing expansion projects and launching new projects contend that if the full marginal cost principle is employed it can discourage those producers furthest out from participating in a proposed expansion (OL2, OL4). Indeed, prospective participants located some distance from the pre-existing line might
decide to wait while the system expands incrementally over time and eventually arrives closer to their property. Districts officials are aware of these objections to participation and have to weigh them against their knowledge that without having a critical mass of new connections lined up prior to the project launch the expansion might not be feasible. This is in part because it is assumed a certain number of participants will be required to effectively support long-term operations and maintenance on the expansion project. If the charges for distant connectors are perceived to be excessive by prospective participants they will be less likely to sign onto the project. With fewer connections over which to spread both expansion project and longer-term operations costs, the per connector costs can become unattractive to connectors close in as well as connectors located further away. And, no less important, experience has demonstrated that grant programs can have short life spans. Grant support available today could be gone tomorrow. There is therefore some urgency in getting as many prospective participants onside as possible early on in the process.

The solution that the districts typically adopt is to share the total costs of the expansion project equally among all new connectors regardless of each connector’s location along the extended supply line. Similarly, the cost of conveying water to new participants is equalized among all district participants. It may, indeed, be the case that connectors located closest to the pre-existing line are subsidizing those further out, but without a cost sharing compromise the project might not proceed at all. In practice, the benefit of obtaining access to irrigation supersedes concerns that some connectors may be paying less than their full share of the cost burden. The chair of the SSRID described the rationale that supports his district’s cost sharing methodology.
To this point everybody is charged the same whether they are five miles out or whatever. So we look at the delivery points and try to have delivery points at the edge of each field. So if they are even three or four miles away from the main canal there should be a delivery point at this stage right near by. We are just having our first pressurized pumping system [installed] … in our district and we hope to have the first couple of pivots up and going this year. They [the new participants] will each be charged a different rate [from pre-existing customers] because they are getting access to a pressurized system so other than that all our irrigators pay the same rate. Currently everybody pays a basic fee and then you pay for how much water you use. So if you use a lot more water then you pay more of a water usage fee. … there is a sense that if you are going to expand the system and the first person willing to hook up happens to be the person furthest down the road, and if he had to carry all the freight himself, it would be excessive and he would never participate. Therefore you have to equalize charges in order to get participation. If we are going to charge those guys at the far end what it costs to get it there it wouldn’t happen but we got funding for this [the most recent expansion]. If we didn’t have funding that wouldn’t happen. …We are discussing these things right now because it is not an easy topic and it is not black and white because if someone comes in and wants water and we have to put in two miles of pipeline, somebody has got to pay for it. If the farmer is willing to pay a good chunk, okay. But if he expects the district to put in two miles of pipeline for one pivot, it is not going to happen. If the provincial government steps in and funds most of it well then it could probably happen or a combination of all three. But the more acres we get the more we can spread our fixed costs across. So when we get more acres, we can develop more acres and maybe in two years we can put in that two miles of pipeline. But it is a balancing act. So our stance is we are talking and are trying to [adjust] … our agreements including the idea that if somebody hooks on one, two, three years later, the first person who was furthest away gets prorated. (OL2: 7)

It is worth noting that none of the scenarios the SSRID has been considering involve the charging of higher volumetric conveyance fees to new irrigators for conventional canal system delivery. And while those connecting to its new pressurized pipeline will pay more than those connected to the canal system, the volumetric conveyance charges for each producer on the pipeline will be at the same rate. It may be the case that additional fees for construction of expansion related infrastructure will be charged to new customers in the future, but the delivery or conveyance rates would remain the same for everyone in the system.
The foregoing discussion about private water rights and the apportionment of expansion and infill costs demonstrates that in actual practice Saskatchewan’s irrigation district associations employ a mix of market-based instruments and cooperative community-based principles to manage water. In the case of Saskatchewan’s irrigation district associations, social factors have influenced the rejection of market-based principles in certain contexts. Similarly, the hydrological conditions that obtain in a given watershed can influence the degree to which soft path versus demand-based management practices are adopted.

10.6 Context and conservation

Fifteen of Saskatchewan’s twenty-four irrigation projects are located in the southwest of the province within what the provincial ministry of agriculture refers to as the Southwest (irrigation) Development Area (SWDA). All of the irrigation districts in the SWDA are supplied by small streams that originate in the Palliser Triangle portions of Saskatchewan and Alberta. Seven of these projects are supplied by streams that flow across the international boundary into Montana. The streams supplying five of the districts in the SWDA flow entirely within internal drainage basins and terminate in alkaline lakes that have no outlet. And, two of the SWDA projects are supplied by Swift Current Creek, which flows into the South Saskatchewan River. As noted in Chapter 5 of this thesis these streams and associated lakes and reservoirs are vulnerable to the dry conditions and periodic droughts typical of the Palliser Triangle. The South Saskatchewan River, on the other hand, is supplied by streams originating in the foothills of the Rockies, a less drought prone region.
Most of the irrigation projects in the SWDA rely on gravity flood or back flood irrigation. Flood systems have been criticized as wasteful in water governance literature and have been blamed for contributing to global freshwater water scarcity (de Villiers 2003, Postel 1999). The flood systems in the SWDA have been subject to similar criticism. Adding to concern over water wasting is the fact many of the projects are located on soils that are not optimally suited to irrigation. Indeed, yield figures for irrigated hay production on these projects is generally half that of yields obtained on irrigated land in the Lake Diefenbaker area where better soil conditions exist, water supplies are more secure, water is available throughout the growing season and applied with sprinkler pivots (MC22, SH11, OL1, OL2).

Notwithstanding these criticisms, ranchers in the SWDA depend heavily on irrigation to grow feed for overwintering cattle in the area. The chair of the Eastend Irrigation District Board described the importance of irrigation in providing affordable feed in parts of southwest Saskatchewan.

Irrigation is critical to the success of a lot of ranching operations in this area. If we couldn’t grow the feed here, livestock producers would have to go somewhere else to get it. Tell a rancher that from now on he has to truck hay in for $120 a tonne. How long is he going to be feeding his cows? How long can he survive in the cattle business with that kind of annual overhead? (Warren and Diaz 2012: 330)

The criticism over waste is especially troubling at present because the long-term viability of some irrigation projects in the SWDA is being questioned. The PFRA operates seven of the projects, but plans to give up its irrigation responsibilities by 2017. Functions formerly performed by the PFRA will effectively be offloaded onto project participants. In the absence of the PFRA’s involvement, irrigators and provincial
government water managers are uncertain as to whether the projects can remain viable. The irrigators are concerned that negative assumptions about the ecological costs and low yield conditions associated with the projects could frustrate their efforts to sustain irrigation in the area. In defense of their operations, they offer their own ecological argument. The chair of the Eastend district board made the following comments.

There are people who criticize flood irrigation and argue that we should all have to go to pivots so we don’t use as much water. They claim we are on poor land and we are inefficient water users. The criticism comes from all directions, including from the PFRA and SaskWater [SWA]… As far as I’m concerned, pivots are impossible here. Maybe it would be easier or cheaper for the PFRA or SaskWater [SWA], but the cost to the farmer would be horrendous. These irrigation plots were developed in the days before anyone knew what a pivot was. The size and shape of the plots would make changing to pivot systems a challenge. If they decided to assemble a new project on better land, we’d have to lift the water out of the valley and then pump it to the pivots. The pumping cost would be just phenomenal. We get told we’re very unproductive, but no one has come up with a solution for how to increase our production in a cost-effective way… Right now, our project works off gravity. Mother Nature’s doing all the work. So I wonder if they take that into account when they say flood irrigation isn’t environmentally friendly. If we went to pivots we’d be using a whole lot of energy and that leaves a footprint too. Currently, the energy footprint for this system is about zero. I think that’s a reasonable trade-off; we might be using more water than we would with pivots, but we’re not consuming any electricity… And if we don’t use it [the water], it’s going to go to the Americans. They’re going to use it if we can’t use it here. (Warren and Diaz 2012: 327)

Another facet of the argument made in support of sustaining the irrigation districts in the SWDA involves the fact that the waters in those streams which flow into Montana are apportioned on a 50-50 basis. Saskatchewan irrigators and other users (two urban centres make use of reservoirs on these streams) are allowed to make use of 50% of the water that is contributed to stream flows in Canada. If the irrigation projects utilizing trans-boundary streams are abandoned, much of the unused water would flow to the US. The higher stream flows that would result may indeed contribute to the health of in-stream and riparian ecosystems on the Canadian side of the border. However,
conservation in Canada would not necessarily be matched by conservation in the US.

Sending more water to the US than is required by treaty is troubling to agricultural producers who have been dealing with drought and dry conditions for generations.

Additionally frustrating is the fact that the dams, reservoirs and irrigation works currently in place would not be applied to economically beneficial purposes.

Irrigation district officials in the Lake Diefenbaker area are somewhat troubled by arguments made by proponents of soft path approaches to water management in opposition to the large dams and water infrastructure projects associated with irrigation. SIPA supports the Saskatchewan AgriVision Corporation’s (2004) view that significant new investment should be made in irrigation infrastructure including the construction of additional dams and reservoirs. Widespread public concern about impending water shortages, whether real or imagined, could present political problems for advocates of expanded irrigation development in Saskatchewan. The expansion of irrigation involving the construction of additional dams and reservoirs, has been opposed by one of the province’s prominent environmental lobby groups, the Saskatchewan Environmental Society (SES). An SES representative interviewed for the IACC project stressed the organization’s preference for a soft path approach to water management.

We are trying to move people away from supply side solutions and away from supply side adaptations to climate change and toward demand side conservation and efficiency…We are trying to bring to bear a critical mass of progressive thinking on water policies to try and shift the discussion [away] from what AgriVision would have us do – dam every river, to something that is a little more sustainable. (SES1: 8-12)

Advocates of irrigation expansion maintain that major water sources such as the South and North Saskatchewan Rivers and the Lake Diefenbaker reservoir are capable of
supplying over 500,000 additional acres of irrigation without compromising the availability of water for other uses, urban, industrial or ecological. SIPA’s president, for example, is confident that the increased water withdrawals from Lake Diefenbaker could be accommodated even in the event of severe multi-year drought.

We have always been able to get all the water we needed when we needed it [for the projects supplied by Lake Diefenbaker] …there is never a shortage even in the driest drought you can imagine. There will never be a water shortage out of Lake Diefenbaker for any use whether it is cities, towns, industry or even future irrigation. The predictions are that in the driest year, the most severe drought you can imagine, you could still support 500-600 thousand more acres of irrigation out of Diefenbaker and still not be short of water in the towns or cities like Saskatoon or for industry. There have been discussions about increasing the water supply to the Regina and Moose Jaw industrial corridor plus irrigation this way [to the west of Outlook]… [It] would be no problem at all in the driest years supplying everyone with water and still not using the allocation we are allotted out of the South Saskatchewan system. (OL3: 2,3)

10.7 Offloading

As noted above, the long-term survival of a number of the irrigation projects in the SWDA is uncertain given that the PFRA has announced that effective 2017 it is giving up responsibility for the seven projects it currently manages. The PFRA was heavily involved in the development of many of the multiple user irrigation projects in Saskatchewan. However, following the initial phases of construction and development, management responsibility was typically turned over to the province and producer run district associations. The fact that the PFRA continued to manage several projects in the SWDA up to the present is therefore something of an anomaly. No less anomalous is the province’s apparent reluctance to facilitate the continued operation of the projects following the PFRA’s departure. Four years after the PFRA announced its plans to cease managing the projects, SWA had not yet indicated whether it will provide the district
associations with financial support or the water it currently allocates to the PFRA (Warren and Diaz 2012: 324). The chair of the Eastend Irrigation District Board expressed producers’ frustration with SWA.

Right now, we pay the PFRA for supplying us with water. They have an allocation from the Saskatchewan Watershed Authority, and then supply the water to us. That is actually one of the issues we’re currently dealing with. We want to know whether or not we will get the allocation when we take over the system. We’ve been asking the question, and no one is giving us a definitive answer. We’re asking for a water license just to guarantee us that we have an allocation of what water is available. We’ve been asking the Watershed Authority to clarify our position and they haven’t done it. Maybe they don’t know how to do it, I don’t know. The PFRA is supposed to be negotiating that for us as well. (Warren and Diaz 2012: 273)

No less troubling for irrigators has been the rather persistent lack of sufficient streams flows to facilitate optimal irrigation. From 1979 until 2010, low snow accumulations in the Cypress Hills have reduced the amount of water available for irrigation. Over that thirty year period producers on some projects have not been able to flood their land twice annually which would allow for the production of two cuts of hay. Prior to 1979 stream flows were generally higher and two cuts of hay were the norm. In particularly dry years during the 1979 to 2010 period producers were not able to do any irrigating. The inability to irrigate has resulted in financial hardship for affected producers who have been simultaneously affected by rising input costs and low commodity prices, particularly in relation to the 2003-2007 BSE crisis. An RCAD respondent whose family has an irrigation allotment on the Vidora project, described the importance of reliable irrigation to the sustainability of her family’s ranching enterprise.

When Cecil and I were first married, we used to get two full irrigations. And we’ve been married since 1977. Now we’re lucky if we get to irrigate half our land once a year. Last year we had no irrigation at all and we had just a single half-irrigation during each of the four years prior to that. The problem is there’s
just been no water. Cypress Lake was drained down to where we couldn’t pump from it last year. It used to have a lot of water but the weather has become drier and the lake doesn’t provide adequate storage, because it is so shallow. There has been less snow and less run off – we haven’t had two full irrigations since 1979… So the end result of reduced irrigation is that we’ve been buying feed. And we’re pretty well at the end of our rope with that option. You can’t sustain a cow-calf and backgrounding operation down here if you are buying feed. The prices you pay for the feed and having it hauled don’t match what you get at the market for your cattle. We probably spent $30,000 on feed last year. If there was any profit to be made with the cattle, that pretty well used it up. And we’re not alone. I mean, everybody who counts on irrigation down here is using every strategy they can think of to make ends meet. They’re trying to get the banks to increase their operating loans – just to try and get through to next year. We have suffered from that next year syndrome around here for years now. (Warren and Diaz 2012: 119)

The producers on the PFRA projects are in the process of determining whether they can afford to manage the projects effectively over the long-term without financial support from senior government. And clearly, without an allocation from SWA, the projects are not viable. On the other hand, irrigators on the PFRA projects south of the Cypress Hills believe that three new dams projects that have already been planned by PFRA engineers could alleviate the water shortage problems they have had to contend with over recent decades. The producers maintain that due to tough economic times in agriculture exacerbated by restricted irrigation they have not been able to accumulate the capital required to finance these projects without contributions from senior government.

Another infrastructure challenge for irrigators on the Maple Creek project is that in the 2010 flood one of the PFRA weirs supplying water to the Maple Creek flats portion of the project washed out. As of June 2013, this weir had not be replaced. Higher than average precipitation in 2011, 2012 and 2013 has allowed producers on the flats to produce feed using dryland methods. However, without repairs being made to the weir, irrigation cannot occur on the flats. Federal ministry of agriculture officials have not yet committed to repairing the weir. The irrigators have offered to hire a local contractor to
replace the weir. Federal officials have refused this offer, apparently over worries that the local contractor will not be able to meet the engineering standards expected by the government.

Irrigators in the SWDA have also argued that improved management of both infrastructure and better watershed wide management and sharing of stream flows could facilitate more reliable irrigation. A number of RCAD respondents held that managers from the PFRA and SWA do not always effectively coordinate the capture of run off from the Cypress Hills in local reservoirs. They also held that water releases from reservoirs to meet the needs of both irrigators and treaty obligations could be better coordinated (MC4, MC22, SH11). Some respondents also argued that water was not shared fairly on some watersheds. For example, during drought years, some irrigators on the Frenchman River faced no water rationing while others received no water at all. In addition, it was alleged that some individuals in the Val Marie area were allowed to irrigate without allocations and without paying any fees (Warren and Diaz 2012: 135-137).

Rather than abandoning the projects in response to drought and the PFRA’s departure, the irrigators take the position that enhancing infrastructure combined with more effective management of the watershed could ensure the long-term viability of the projects. The irrigators find themselves caught in a negative feedback loop, a classic Catch-22 situation. They require capital to enhance the reliability of the irrigation projects, but lack capital, in part, because unreliable irrigation has reduced their incomes and cash reserves. Without direct government support through grants or long-term
financing arrangements, combined with allocation guarantees, it is unlikely that the necessary improvements can be made.

10.8 Water sharing in the SWDA

Irrigators in the SWDA have had to frequently deal with water shortages. Under a hypothetical market-based water governance model that allowed for the trading of water rights, one would assume that in those years when water has been in short supply on the projects in the SWDA, any water available would be consumed by those willing to pay the most for it. This could conceivably be managed through an auction system, or as was the case in southern Alberta in 2001, by informal neighbour to neighbour trading. Actually, it is not entirely clear whether Saskatchewan’s water governance framework specifically prohibits a district association from adopting this sort of arrangement.

Nonetheless, this is not what irrigators facing water shortages in the SWDA have chosen to do. When water is rationed due to low run off and low reservoir levels, producers attempt to share the decrease evenly. For example, if there is only enough water available to flood 1/3 of the acreage on a project, each project participant is provided water to irrigate 1/3 of their normally irrigated acreage. In 2010, when it appeared that the physical limitations of the infrastructure on the Consul project would not permit equal sharing of the available water, a lottery system was developed. Under the lottery those drawn in the first round would be allowed to irrigate a portion of their acreage. If additional water became available, perhaps due to heavy spring rains, only those not drawn in the first round would be eligible for the second draw and so on (MC14, MC22A).
The research findings described support the proposition that there is a cultural preference for the sharing of resources in the SWDA, as opposed to allowing market forces to determine who is eligible for water. Ranchers in the southwest, many of whom irrigate, have a strong sense of community solidarity built around important labour sharing institutions and the need to rely on neighbours during emergencies such as fires or floods. Relationships with neighbours are highly valued, especially in the face of declining rural population. As neighbours become fewer, the value of those who remain in the region is enhanced. For some residents of the area, interest in seeing one’s neighbours survive in agriculture tends to trump the personal benefit one might gain from outbidding a neighbour for water and threatening the viability of her or his ranch. A rancher from the Maple Creek area described the importance of supporting neighbours. His comments suggest that within the social context of southwest Saskatchewan’s ranching community certain features of market-based water governance are currently untenable.

There is a strong sense of community. People work together here and there is a bond among neighbours. Sometimes all you’ve got is your neighbours. We all work together and help each other brand and wean calves. If there is trouble all you’ve got to do is pick up the phone. They’re all great and they’re all there to do whatever to help you in a jam. When it comes to being out of water we help each other out if we can. I had a neighbour to the west who was very worried one summer because he had a field adjoining this place that had run out of water. He was trying to make improvements to a spring but until they were done he couldn’t use that field unless he hauled water. I told him, “don’t give up on that field – get a pump and take water out of that slough of mine to tide you over.” You can’t leave a guy stuck like that when you can help him. You just wouldn’t do it. We’re all there for each other all the time. None of us are perfect neighbours. We’re just people and sometimes we have our little arguments, but it’s not like you wouldn’t help a guy out just because you’d argued with him. Getting along with your neighbours is more important than anything else you might do to survive in this country. These neighbours are important and your relationship with them lasts generations. (Warren and Diaz 2012: 110, 111)
10.9 Costs and benefits

The predicament of producers on the PFRA projects in the SWDA has prompted questions about the level of financial support, if any, that irrigators should reasonably expect from government. Clearly, the subsidization of water users, whether they are urban residents or farmers, runs contrary to the precepts of market-based water governance and market environmentalism. Nonetheless, the subsidization of irrigation infrastructure costs by government has been a decades long practice on the Canadian prairies. Large projects, such as the Gardiner Dam and Lake Diefenbaker, were totally financed by senior government. Construction costs were considered sunk costs and governments did not attempt to recoup them through fees charged to irrigators. Indeed, not all the costs were incurred solely for the benefit of irrigation, many of the dams and reservoirs built in support of irrigation have also provided water for town and country communities and cities such as Regina and Moose Jaw.

The case in support of government subsidization of irrigation infrastructure has rested primarily on the purported economic and social benefits of irrigation agriculture and the need to sustain agricultural production and community water supplies during droughts. The central rationale in support of expanded irrigation provided by Saskatchewan AgriVision (2004) and SIPA (2008, 2008a) is that the money invested by government in infrastructure construction will produce direct and indirect economic benefits that far surpass the amounts invested. The resulting increase in economic activity is anticipated to return more to the governments in new tax revenues than was spent on infrastructure. SIPA (2008: 109) estimates that a $2.9 billion investment in irrigation infrastructure in the Lake Diefenbaker area staged over the next 30 years would allow for another 500,000 acres of land to be irrigated and generate $60 billion in economic
activity within a 40 year period. SIPA estimates that increased primary agricultural production would produce a direct benefit-cost ratio of 4:1. A benefit-cost ratio of 14:1 is realized when the benefits of a fully diversified agricultural economy are included in the calculation (SIPA 2008a: ii).

A somewhat less encouraging assessment of the costs of irrigation infrastructure and the resulting economic benefits for irrigation in the SWDA is provided by Kulshreshtha (1991). According to Kulshreshtha (1991) the benefits derived from government investments in irrigation infrastructure in the SWDA have not matched costs. Kulshreshtha (1991: I, ii) reports a benefit-cost ratio of 0.72 for irrigated alfalfa production on PFRA projects in the SWDA. When the benefits for irrigation are combined with the benefits that PFRA infrastructure provides for municipal water consumption and recreation the ratio is 0.85 (NPV of $-96.9 million) (Kulshreshtha 1991: ii). However, Kulshreshtha (1991: i) also reports that irrigation is critical to the sustainability of many cow-calf ranching operations in the region. And, Kulshreshtha (1991) does not assess the possibility that greater economic benefits might arise if the region’s infrastructure and water management were improved. For example, if the three dam and reservoir projects planned by the PFRA in the 1980s were to go ahead.

When assessing the value of continued government support for irrigation in parts of the SWDA, such as RM# 51, policy makers will confront the prospect that the loss of irrigation in the region could exacerbate depopulation in an area where the limits of resilience for the few small urban communities that remain is being challenged and the survival of family agriculture is already precarious. The comment provided below is
representative of the position of many of the RCAD respondents from the southwest corner of the province.

Without irrigation many of us would simply not be able to survive as cow-calf ranchers. Maybe we could survive by switching to straight grazing operations. Sell off our cows and run calves raised by someone else on our land as yearlings – but that would involve a big reduction in a rancher’s income. Irrigation is one of the few things that has kept Consul [the only remaining village in RM #51] going… I don’t know how they expect us to survive down here. There aren’t that many of us left and if we can’t irrigate there will be even fewer of us. (MC26: I)

10.10 The implications of climate change

The uncertainty surrounding the effects of climate change on irrigation in Saskatchewan may influence the decisions of some senior policy makers with respect to making large public investments in irrigation infrastructure. It may prove difficult for risk-averse policy makers to invest in irrigation infrastructure destined to periodically run dry in the decades ahead. On the other hand, some observers, including SIPA’s leadership, contend that “doubling down” on irrigation by enhancing infrastructure assets, Saskatchewan producers and the communities that rely on irrigation infrastructure for their water supplies will be well-positioned to withstand drought in the 21st century. For an imaginative optimist there are grounds for hope that even the dry southwest may be able to support irrigation, provided some of the management and infrastructure changes noted above are undertaken.

That being said, there is evidence from the paleo-climatic record which suggests that the droughts experienced on the Canadian Prairies over the past century were less severe and of shorter duration than many of those experienced over the past 1,000 years. How past climate patterns will be influenced by the changes predicted in response to anthropogenic global warming remains unclear. But if the past is any indication of what
we can expect in the future, serious surface water shortage could occur. SIPA’s president concedes that if we experienced a mega-drought equivalent in severity and duration to some of those described by the paleo-climatic record both dryland and irrigation agriculture could be untenable (Warren and Diaz 2012: 317).

The recommendations provided in RCAD (2012: 50, 51) state that without additional regionalized climate research and preparedness planning Saskatchewan may not be well placed to contend with the climate challenges presented over coming decades. That conclusion extends to the province’s capacity to sustain irrigation agriculture in a changing climate.

10.11 Conclusions

The governance and management of irrigation districts in Saskatchewan involves a hybrid mix of paradigmatic forms, but it is most consistent with function based Type II systems and community-based systems. Irrigation district governance incorporates community values, including a preference for cooperative governance, the sharing (cross subsidization) of expansion costs, and the equitable sharing of water use reductions. At the same time, the districts employ volumetric pricing for the water each of their members consumes, a feature of the district systems which is consistent with the market-based paradigm. However, district irrigators reject the market-based water governance maxims of private property rights in water and the trading of water in markets.

The districts remain heavily reliant on the support of senior governments for the financing of infrastructure projects. The challenges presented by the offloading of the PFRA’s responsibilities for irrigation in the SWDA underlines that dependency. In the absence of ongoing support from senior government it is unclear whether many of the
systems in the southwest corner of the province are sustainable. Irrigation offers promise for coping with future droughts. It also offers opportunities through more intensive production and growth in value adding activity to enhance the sustainability of farm production units and their neighbouring town and country communities. It is unlikely that those benefits can be fully realized without a change in policy direction on the part of senior governments.

Chapter 10 Notes

1) The figures provided by the author for district and private irrigation were derived from Saskatchewan AgriVision (2004), SIPA (2008, 2008a), figures provided via email October 1, 2012 by Melanie Nadeau with the Irrigation Branch of the Saskatchewan Ministry of Agriculture and an email provided on October 4, 2012 by Andrew Thornton with the Saskatchewan Watershed Authority. The author cautions that the figure for total private irrigators is an approximation. This is because SWA has not conducted follow-up monitoring of private allocations. An allocation made two decades ago, for example, may have been abandoned – the irrigator may have ceased irrigating, but SWA has no systematic process for determining the ongoing status of a private allocation (SH7A). An exception was noted in relation to irrigators who rely on flows on streams that cross the international boundary with the US. Private irrigators on those streams are required to provide SWA with annual use reports (MC18.1A).

2) Respondents involved with the Taber Irrigation District in Alberta indicated that some expansion has been occurring as a result of employing water saving technologies which enable producers to irrigate more land with less water (TA1, TA3).

3) District associations were only recently established (2009) on the seven PFRA managed projects, in conjunction with the PFRA’s decision to abandon its irrigation responsibilities by 2017. However, the majority of district systems (commonly described as provincial systems) in the Lake Diefenbaker area and in the SWDA have had district associations in operation for decades.

4) As was noted in Chapter 7, there is no formal process or plan in place to determine how scarce water might be shared among contending use groups. The Chair of the South Saskatchewan River Irrigation District (SSRID) assumes that irrigators have a first in time right to water in Lake Diefenbaker (OL3). According to SWA officials this is not reflected in the 1984 legislation which gives the Minister the final say. If a major shortage were to occur SWA officials report that the assumption they would operate under would grant priority to non-discretionary human needs (SWA1: Para. 96-98). How other needs, such as irrigation, hydroelectric power generation, industrial uses, recreation and environmental needs might be prioritized remains somewhat unclear.

5) SIPA (2008a: 116) and interview respondents TA1, TA2, TA3, OL2, OL3 report that the Province of Alberta provides the districts with long-term financial commitments of ten or more years that include up to 75% of the funding for infrastructure enhancements and renewal.

6) Following the completion of the Gardiner Dam in 1969 the Liberal government led by Premier Ross Thatcher indicated it would impose a water tax that would apply to any parcel of land deemed suited to irrigation (Suderman 1966). Farmers who did not want to irrigate opposed the tax. The Blakeney NDP government that succeeded Thatcher in 1971 abandoned the water tax idea. The reluctance to irrigate among some farmers was in part due to the fact the Lake Diefenbaker area lies on the northern margin of the Palliser Triangle where it is possible to achieve respectable dryland crop yields without irrigation most
years – unlike the drier southwest where yields are consistently lower. The lower than anticipated uptake of irrigation on the part of farmers in the Lake Diefenbaker area in the 1970s is famously illustrated by the fact that a major supply canal constructed on the west side of Lake Diefenbaker has never been put into operation because so few farmers on the west side were interested in irrigation.

7) Saskatchewan AgriVision Corporation, which ceased operations in 2008, was not without influence in the province. Its President, Dr. Red Williams, is a well-known farm broadcaster, professor emeritus of animal science at the University of Saskatchewan and a former federal Liberal Party candidate. Graham Parsons, the principal author of Water Wealth, A Fifty Year Water Development Plan for Saskatchewan is well-known in conservative circles in Saskatchewan, having served as Deputy Minister for Privatization in the 1980s for the Progressive Conservative government led by Grant Devine.

8) Respondent TA3, a member of the Alberta Irrigation Council, indicated that urban expansion was putting pressure on water supplies in the province. He reported that since the legislation was changed in 1999, there have been instances when individual allocations had been purchased to accommodate growth in urban consumption. He described an instance in which a developer wishing to build a shopping complex just south of Calgary purchased the allocation of a farmer (with an individual allocation) who was at the time hoping to retire. It is expected that the demand for more allocation transfers from agriculture to urban and industrial development will increase in southern Alberta. This is the result of the fully allocated status of surface waters in the region combined with the growth of urban centres such as Calgary and its satellite communities. While transfers may occur with greater frequency in the future, under the 1999 legislation they remain tied to the beneficial use principle. This means that any water transferred must be used for a socially beneficial purpose such as irrigation, residential, industrial or ecological use – not held for speculative purposes. Furthermore, no irrigation water transfers can occur without authorization of the district associations (except in the case of individual allocations) and the regulator – Alberta Environment (Saskatchewan AgriVision Corporation (2004: 11). The irrigation districts are likely to prove reluctant to sell portions of their allocations in support of urban growth, principally because it is widely recognized that the high density of irrigation in southern Alberta is required to sustain the region’s value adding industries.
CHAPTER 11: Regional systems and private water

11.1 Introduction

A significant number of people in the Saskatchewan portion of the Palliser Triangle have their water needs met outside of conventional municipal systems. This population includes urban communities that participate in regional pipeline systems, groups of farmers who belong to rural water pipeline associations, and, individual households (primarily farm families) which rely on their own privately operated systems. This chapter describes regional and private water systems and the characteristics of the governance models that apply to them. The chapter describes the levels of support that senior governments provide to these non-conventional systems. It also proposes that despite regulations and assumptions to the contrary, water is being bought and sold in Saskatchewan.

11.2 Regional systems and rural water pipelines

Regional systems

Given the erratic distribution and quality of surface and groundwater resources in southern Saskatchewan, it is not surprising that over the course of the past century many of the province’s urban communities have developed water sources located some distance beyond their corporate boundaries. Currently, there are 45 cities, towns and villages, accounting for approximately 238,571 urban residents, that obtain their water via pipelines supplied by sources located well beyond their corporate limits. In many instances the pipelines supplying these urban centres have been incorporated into regional water supply systems servicing multiple communities along with neighbouring farms and businesses. These regional systems typically rely on water that is withdrawn
from a suitable source and treated at a single shared treatment plant and then distributed
via pipeline to end users, although there are some systems that supply only raw untreated
water. Through these systems communities lacking suitable local water sources gain
access to higher quality water. Not surprisingly, economies of scale and various
efficiencies can be realized when a group of communities and farmers share withdrawal,
treatment and delivery infrastructure.

Some regional systems date back to at least the 1960s when the EK (Eston-
Kindersley) pipeline was built. The evolution of the EK system from a pipeline originally
envisioned to supply two town and country communities into a system which supports a
regional pipeline network reflects a pattern that has been repeated in a number of regions
in the province. In the case of the EK line, the two urban centres involved were seeking a
source of raw water that was more reliable and amenable to treatment than the surface
and groundwater in their immediate vicinity (KD4A, KD4B, KD6, KD6A, KD40, KD42).
The pipeline brings raw water from the South Saskatchewan River to each community’s
treatment plant. Area farmers and ranchers who lacked reliable and/or palatable source
water took advantage of the fact a water pipeline was passing through their
neighbourhood and connected to it. Over the next few decades, spur lines (referred to as
laterals) servicing multiple farmsteads and a few small villages were connected to the
urban water treatment plants supplied by the main EK line. Participants in these lateral
systems formed associations to share construction, operation and maintenance costs.

The succession of widespread droughts in the 1980s put water systems in the
southern part of the Saskatchewan under stress, encouraging a number of town and
country communities, farmers, ranchers and acreage residents to construct pipelines
connected to more reliable sources. The creation of SaskWater in 1984 facilitated the development of some of these systems. By 2001 SaskWater was providing water to 42 regional water networks (see Table 6.2). The pipeline systems supplied by SaskWater ranged from small projects involving a few farmers to large regional networks supplying large towns and small cities. The Melfort and Humboldt regional systems are the two largest SaskWater networks, together providing water to over 10,000 people.

Widespread drought in 2001 and 2002, combined with the new water quality standards established under the Safe Drinking Water Strategy (SDWS), encouraged more town and country communities to consider constructing pipelines to new water sources. SaskWater estimated that in 2002 approximately 40 communities were facing possible water shortages due to drought (SaskWater 2002: 7). Assiniboia, Gravelbourg, Duck Lake and Maidstone developed new wells or surface water sources that required the construction of pipelines in response to new regulations and drought after 2002. And, with the exception of Duck Lake, area farmers have taken advantage of the new pipelines and established rural water pipelines connected to these pipelines. Approximately 75 rural water pipeline associations are operating in Saskatchewan, of these 59 are supplied with treated water by SaskWater.

SaskWater’s post-2002 marketing plans assumed that demand for the creation of new regional systems would contribute to the corporation’s growth. The planners were disappointed. As was mentioned in Chapter 6, a number of barriers stood in the way of regional system development. For instance, given the varying hydrological conditions affecting communities, not all municipalities in a region face water quality and quantity challenges at the same time. The research identified areas in which some communities
were dealing with low quality water while nearby communities had excellent water and plenty of it (e.g., Gravelbourg and Shaunavon). In addition, the quality of water infrastructure varies among communities. A community which has only recently undertaken an expensive upgrade of its water and/or wastewater infrastructure is less likely to see benefit in participating in a regional system than communities facing more immediate pressure to upgrade. Furthermore, at any given point in time, it could be the case that not all the communities located within the scope of a proposed regional system will have the financial capacity required to participate.

Many of the communities that made significant system improvements after 2002 did so without engaging SaskWater. The most significant growth experienced by SaskWater in relation to regional and rural pipeline systems after 2002 was in the Saskatoon area. SaskWater was able to negotiate an arrangement with the City of Saskatoon whereby any of the growing bedroom communities near the city that wished to connect to Saskatoon’s water treatment plant would have to purchase water from SaskWater (SWJA).

Rural water pipeline associations

The number of farmsteads participating in pipeline associations varies considerably. One of the larger associations, the Dundurn Rural Water Utility, provides water to over 1,800 users while others supply as few as 10 farmsteads (SARWPJ). The associations only rarely operate their own treatment plants. The majority purchase their water from nearby towns and cities or SaskWater.² For example, the Yorkton Rural Water Pipeline Association purchases water from the City of Melville; the Dundurn Rural
Water Utility buys its water from SaskWater (which in turn purchases the water from the City of Saskatoon).

Some associations provide their members with non-potable water which the participants are themselves responsible for treating. This is the case for one of the systems operated by the Wood River Utilities Board (GB39). This is interesting given that urban communities, including small villages and hamlets, are technically not permitted to provide non-potable or substandard water to their residents, regardless of the fact that providing municipally treated water could be cost prohibitive for a small centre.

Offloading, represented by the decommissioning of the PFRA, has affected efforts to establish rural water pipelines. Prior to 2008, PFRA staff assisted groups of farmers in organizing new pipeline systems. That assistance included engineering advice and help in locating government grants and financing. Approximately 30 of the rural water pipeline associations operating in the province belong to the Saskatchewan Association of Rural Water Pipelines (SARWP), an umbrella organization which provides advice on governance and technical matters and lobbies senior governments on behalf of its members. SARWP provides its members with much of the advice formerly provided by the PFRA. It helps people organize new associations and locate financing, but does not provide engineering support (Saskatchewan Association of Rural Water Pipelines Inc. [SARWP] 2009: vii-2; SARWP1). Engineering assistance formerly provided by the PFRA has been offloaded onto association participants who are now required to hire engineers from the private sector or SaskWater.
11.3 Financial barriers

Financial issues can stand as barriers for communities and individual households that would benefit from participating in rural water pipeline networks. Not surprisingly, the availability of grant support from senior government has historically been an important consideration for project proponents. However, as is the case for municipalities and irrigation districts, grant support is not always available. Programs appear then disappear and it is often the case that when programs are in existence the demand for support can exceed the funds available. For example, a SARWP official reported that a recent expansion undertaken by the Dundurn Rural Water Utility received funding support from the Building Canada Fund which covered 66% of project costs. However, other projects at other times received much less or nothing from senior government. The SARWP official allowed that factors contributing to a successful grant application were something of a mystery. She claimed – no one knows for certain why some applications succeed and others fail (*SARWP1*: 2).

New projects are typically launched with a combination of grant funding and financial contributions from end user participants. The amount each prospective participant will pay for their initial connection to the new pipeline depends on the amount of grant support available and the physical parameters of the project. For example, people connecting to a recent expansion of the Dundurn Rural Water Utility were charged a connection fee of $11,000, while those participating in an expansion of the Prince Albert rural pipeline system paid just $8,000 each. A SARWP official attributed the difference, in large part, to varying levels of government grant support (*SARWP1*: 2, 3).
Connection costs can compare quite favourably with the expense of constructing a new farm well depending on the hydrology in a given area. Furthermore, in many parts of Saskatchewan the quality of source water is poor and can easily be surpassed by the quality available from a pipeline system. That being said, prospective participants often require financing to cover the cost of their initial connection fee. The provincial government has provided, at no cost to the province, some assistance in this regard through Sections 33 and 34 of the *Municipalities Act* that allow for loans made by the associations to be attached to the municipal taxation system. Under these arrangements any loans made by the association to participants can be secured in the same way that property is used as security against property tax arrears. Approval of the arrangement by the respective rural municipalities is required. In light of these security arrangements the associations are able to obtain credit from banks and credit unions, which in turn allows them to extend financing to participants (*SARWP1*: 3).

### 11.4 Cross subsidization

Following the initial construction phase, pipeline association participants are typically charged a flat fee for operations and maintenance, and a volumetric fee for the water they consume. Many associations base their volumetric fees on an assumed minimum use rate with additional charges levied for use above the minimum (*SARWP1*: 4,5; *GB*40; *KD*6; *KD*6A ). In essence, the minimum use rates are fixed fees and not an actual volumetric fee. Volumetric fees are designed to reflect the cost of the treated water that associations purchase from SaskWater or municipal plants. Therefore, while the associations conform to the full cost pricing principle for their operations and maintenance expenses, only a portion of those fees are based on the marginal full cost
pricing principle. For those associations that provide participants with non-potable water the volumetric fee is more precisely a delivery fee intended to cover operations and maintenance costs.

The organizers of most rural water pipeline associations, like the organizers of irrigation projects, have discovered that the marginal full cost pricing principle is difficult to apply to initial construction costs. Cross subsidization is typically required to obtain the critical mass of participants required to establish a pipeline network. Initial connection rates are typically equalized between distant connectors and those located closer to the source of supply. However, new participants joining the system following the initial construction phase may indeed be required to pay fees that more closely reflect the actual cost of extending service to them.

According to a senior SARWP official, system organizers are confronted by the need to encourage enough people to participate in the system to cover both initial line and connection, construction and long-term operations and maintenance expenses (SARWP1: 2). Most system proponents come to realize that a critical mass of participation is required to achieve the economies of scale required for a sustainable system. But it is not simply a matter of cost sharing. SARWP advises new associations that without a constant draw on a system’s waterlines the effects of chlorination are diminished. Water standing too long in the lines can require retreatment, which translates into the need to develop additional treatment facilities along the course of the pipeline. A critical mass of participation is required to ensure relatively constant flows and avoid the need for additional treatment (SARWP1: 3).
The solution employed by most start-up pipeline associations is to equally share initial construction costs. Those participants furthest from the point of origin pay the same connection fees as those closest to the start point for the pipeline (SARWP1: 2). Under these arrangements, relatively proximal connectors are in effect subsidizing relatively distal connectors.

The use of cross subsidization to stimulate participation in pipeline projects in Saskatchewan again demonstrates that in certain contexts there are practical challenges associated with the application of market-based principles such as marginal full cost pricing. In the case of rural water pipelines, the factors favouring cross subsidization are both socio-economic and technical. For some prospective participants the cost of connecting to a pipeline is prohibitive. Their participation requires subsidization through cost sharing. At the same time, culturally-based perceptions about fairness and equity appear to influence opinions about how initial costs should be apportioned. Despite whether each participant pays the precise cost of their connection is less relevant to participants than the fact that the system will require a degree of cooperation and breadth of participation to be viable.

11.5 Wave of the future?

The reports of several municipal officials and water managers interviewed in connection with the RCAD project, and independently by this writer, suggest that regional pipeline systems offer significant advantages and have the capacity to play an increasingly important role in providing water to rural communities (GB1A, CN36.1, KD4, KD4A, KD6A, KD4l). They can assist communities that face hydrological and regulatory challenges and offer economic efficiencies in a variety of contexts. As noted in
Chapter 8 of this thesis, officials and water managers from Coronach and Gravelbourg are concerned that their current water sources could prove vulnerable to protracted drought \((GB1A, \text{CN36.1})\). Pipelines connected to more reliable sources could reduce that vulnerability. The development of regional systems could potentially form an important component of reducing vulnerability to drought under the climate conditions predicted for the coming century. And, while not all communities may be willing or able to participate in a regional system at the same time, long-range planning for new regional systems and the expansion of existing systems could nonetheless proceed as a preparedness measure.

Notwithstanding the foregoing, regional systems are not necessarily a panacea for resolving the water problems confronting town and country communities in the Palliser Triangle. The unanticipated regulatory and hydrological challenges that frustrate municipal water managers and irrigators could conceivably apply to regional systems as well. This possibility has been recognized by Kindersley’s public works officials who have developed options, a plan “B,” to provide the community with water should the EK pipeline fail or the South Saskatchewan River runs dry \((KD41, KD42)\).

### 11.6 Private water

The Saskatchewan Watershed Authority estimates that roughly 150,000 Saskatchewan residents (14% of the province’s population), rely on private drinking water systems \((\text{SWA 2012: 8})\). This user group includes many of the province’s 36,952 farm households which rely on their own wells and dugouts to supply water for human use and to support livestock operations.\(^5\) It also includes a number of urban residents from small communities who rely on private wells as opposed to municipally supplied
water. Most private water systems operate outside of the province’s water allocation/licensing process. Under the current regulatory regime, farmers and ranchers do not require allocations to withdraw water for household use or for livestock. Individuals and corporations require water allocation licenses only when their systems are employed to support commercial irrigation (as opposed to a garden where production is for family use); for intensive livestock operations, such as cattle feedlots; and for high volume industrial uses such as potash mining and milling (SWA 2003, SWA: Para. 98-144). A defining feature of private water systems in Saskatchewan is that users own and operate their own water withdrawal and conveyance infrastructure and treatment systems. With the exception of some industrial users, owners of individual water systems are not required to pay for the water they consume.

The source water supplying private systems is typically located on the user’s property, as in the case of a farm well or dugout. However, some private users, such as the Mosaic potash mine at Belle Plaine, Saskatchewan withdraw water from Buffalo Pound Lake and convey it several kilometers via pipeline to the mine site. All source water in Saskatchewan, whether on the surface or underground, on private land or public land, is owned by the Crown. As was described in earlier chapters, SWA operates under the principle that water is a public good that cannot be sold in Saskatchewan. When municipalities charge residents for water, or when an irrigation district charges patrons for water, the fees are attributed to withdrawal, conveyance and treatment, not to the water itself. For example, SWA charges SaskPower for non-consumptive water use in relation to hydroelectric power generation, the fees are attributed to the cost of maintaining and operating dams and reservoirs (IACC 2009b: 5, 6; SWA 2003).
Notwithstanding its general practice, SWA does in fact charge volumetric fees for raw water to some large industrial users (primarily SaskPower and potash mines) who own and operate their own infrastructure. Even in these instances SWA can argue that it maintains the canal supplying water to the potash mines east of Saskatoon, and that water is available for use by the Mosaic mine at Belle Plaine only because SWA maintains suitable water levels on Buffalo Pound Lake. Outside of these sorts of exceptions, SWA does not apply a charge on the actual water being withdrawn. However, it is assumed that the water is being withdrawn for the beneficial use of the private system operator and not for resale.

Operators of individual systems, such as farmers and ranchers, are under no regulatory obligation to ensure their water meets provincial drinking water quality guidelines (SWA 2012: 8). They are, however, encouraged by public health authorities to have their water periodically tested, particularly households with small children. It is assumed that human health risks can arise on farms where water sources can be contaminated by faulty septic systems, livestock and agricultural chemicals.

**11.7 Government subsidization**

The regulatory footprint of government in the area of private water systems is relatively small compared to the rules that apply to public delivery systems. That said, the provincial and federal governments have been active in providing technical and financial support for private on-farm water systems in the Palliser Triangle region. In its most recent iteration, the PFRA’s dugout program provided farmers and ranchers with up to 50% of the cost of new dugouts built to the PFRA’s design specifications (*GB19, KD36,*
Over the course of its 75 year history the PFRA was involved in the construction of literally tens of thousands of farm dugouts on the prairies.

While the PFRA focused its farm-related water development activities on irrigation and dugouts, the provincial government was active in assisting farmers with the construction of wells and the purchase of pressurized water delivery equipment and water treatment systems. The province’s activity in this area arose in conjunction with the CCF government’s rural electrification initiatives, which provided the power needed to operate modern water pressure systems. In 1960, the Saskatchewan government established the Family Farm Improvement Branch (FFIB) which provided technical advice and cost-shared subsidies for farm wells and water treatment systems (Peck 1964). The FFIB ceased operations in the 1980s. The PFRA’s direct involvement in farm dugout construction came to an end in 2008 in conjunction with the Harper government’s re-mandating of the organization.

Given the scope of the PFRA’s involvement in dugout construction, one might assume that by 2008 any farmer who wished to build a dugout had one. However, dugouts tend to have finite life spans. Over time bank erosion and accumulations of sediment reduce the volume of water that dugouts can contain, necessitating re-excavation. The demand for new dugouts and cleanout (dredging) is ongoing and becomes more pronounced in response to drought conditions (Agriculture and Agri-Food Canada 2002, MC8).

Notwithstanding the dissolution of the FFIB in the 1980s and the PFRA in 2008, federal and provincial government support remains available for the development of on-farm water systems. A number of factors arose in the 2000s that encouraged senior
governments to continue supporting the development of on-farm water systems. Some of the impetus for ongoing support originated in a region centred around RM 76 and the town of Ponteix where the infamous prairies-wide drought conditions of 2001-2002 reappeared in 2004 and persisted for another four years. Adversely impacted producers from the Ponteix drought pocket organized the Southwest Drought Disaster Committee which lobbied the provincial and federal governments for financial support including assistance with the construction of dugouts, wells and innovative solutions such as community wells (wells shared by RM residents) and pasture pipelines (SH14.1, SH14.2, OWL11). The provincial government responded by launching the Farm and Ranch Water Infrastructure Program (FRWIP) in 2008. The program was cost shared by the federal and provincial governments and applicants. A farm applicant was responsible for 50% of project costs. The government share was apportioned according to the 60-40 split typical of federal-provincial agriculture programs. FRWIP was initially intended to be a one year program targeted at producers in drought-stricken municipalities in the south central part of the province. In the wake of the program’s popularity and requests from farmers in other regions for similar support, FRWIP became a province-wide program in 2009. Between 2008 and 2011, the combined federal and provincial government share of project costs was $30.7 million.6

11.8 One-size-fits-all programming

In assessing the efficacy of water governance and management systems, Hurlbert (2009: 54) acknowledges the importance of decentralization and subsidiarity, including the participation of affected stakeholders in decision making. This writer’s assessment of the delivery of senior government water programming at the farm level in the study
communities suggests that efficacy can indeed be hampered by a lack of attention to local conditions and input from stakeholders.

Farmers and ranchers interviewed for the RCAD project were generally appreciative of the fact there has been public money available to assist them in developing water systems over many decades. The PFRA’s role in establishing many of the dugouts in use today is widely recognized and rural people were grateful for the help (MC26: 8). Similarly, farmers and ranchers who made use of FRWIP assistance to construct new wells and pipelines described the critical role the program played in making their projects possible (MC10, MC20, MC26). The comments made by a rancher from the Maple Creek area illustrate how important FRWIP assistance was for his operation.

…If you have got good water you can do just about anything with it and you have got something but if you’ve got a place with no water, or water that is not any good, you have got nothing. That [FRWIP] is one good thing. When we put in this new water system that infrastructure program was a godsend….we ended up drilling a well like 1,000 feet deep and then we had to trench in with it. That thing was like $20,000 for a gallon and a half a minute…I mean I couldn’t have afforded it without the help of that program. (MC20: 7)

Despite there being a broad consensus about the benefits of government support for the development of farm water systems, more than a few RCAD respondents were troubled by the way that more recent PFRA programs, in particular, have been administered (MC8, MC9, MC14.1, MC20, MC24,MC26 SH12, SH14.1). While they were generally appreciative of the support provided they nonetheless objected to the one-size-fits-all eligibility requirements, cumbersome application processes and delays in receiving the government’s share of project costs.
Far less criticism was directed at FRWIP than was the case for the PFRA. FRWIP was administered by the provincial government in cooperation with RM offices. Assistance in completing FRWIP forms was available at the local level, and eligibility requirements were considered less onerous than had recently been the case with PFRA dugout programs. The PFRA did indeed have a presence in rural areas, however, its offices were far less numerous, located in a handful of regional hubs as opposed to each RM.

Some RCAD respondents reported that in its final decades of operation the PFRA’s farm water programs had become laden with eligibility criteria that failed to account for the unique circumstances of different production. Respondents reported that the PFRA’s one-size-fits-all criteria for dugouts had become especially problematic by 2001-2002 when many producers were attempting to cope with depleted dugouts. There was considerable cynicism regarding the PFRA’s insistence that dugouts had to be fenced to be eligible for grants, given that its own community pasture managers were known to be removing dugout fences (Agriculture and Agri-Food Canada 2002, MC8, MC20). In the Cypress Hills area, producers objected to size requirements that failed to recognize local hydrological conditions including the role of water bearing gravel seams and springs in sustaining dugouts (MC8).

Producer antipathy regarding the excessively bureaucratic operations of the PFRA ran quite high in some instances. A producer who was denied a grant he was anticipating over failing to meet a reporting deadline said,

That’s why I have no faith in the PF [PFRA], it’s just a bunch of [swearing], pardon my language, but that’s what they are, eh. They’re guys that weren’t any good at home on the farm, they weren’t any good at anything else, but they could get a government job, eh. And I see lots of it in my lifetime about the stupidest
people that got PF jobs out here eh. I don’t mean that to be like a play list for all of them, but it applies to some of them, that’s the way it is…(MC14: 8)

RCAD respondents, including RM administrators who assisted in distributing applications for FRWIP funding, reported that the looser eligibility criteria and straightforward application process contributed to the program’s popularity and high rates of uptake. That being said, some RCAD respondents reported that their applications were not accepted and others indicated that they lacked financial resources to cover their half of the cost of projects (MC9, MC3A). Conversely, two respondents observed that FRWIP’s looser eligibility requirements had led to instances of fraud and abuse (MC27: 1, SH10: 3).

FRWIP grants were perceived to be much easier to administer and obtain because with the PFRA removed from the process, there were fewer restrictions on the eligibility requirements for dugouts. Indeed, there was no formal linkage between the eligibility of an application for funding and oversight by technical experts. For example, an applicant could in theory apply for a grant for a pasture pipeline project without any assurance that the wells, pumps and pipelines would actually perform as anticipated (SH10).

Particularly troubling for some respondents from the southwest corner of Saskatchewan was the failure of the 2010 federal-provincial Pasture Recovery Program to include their municipalities within the scope of its drought assistance payments (MC9, MC15.1, MC15.2, MC15.3 SH11). The administrator for RM 111 argued that program administrators had employed drought measurement criteria which failed to take hydrological drought into account. The drought assessment methodology apparently accounted for spring and summer rainfall levels but not the impact of low winter snow.
pack and run off on the irrigation projects in the Cypress Hills area. Producers from RMs 51 and 111, who had been denied water for irrigation in 2009 due to drought, were not provided with support under the program \((MC9, MC14.1, MC22, MC24)\). One respondent reported that the PFRA had denied her water for irrigation due to drought in 2009, but they still assessed her an operations and management fee. At the same time she was ineligible for drought support in 2010 \((MC24)\). Respondents from an area encompassing a few RMs, which had endured four successive years of drought (known as the Ponteix drought pocket), were similarly disappointed that they were excluded from the program \((MC15.1, MC15.2, MC15.3, SH11.1)\). A system which gave greater emphasis to local conditions and interpretations could conceivably have benefited these producers.

Respondents also described a tendency for government support programs to inflate prices. For example, a number of respondents reported that government assistance for purchasing feed during drought years, resulted in higher prices for feed \((MC14, SH11, SH12)\). Similarly, it was suggested that contractors took advantage of the fact government money was available when billing for water projects.

The rural residents interviewed for the RCAD project did not object to the use of public money to subsidize on-farm water systems. One reasoned that if urban communities were provided with assistance for their water projects, it wasn’t unreasonable to provide something for rural people \((MC9)\). At the same time, there was a consensus that government programs were not always efficiently or fairly administered. The criticism of the administration of government programs for water infrastructure is perhaps coloured by the attitudes of farmers and ranchers to the perceived inadequacies of government risk management programming for agriculture. The RCAD project
identified widespread disappointment among producers for programs such as AgriStability. Producers were critical of programming that enabled policy makers to appear generous from a public relations perspective but fell far short of meeting purported objectives.

11.9 The private water market

Notwithstanding assumptions to the contrary, raw (untreated) water is being bought and sold in Saskatchewan by parties other than SWA. It is probably not a significant amount of water, but no one actually knows for certain how widespread the practice is. Maple Creek, Shaunavon, Gravelbourg and Assiniboia all make town water available to anyone prepared to pay the vending fees. The service is viewed as a neighbourly response to local farm families who lack good quality drinking water. In these cases, the municipalities can claim to be charging for withdrawal, treatment and delivery, not for the water itself.

In the southwest corner of the province farmers and ranchers are selling water from dugouts and sloughs on their land to oil and gas exploration companies. Indeed, a dugout contractor (and RCAD interviewee) reported that some of his customers built dugouts for the express purpose of selling the water. In these instances water sales are legitimized via the convenient fiction that it is access to the water that is being sold, not the water itself. The practice is hardly secret. Farmers in the Shaunavon area openly advertise water for sale in the local shopper publication. The contractor reported the following:

I don’t know if we should talk about this on tape, but a lot of those holes [dugouts] at that time [2000–2002], they were not necessarily for livestock [despite sometimes being funded by the PFRA]. If you have a gas field being developed in an area the farmers will keep you busy. With everybody [gas
companies] punching holes in the ground they want water for their gas wells. So the farmers -- they’re going to sell them water. Not sell water. I shouldn’t say that. Sell the access so you can get to the water. So they wanted dugouts. The companies’ water trucks came up and sucked water out of their dugouts and they could make money off it. They did it because their neighbor was doing it. (MC8: 3)

There were very few respondents who reported opposition to the sale of municipal water to farmers and energy companies (SH2.1, SH2.2, SH5). And there was virtually no criticism of the sale of farm dugout water to energy companies. Support for the sale of water to farmers is understandable, given the interconnected relationships that obtain between town and country communities and their neighbouring farm communities. Municipal officials are reluctant to deny water to a farm family whose well or dugout may be out of service. A respondent from Shaunavon indicated that some members of the community complained about energy companies using town water (SH5). However, the prominent role played by energy companies in the local economy, and the benefits associated with that activity, serves to mute criticism over their activities. RM administrators were supportive of the energy companies and did not object to them making use of surface water (SH1, SH3). Nonetheless, there were some restrictions that local officials and residents considered essential. To protect the safety of drinking water, farmers are not permitted to fill water tanks used for chemical spraying at urban municipal vending facilities. It is perhaps preferable to have energy companies using surface water from farm dugouts than having them utilize groundwater, both from cost and water conservation perspectives.

The RCAD project’s interviewees included a family from southwest Saskatchewan who bottle and sell water from a spring located on their property. The
service was particularly popular in Maple Creek, when that community was under its lengthy boil water advisory. According to these respondents their operation does not require an allocation license. And while on their own initiative they have the water periodically tested, they are not obligated to meet the drinking water monitoring and reporting requirements imposed on urban municipalities \( (MC23) \). It is somewhat ironic that essentially unregulated water was the “safe” alternative for municipal water that is subject to more rigorous safety protocols.

**An example for smaller communities**

The relative lack of regulation related to on-farm water systems might be interpreted by some observers as grounds for expanding the regulatory framework to encompass private water. On the other hand, applying the same standards that apply to farm systems to smaller urban centres that cannot afford to bring their treatment systems up to provincial standards would solve the water infrastructure challenges of small communities. The regulatory inconsistency implied by the lack of regulation around private water compared to urban systems, might conceivably be considered an example of the sort of regulatory flexibility required for water governance policies to produce optimal results in different hydrological and social contexts.

RCAD (2012) describes the apparent disconnect that characterizes relationships between residents of rural areas of the Palliser Triangle and the agencies of senior government based in large urban centres such as Regina, Saskatoon and Ottawa. The RCAD project’s recognition of the benefits of flexible, context-sensitive programming corresponds with this writer’s assessment.
11.10 Conclusions

Regional systems

Rural water pipeline systems can be characterized as community-based Type II systems that are often dependent on senior government to assist them in financing major infrastructure projects. The governance structures employed by those regional systems, which service farmers only, operate on the basis of one farm one vote (similar to the governance of irrigation districts). The assignment of decision making authority becomes somewhat more complicated when systems include towns, villages and individual farm connections. Regional pipelines offer cost effective solutions to the hydrological and financial challenges facing many town and country communities in the Palliser Triangle. They also offer possible solutions to the challenges presented by climate change. Nonetheless, there are barriers to regional system development related to the varying hydrological needs and financial conditions of prospective participants. The expansion of existing regional networks and the development of new regional systems can therefore be expected to occur across relatively lengthy time frames and can be expected to require financial support from government in the form of grants and/or long-term financing.

Private systems

The governance and management of private on-farm water systems in the study area can be characterized as an example of near fully-realized subsidiarity, although farmers have historically relied on government subsidization to develop water systems. Interestingly, government financial support for private on-farm systems has remained available despite reductions in support for irrigation projects. In the case of on-farm water, the province has assumed the role formerly performed (offloaded) by PFRA. And,
both federal and provincial monies continue to be made available to support on-farm water systems via the FRWIP program. This exception is perhaps explained by the fact the costs associated with the FRWIP program pale in comparison to costs involved in expanding and maintaining irrigation agriculture in the province (see footnote 6 to this chapter). As noted above, the lack of regulation around the quality of water used on farms suggests solutions to the challenges for small communities facing costly infrastructure upgrades. While the province is wisely reluctant to abandon regulatory measures that ensure the safety of urban water, a compromise is perhaps possible. For example, a town administrator interviewed by this writer wondered whether residents of small communities might be allowed to install point of entry reverse osmosis systems, provided that the municipality supported the safe operation of these systems by having its employees periodically monitor the systems to ensure they are working effectively.

Chapter 11 Notes

1) The 238,571 figure included residents of Regina and Moose Jaw, as well as a number of smaller communities identified by the Saskatchewan Ministry of Environment as communities supplied by pipeline. Both Regina and Moose Jaw rely on water conveyed from Buffalo Pound Lake. A number of smaller urban centres and rural water pipeline associations have connected to the pipelines supplying some of these centres.

2) SARWP’s Executive Director (SARWP1: 2) is aware of only one rural pipeline association, Coteau Hills, that had its own treatment plant.

3) Interview respondents reported the cost of having a new well drilled and cased to range from $20,000 for a shallow well to $80,000 for an 800 foot well (MC20: 7, SH10: 2).

4) The pipeline associations are defined as Public Utility Boards pursuant to Sections 33 and 34 of The Municipalities Act Chapter M-36.1 of the Statutes of Saskatchewan 2005. Under these arrangements the pipeline association is required to obtain the approval of the Rural Municipality (ies) where the pipeline is located. Participants failing to pay their water bills can have the outstanding amounts added to their municipal tax bills. In this way outstanding water bills are secured by the participants’ land titles (SARWP 2009: VII-B).

5) The population figures were obtained from the Saskatchewan Bureau of Statistics web site http://www.stats.gov.sk.ca/pop/ (accessed October 25, 2012).
6) FRWIP was launched in November of 2008 and extended to the entire province in 2009. In its first year the province issued $18.9 million in grant support. The program was budgeted to cost the provincial government $52.8 million for its share of costs. However, between 2009 and 2011 only $11.8 million was spent. Farmers received 50% of the funding for approved projects and RMs received 66.7% of the cost for developing community wells. As of January 2012 4,128 projects had been approved of which 2,381 had been completed. Approved projects included 17 community wells. This information was provided in an email sent to this author on October 24, 2012 by Garth Lipinski, Saskatchewan ministry of Agriculture.

7) The best management practices for dugout construction supported by the PFRA are presented in an Alberta Agriculture and Food publication that was co-sponsored by the PFRA: Alberta Agriculture and Food in 2002 (first edition). Quality Farm Dugouts: Alberta Agriculture and Food. RCAD respondent MC8 reported that to be classified as eligible for PFRA funding support a dugout had to be a minimum of 2700 cubic yards, which is 165 by 70 by 13 feet deep or 200 feet by 60 feet. According to MC8, contractor charges for excavating a dugout of this size averaged $3,000 in 2001-2002. Respondent MC8 reported that he worked on approximately 200 dugouts in southwest Saskatchewan in the 2000 – 2003 period of which he estimated only four or five received PFRA funding support. He reported that this was largely because the type of dugout that met the PFRA’s criteria exceeded his customers’ needs and budgets. In addition, PFRA dugouts required an onerous application process and payments for the PFRA portion took months to arrive. Objections were also raised over the PFRA’s insistence that new dugouts be fenced to prevent cattle from walking into them. The PFRA maintained this was advisable to prevent contamination of the water with cattle waste and to prevent the cattle from degrading the banks of the dugout. Fencing cattle out of dugouts required producers to develop water pumping systems to carry dugout water to troughs. While dugout fencing might have worked well in some areas of the prairies, where the acreage required to graze cattle is low, it is a problem in the southwest where cattle graze on huge tracts of land and may not be seen by ranchers for days on end. There had been two prominent incidents in the southwest just prior to and during the period when the RCAD fieldwork was being conducted when dozens of cattle had died of thirst. The mechanical pumping systems supplying water to these cattle had failed and the dugouts on the pastures had been fenced denying cattle access to water. Particularly galling for producers who incurred the expense of fencing their dugouts in order to receive PFRA funding was the fact that the dugout fences on PFRA pastures in southwest Saskatchewan had been removed by PFRA’s own managers to prevent cattle from dying of thirst should pumping systems fail (MC21A).

8) The author encountered a 10 page advertising bulletin freely distributed to businesses including restaurants in Shaunavon, The Boomtown, published weekly by Winquist Ventures www.southwestboomtown.com The July 18, 2010 edition’s Classifieds section (p. 9) included an ad for dugout water for sale.

9) SARWP assists associations in coming up with workable bylaws whereby users can be represented by board members representing groups of users.
CHAPTER 12: Conclusions

12.1 Introduction

One of the principal research questions posed by this thesis asks how the water governance and management paradigms described in the literature are reflected in the Palliser Triangle region of southern Saskatchewan. The research presented in the thesis indicates that water governance and management systems in the region exhibit an eclectic or hybrid mix of practices which feature elements prescribed by all three of the predominant paradigms described in the literature. This finding is consistent with Hurlbert (2009: 48) who contends that while no model is used exclusively, each of the dominant paradigms is “used in a variety of combinations in Western Canada.” While water governance and management in the study communities does, indeed, reflect a combination of features that can be ascribed to each of the major paradigms, the general trajectory of policy development on the part of senior government since 2002 can be characterized as an effort to impose elements of the market-based paradigm on Saskatchewan’s water governance framework.

This chapter of the thesis summarizes the characteristics of water governance and management operating at the municipal level, on irrigation projects, regional and rural water pipelines and private systems in relation to the predominant paradigms. It also summarizes outcomes, the implications of the various systems in operation for conservation, social equity and infrastructure objectives. It summarizes the findings related to the question of whether or not the systems reflect the goals of policy makers. The chapter concludes with an assessment of overarching policy problems that frustrate more efficacious water governance and management. These include the challenges
presented by offloading and the national debate over funding responsibilities related to municipal infrastructure maintenance and renewal. No less problematic are the difficult questions associated with the sustainability of rural communities in the Palliser Triangle region. Another troubling, yet relatively unaddressed, elephant in the room is the lack of awareness about the implications of climate change for water systems in the study area.

12.2 Municipal systems

Characterization

Most Saskatchewan residents are supplied with water and wastewater services by municipally owned and operated utilities. The operation of these utilities conforms in many respects with what Bakker (2010) refers to as the municipal hydraulic paradigm and Linton (2011) describes as the state hydraulic paradigm. Using Hurlbert’s (2009) characterization of the predominant paradigms, one might reasonably classify municipal systems as a form of government agency management. Municipalities, which are creations of the province, are the principle agencies to which government authority of water management is delegated. However, the research presented in this thesis, and suggested by Hurlbert (2009), demonstrates that this characterization is somewhat insufficient. For example, under the direction of the provincial government, important market-based water governance maxims have been introduced into municipal water governance since 2002. Municipalities seeking grants have been obliged to adopt marginal full cost pricing. In addition, balanced budget orthodoxy and constraints on the role of the state have resulted in water policies and programming designed to reduce the need for and availability of senior government grants for municipal infrastructure
projects. The provincial government’s encouragement of marginal full cost pricing for water is largely the result of its pursuit of budget balancing objectives.

Some municipal officials view marginal full cost pricing as an appropriate method for managing utility operations and financing infrastructure improvements. Others consider the government’s insistence on it as a qualification for grant support as an assault on municipal autonomy. The objections are not directed against the need for fiscal responsibility on the part of municipal governments or the merits of full cost recovery per se. They are based, rather, on the proposition that revenues sufficient to cover costs can be generated outside of, or in addition to, marginal volumetric water and sewer rates through instruments such as fixed service fees and the property tax system. And, for those officials who are protective of autonomous decision making, the choice of cost recovery methods is something the municipalities should be entitled to make.

The establishment of SaskWater as a for-profit utility in 2002 is another manifestation of efforts by the provincial government to move water governance and management further along the market-based continuum. SaskWater operates as a corporatized utility which enters into P3 type arrangements with municipalities. Despite the effects of more stringent water safety regulations associated with the SDWS, SaskWater has not achieved the success imagined by government planners in 2002. Many municipalities have concluded that they are best advised to retain control of their own utilities. This in part reflects a desire to protect municipal autonomy and the widely held perception that SaskWater is an inordinately high cost provider of treated water. From SaskWater’s perspective, its less than stellar growth has been the result of restrictions on its ability to aggressively compete for business, the government’s reluctance to provide it
with the borrowing capacity required to fund some projects, and purportedly lax enforcement of safe drinking water standards on the part of the environment ministry.

The research also shows that municipal systems reflect the influence of community level, or user-based, decision making whereby democratically elected local officials use the limited authority they have over their water and wastewater systems to implement solutions based on local hydrological and social conditions and community values. The research also shows that municipal officials in five of the eight study communities have adopted cross subsidization through lifeline rates to enhance the affordability of non-discretionary water use for their residents. Lifeline rates are held to be progressive measures that enhance social equity by allowing low-income households to meet their needs at rates that are subsidized by higher income households (Mieno and Braden 2011). Cross subsidization runs contrary to the advice of experts on market-based utility management such as Bonbright (1961). The use of cross subsidization in support of affordability indicates that the principles of market-based water governance have not been fully embraced at the community level. Furthermore, the study communities have all rejected the market-based notion that water prices are the key instrument available for the promotion of water conservation, choosing instead, to rely primarily on rationing.

Features of municipal water governance, as experienced in the study communities, reflect a concern for community sustainability bolstered by decades of rural population decline. Expressions of community solidarity including the need to support and retain residents across the class and income spectrum and the importance attached to community survival are reflected in efforts to maintain affordable water rates. In this respect, the research shows that town and country water governance systems embody
community values that at times run contrary to the principles of market-based water governance.

**Outcomes**

**Conservation**

The application of marginal full cost pricing to municipal water governance in the study communities has not played a predominant role in managing water conservation. Notwithstanding the recommendations of economists and assumptions about the role of prices in affecting use rates, the study communities have all chosen regulated rationing as their preferred method for conserving water. The social conditions that obtain in the study communities allow for the relatively seamless management of use rates through rationing. Conservation efforts are focused on maintaining supply levels under the limitations imposed by nature and existing infrastructure. Those communities participating in watershed committees have indeed taken a broader approach to conservation through the development of source water protection plans. The activities of these committees reflect the goals of decentralization that are embraced by IWRM and provide a venue for stakeholder deliberations on a watershed-wide level. However, the capacity of these committees to influence policy and finance their long-term operations remains unclear.

Regardless of the degree of influence exercised by watershed committees, those facets of water governance and management which affect the status of aquatic and riparian ecosystems are vested primarily in SWA and the Ministry of Environment. Municipalities are subject to allocation rules and pollution safeguards that purportedly take environmental well-being and source water sustainability into account. This thesis
has not attempted to measure the effectiveness of the source water protection measures that fall under the purview of senior government agencies.

The conservation-infrastructure financing paradox

Municipal officials from the study communities have experienced the contradictions that arise when marginal full cost water rates are employed to encourage conservation but are at the same time are expected to generate the funds required for infrastructure upgrading. The experience of Maple Creek suggests that when rate shock inducing price increases are imposed, there is a possibility that discretionary use rates can decline to the point that overall revenue is reduced. In addition, large price increases affect the capacity of low-income residents to meet their non-discretionary needs. Water rates are viewed by residents of town and country communities as a component of the overall municipal tax burden. There is a perception within some communities that the size of that burden can affect the capacity of communities to attract and retain residents. With the exception of Shaunavon, the study communities have found that effective water utility revenue management requires a “balancing act” that incorporates fixed monthly connection fees in addition to volumetric prices.

Equity

The water rate structures employed by the study communities reflect the proposition that all residents should have access to their basic non-discretionary water requirements at affordable rates. For five of these communities, providing affordable water for low-income residents involves the cross subsidization of rates through increasing block systems that include a lifeline rate. Nonetheless, some of these communities have implemented rate increases that threaten affordability. The magnitude
of these increases is linked to the levels of grant support and borrowing capacity available
to municipalities undertaking major water infrastructure projects. For some communities,
the relative dearth of financing available through grants and borrowing has necessitated
large increases in water rates and the imposition of onetime levies. For Duck Lake, a
large rate increase accompanied by a one-time levy resulted in households having their
water shut off, and prompted some seniors to leave the community. In Gravelbourg,
higher water prices generated incredibly high bills for residents who were unaware of the
implications of faulty plumbing and high use appliances. In Maple Creek, higher rates are
associated with the growing impression that the community’s overall tax burden has
become excessive.

The provision of grants in support of municipal water infrastructure projects is an
opaque process that has resulted in significant inequities in the levels of grant support
available to different communities. Gravelbourg, for example, has been treated relatively
generously compared to Kindersley, Duck Lake and Maple Creek, all of which had much
smaller proportions of their infrastructure projects financed by federal-provincial grants.

*Infrastructure financing*

The adoption of marginal full cost pricing does not guarantee that a municipality
can finance its water infrastructure without government grant support and/or financial
backing, or the imposition of shockingly high water rates. The research presented in this
thesis demonstrates that unanticipated water crises can frustrate the plans of prudent and
imprudent managers alike. The planners responsible for developing the SDWS predicted
that the imposition of marginal full cost pricing would reduce the demand for grants from
senior government and reduce the amount of municipal borrowing that would show up on
the province’s balance sheet. The potential impact of that process on low-income households received far less attention than the fiscal benefit to the province.

*The self-referential effectiveness of the SDWS*

Measured in terms of the goals that policy makers had in mind when they developed the SDWS, success has been somewhat elusive. It is indeed the case that since the Cryptosporidium parvum outbreak in North Battleford in 2001 no one has (as far as this writer knows) been made seriously ill from drinking municipally supplied water in Saskatchewan. However, other important components of the SDWS have proven less successful. For instance, the imposition of market-based marginal full cost pricing has not eliminated the demand for grant support. Indeed, one might reasonably assume that senior governments have themselves recognized the utopian nature of this objective by continuing to make infrastructure grants available.

SaskWater did not live up to the expectations of the planners. One might reasonably contend that it was given a “mission impossible.” The corporation was not allowed to aggressively compete with private sector engineers, and its capacity to develop long-term financing arrangements was circumscribed by the government’s reluctance to have more debt appearing on the province’s balance sheet. SaskWater’s profits in recent years have been largely the result of relatively high rate increases imposed on existing customers. The rate increases imposed by the corporation over the past decade far exceed those introduced by Crown corporations that fall under the purview of the Saskatchewan Rate Review Panel. Indeed, the review of water rates set by SaskWater and municipalities by an independent advisory or regulatory panel could contribute to the introduction of greater fairness and equity into the setting of water rates.
The water rates set by municipalities and their ability to borrow are, indeed, reviewed by the SMB. However, that process lacks the transparency that is generally considered essential to rate setting processes (Bonbright 1961). In the absence of a more transparent process, it is not possible, for example, to determine how the SMB balances issues of fiscal responsibility and rate affordability.

The research presented in this thesis suggests that municipalities may not be obtaining optimal service from either SaskWater or private engineering firms. There is evidence to suggest that some projects have been subject to gold plating. A number of officials at the municipal level have argued that communities would benefit from the availability of unbiased advice about the sorts of infrastructure improvements that would most cost-effectively meet their needs. Prior to 2002 this sort of advice was available through SaskWater and, until 2012, it was available to farmers and irrigators through the PFRA. The research shows that some rural residents assume that Saskatchewan’s safe drinking water standards and/or the overzealous interpretations of those standards are examples of gold plating. Some residents of town and country communities wonder why they are not permitted to operate non-conventional water treatment delivery systems given that farm residents do not face similar restrictions. It is reasonable to assume that residents of small centres facing expensive treatment plant upgrades might prefer a point of entry treatment option, or “boil or buy” drinking water systems over the alternative of unaffordable municipal water rates. In Chapter 11, the author suggested how low cost point of entry systems might be operated safely, allowing municipalities to forego multi-million dollar treatment plant upgrades.
12.3 Irrigation projects

Characterization

The governance of multiple user irrigation projects in Saskatchewan also involves an eclectic mix of features that reflect aspects of each of the predominant paradigms. But, they most closely conform to the characteristics of community/user-based systems and function-based Type II systems. The irrigation associations are allowed a certain degree of autonomy for determining their own governance structures, the rates they charge participants, and for coordinating infrastructure projects. An important feature of the governance models employed by the irrigation project associations is one member one vote, cooperative-style decision making. This form of governance is preferred over a corporate styled model that would delegate voting rights in accordance with levels of investment. Furthermore, the association officials and the irrigators interviewed in support of this thesis are opposed to the establishment of private water rights that could be traded in markets independent of beneficial use criteria tied to specific parcels of land, and conceivably held by non-resident speculators.

Autonomy at the irrigation project level is nested within a regulatory environment governed by provincial and federal agencies. Historically, an important feature of the operation of irrigation projects in Saskatchewan has been the prominent role played by senior governments in financing the construction of major irrigation infrastructure components. However, levels of senior government support have declined over recent decades. In the early 1970s, irrigators made use of project infrastructure that was totally funded by senior governments. More recently, funding has been made available on a cost-shared basis which requires the project associations to raise a significant portion of
the required funding. The planned departure of the PFRA from irrigation projects in the southwest of the province is another example of the declining role of government in support of irrigation in the province. The province has thus far proven reluctant to fill the role formerly played by the PFRA. In effect, the irrigation projects are being required to shoulder a greater share of the costs associated with operations and infrastructure development. This situation echoes the offloading effects of the SDWS on municipalities.

There are elements of market-based water governance in operation on the irrigation projects. The project associations have adopted the marginal full cost pricing principle associated with market-based water governance, via volumetric fees, to cover most of their operations and maintenance costs. However, they employ cross subsidization when financing major expansions.

Outcomes

Conservation effects

The water allocations awarded to irrigation project associations by SWA purportedly ensure that the health of aquatic and riparian ecosystems is not compromised by the withdrawal of water for irrigation. Since 1984 the provincial government has reserved to itself the right to reduce allocations in response to supply crises such as shortfalls produced by drought. However, managing the apportionment of allocation reductions within the projects falls within the purview of the irrigation project associations. The research indicates that this has not been an issue for the associations supplied by Lake Diefenbaker. Since those projects were launched, there have not been many instances in which irrigators have not been able to obtain all the water they needed, when they needed it. This has not been the case in the southwest of the province where
allocations have been reduced due to water shortages on many occasions over the past 30 years. Irrigators on projects in the southwest have chosen to share the available water in an equitable manner that distributes allocation reductions evenly among irrigators. The water sharing schemes employed by irrigators run contrary to the tenets of market-based water governance which would see allocations determined by the prices individuals were prepared to offer in the marketplace for scarce water. However, as noted above, irrigators and their associations are opposed to the establishment of private marketable water rights.

The irrigators interviewed for this thesis did not share the aversion for supply based solutions common to promoters of soft path approaches to water governance or the concerns of environmentalists for the protection of water related ecosystems. For example, irrigators in the southwest expressed disappointment over the shelving of the Meridian Dam project and SIPA is promoting the expansion of irrigation infrastructure and water use in the Lake Diefenbaker area. A number of respondents from the southwest were upset that worries about the loss of habitat for a rare bird had derailed a planned dam and reservoir on Battle Creek. These findings suggest that the decentralization of authority over water governance and management to the lowest possible level can at times be inconsistent with the objectives of environmental sustainability and soft path solutions. This suggests that oversight by external agencies may be required to ensure that source water and ecosystems are protected.

Equity

The equitable sharing of allocation reductions is one of three practices employed by irrigation project associations that fall outside the parameters of strictly applied market-based water governance. The other two are the irrigators’ preference for
cooperative, one farm one vote, association governance and the practice of employing cross subsidized cost sharing for project launches and major expansions.

The research shows that irrigators prefer a governance model which sustains both large and small producers. There is concern that although it may be desirable to attract new investment on behalf of expanding irrigation activity, new investment could threaten the ability of existing operators to expand their operations and limit the ability of the children of community members to enter agriculture. The introduction of market-based governance practices such as private transferable water rights that are not tied to beneficial use on a particular parcel of land is not something that irrigators currently want. The adoption of a Chilean style private water rights model recommended by Saskatchewan AgriVision Corporation (2004) would require the top down imposition of a radically new governance model that conflicts with the social conditions and values that obtain in the study communities.

*Infrastructure financing*

The subsidization of irrigation related infrastructure costs by senior governments has been an important facet of water governance and management on the prairies since the creation of the PFRA in 1935. The retreat of the PFRA from its role as a provider of technical and financial support for irrigation projects has not been matched by a proportionate increase of support on the part of Saskatchewan’s provincial government. In neighbouring Alberta, the province has played a much larger role in support of irrigation than is the case in Saskatchewan. In Alberta there appears to be greater appreciation of the economic multiplier effects generated by dense concentrations of irrigation farmers. As a result, the province continues to subsidize a major portion of the
costs for infrastructure enhancement. The lack of sustained enthusiasm for irrigation on the part of Saskatchewan governments has contributed to the lack of expansion in the Lake Diefenbaker area and could threaten the sustainability of irrigation in the southwest corner of the province. The loss of irrigation in the southwest is likely to in turn threaten the sustainability of individual farm and ranch operations and the well-being of associated town and country communities.

The self-referential success of irrigation policy

Those aspects of water governance and management that fall under the purview of irrigation project associations have been generating outcomes that conform to local hydrological and social conditions. Those features of the system which purport to address water conservation and source water protection are administered by the province and the federal government and are described by the responsible officials as adequate. However, assessing the efficacy of infrastructure financing policy is much more problematic. None of the interviewees, including those from the relevant provincial government agencies, is entirely certain what the policy objectives of the province are (e.g., Saskatchewan AgriVision Corporation 2004, SIPA 2008 and SIPA 2008a). One is tempted to infer that the goal of reducing the cost burden of water governance and management for the province embraced by the SDWS is similarly influencing the province’s irrigation policy.

The user pay principle is not in full effect in relation to irrigation in the Lake Diefenbaker area where a modest level of grant support remains sporadically available. However, it is unclear whether irrigators in the southwest will be receiving an allocation let alone financial support in the wake of the PFRA’s departure.
SIPA and the Saskatchewan AgriVision Corporation have both advocated on behalf of the expansion of irrigation in Saskatchewan. They both contend that the economic benefits of irrigation expansion will far exceed the costs incurred to develop the necessary infrastructure. They also propose that expanding irrigation will reduce vulnerability and enable producers to capture benefits anticipated under climate change forecasts. Without a significant financial commitment on the part of senior governments it is highly unlikely that these benefits will be fully realized. Indeed, with respect to irrigation in the southwest, it is not clear whether the projects will continue to operate in a suboptimal manner, be improved, or decommissioned. This is largely because the provincial government does not yet have a clearly articulated vision for irrigation in the southwest of the province.

12.4 Regional systems and rural pipelines

Characterization

Regional water pipeline systems reflect a range of paradigmatic forms. Those that supply two or more urban communities share characteristics with municipal systems. They also meet some the criteria for user or community-based systems and for what Hooghe and Marks (2003) describe as Type II function based systems. And, those systems that supply farmsteads, but not urban centres, conform most closely to the criteria for Type II systems. The rural pipeline associations often enjoy a beneficial nested relationship with rural municipalities which allow for the attachment of water charges to municipal tax enforcement systems. This sort of nested relationship is similarly consistent with Hooghe and Marks’ description of Type II systems and Ostrom’s (2008) characterization of the beneficial nesting that sustains community-based
CPR systems. An important feature of market-based water governance, marginal volumetric pricing, is reflected in regional systems as well, particularly those systems which obtain water through P3 type arrangements with SaskWater.

In important respects, regional and rural water pipelines, and irrigation projects in Saskatchewan, also reflect the objectives of distributed power and subsidiarity described by Hurlbert (2009). While important aspects of water governance such as allocations are indeed governed by senior government agencies, a degree of decision making has been delegated to the lowest feasible level, the pipeline association.

Notwithstanding how these systems might be characterized, they are widely regarded as one of the most cost effective methods available for ensuring that town and country communities and farm households have access to reliable supplies of water. The planners involved in the formation of the SDWS held that the development of these systems would enhance drought resilience and enable some small communities to obtain safe drinking water without having to refurbish their own treatment plants.

Outcomes

Conservation

Conservation related to environmental protection falls outside the parameters of pipeline association management. Some pipeline participants are active in local watershed committees, and share in the modest influence these committees have in relation to source water protection. However, conservation related to supply shortfalls is managed by the associations. The associations will reduce or shut off line flows in response to equipment failure or other supply related emergencies. On many projects,
individual association participants are expected to maintain their own water reserves to withstand short-term supply failures.

Social equity

The most important equity enhancing feature of regional systems is their capacity to deliver quality water to communities and farmsteads that would otherwise face high source development and treatment costs, or be required to rely on poor quality and/or volumetrically inadequate water supplies. Regardless of the potential benefits offered by these systems, their development has been frustrated by a range of technical and financial barriers (see Chapter 11 of this thesis).

Many, but not all, rural water pipeline associations employ an increasing block rate system. However, the lowest rate block is treated by some associations as a minimum use amount which is tantamount to a fixed regular connection charge. While the volumetric fees conform to market-based water governance practice, the associations typically employ cross subsidization during their launch phase. As is the case for irrigation project associations, the pipeline associations have found that encouraging a critical mass of participants to connect to new water systems requires the equalization of rates between proximal and distal connectors.

Infrastructure financing

Financing the construction of regional pipelines typically involves a combination of government grants, bank financing and connection fees paid in advance by participants. The pipeline associations share the experience of municipalities and irrigation projects with respect to the sporadic availability of grant support. They also share the frustrations that arise from the lack of transparency and apparent lack of
fairness in the awarding of grant financing. Long-range plans that describe the potential for regional pipeline system expansions and the development of new systems could introduce a degree of predictability for financial planners. However, the execution of these plans would undoubtedly be frustrated by the barriers described in Chapter 11. Perhaps most importantly, they would potentially require a significant financial commitment on the part of senior governments, not to mention the necessity of a long-term vision for water governance and management in the province.

The self-referential success of policy related to regional systems

Planners responsible for the development of the SDWS recognized the value of regional systems and expected that SaskWater would play a leading role in their development. While SaskWater’s role in launching new projects has been less influential than planners imagined, regional systems have nonetheless proliferated. Governments have played a role in the growth of these systems by making grants available, and by allowing pipeline associations to attach water bills to the municipal tax enforcement process. That being said, the development of regional solutions has been led by innovative people at the community level who were seeking solutions to their water problems. Despite the growth in the number of systems, it remains the case that there are other regions within the Palliser Triangle that would benefit from participation in regional systems.

12.5 Private water

In important respects the governance of private on-farm water systems in the Saskatchewan portion of the Palliser Triangle operates much like it did under the unregulated “Wild West” conditions that prevailed when the traditions of on-farm water
management were being conceived. The governance of private water systems represents a near fully realized application of principles of subsidiarity. Farm households do not require surface or groundwater allocations and they are not required to have their water treated to Ministry of Environment standards. The lack of regulation around water quality for farms has prompted some observers to ask why the restrictions placed on small urban communities could not be relaxed. The operators of private systems are supposedly not permitted to sell water, but the research indicates that some sales do indeed take place.

Rural households have been supported for decades by government programs designed to improve the quantity and quality of water available to farmers. The creation of the FRWIP program reflects sensitivity to farm issues on the part of rurally-based conservative political parties in Saskatchewan. Since the 1980s Saskatchewan’s conservative governments have set aside their ideological preference for small government and user pay service delivery in the interest of rural community sustainability and rural votes. Decades of government assistance in support of private on-farm water systems and opportunities in some areas to participate in rural pipeline projects, has contributed to considerable water security for the province’s farm population. That being said, farmers and ranchers have frequently been frustrated by the one-size-fits-all eligibility criteria and ham-handed management of government programs designed to support on-farm water management. The FRWIP program appears to be a notable exception in this regard due to its flexible eligibility criteria and uncomplicated application process.
12.6 The deficiencies of market-based approaches

One of the findings derived from the research supporting this thesis is that efforts to apply market-based principles to water governance and management in the context of town and country communities, irrigation districts and regional pipeline systems in the Saskatchewan portion of the Palliser Triangle have failed to consistently generate beneficial outcomes in relation to social equity, conservation and infrastructure financing objectives. The analysis of the shortcomings of market-based water governance and market environmentalist policies presented in the thesis identifies contradictions that arise from the conflation of market-based pricing principles with conservation and infrastructure financing objectives. In addition, there are contradictions that arise due to the conflicting values represented by market-based principles versus the social values supported by residents of the study communities. The issues generated in association with these contradictions in the context of the study communities are summarized in the list provided below.

1) Reliance on marginal full cost pricing has not eliminated, and will likely not eliminate, the need for government grants and/or government supported financing for major infrastructure projects. This is particularly the case with respect to unanticipated water crises.

2) Reliance on marginal full cost pricing as the principal method for encouraging water conservation is perceived by water managers in the study communities to be less effective than regulated rationing.

3) Reliance on marginal full cost pricing combined with restricted access to government grants and government supported financing has, in certain contexts,
generated rate shock and water rates that are socially inequitable and inimical to community sustainability.

4) Marginal full cost pricing is incompatible with the challenges confronting irrigation associations and rural pipeline associations endeavouring to develop new systems or undertaking major system expansions.

5) Market-based water governance maxims in support of private ownership of water, tradable water rights and governance systems based on degrees of ownership as opposed to cooperative governance principles are incompatible with traditional community values and the preferences of district irrigators in the study area.

6) The imposition of market-based user pay principles to the management of irrigation agriculture and the accompanying reductions in government grant support are inconsistent with efforts to sustain and expand irrigation in the study area.

7) A dogmatic over-reliance on market-based principles at the expense of flexible and eclectic approaches to water governance that take local hydrological and social conditions into account is inimical to the development of water governance and management systems capable of fully addressing social equity, conservation and infrastructure financing objectives in the context of the study communities.

12.7 Elephants in the room

Offloading

There are three factors affecting water governance and management in the Saskatchewan portion of the Palliser Triangle that have gone largely unaddressed by policy makers since the 1980s. These factors reflect the expression, “the elephant in the
room,” which refers to an important issue which should be obvious to decision makers, but is nonetheless largely ignored. Foremost among the elephants is the interrelationship between the challenges confronted by water managers at the local level and offloading. Nationwide concern about Canada’s municipal infrastructure deficit and the relative lack of revenue generating capacity on the part of local governments compared to senior governments is reflected in the water governance challenges confronting the communities studied in support of this thesis. Solutions for many of these challenges will remain difficult to develop until the overriding issues related to the fiscal imbalance between local and senior governments are addressed. No less influential is the neoliberal bent of senior governments which have been reticent to use government in support of predictable long-term funding arrangements for infrastructure development.

*Rural population decline*

A second elephant in the room is the reluctance on the part of policy makers to formally acknowledge the demographic changes occurring in rural Saskatchewan. Stabler and Olfert (2002), among others, have described the challenges of rural community survival but governments have been reluctant to develop policies that reflect what has happened and is likely to happen with respect to small community sustainability. Communities experiencing population decline are losing ratepayers and revenues, but are nonetheless required to maintain basic services. The challenges associated with providing water and sewer services are further exacerbated by the imposition of new regulatory standards in the absence of flexible financing alternatives and low-cost compliance options. It is reasonable to assume that at some point along the trajectory of decline it becomes economically and politically unreasonable to subsidize a dying community’s
infrastructure. However, there has been little public discussion about how such limits might be determined. Governments have tacitly recognized the new reality by withholding water infrastructure grants or providing relatively small grants to small and possibly dying communities. However, the methods employed to determine grant eligibility lack transparency. And because they are largely a mystery they do not lend themselves to rational long-range planning. The research presented in this thesis suggests that recognizing the precarious futures of communities such as Duck Lake by developing better strategies for communities experiencing demographic and water stress is probably warranted including measures in support of low cost water treatment alternatives.

*Climate change*

A third elephant in the room is climate change. There is a dearth of preparedness planning that deals with the impacts of climate change on water security in Saskatchewan. Governments could assist municipalities in developing alternative water supply plans in the event that the severe drought conditions expected under climate forecasts deplete current sources. Only one of the study communities, Kindersley, has developed a “plan B” which accounts for the possibility that its main source of supply could fail. That being said, other communities have recognized the enhanced security available through participation in regional systems. The development of long-range plans that recognize the potential for the expansion of regional water pipeline networks and a more thorough mapping of the province’s groundwater would be beneficial steps to take in this direction. Historically, major changes to water governance and management policy in Saskatchewan have been reactive measures adopted in response to major crises. The drought of the 1930s provided the policy window that led to the creation of the PFRA and
the development of the infrastructure required to support irrigation in the province. North Battleford’s drinking water crises led to the Laing Report and the SDWS. That pattern needs to change in favour of a more proactive approach if the province hopes to successfully prepare for climate change.

12.8 A final synthesis, limitations, and areas for additional research

The water governance and management systems employed in town and country communities, on irrigation projects, by regional pipeline associations and private water systems in the Palliser Triangle region of Saskatchewan reflect an eclectic mix of features suggested by the predominant paradigms largely because one size does not fit all. Optimally constituted water governance and management systems should be flexible enough to allow for context specific conditions. They need to account for local hydrological and socioeconomic conditions. That being said, the systems operating in the study communities are at times less than optimal. Externally designed templates have indeed been imposed on these communities. The communities have endeavoured to adapt these measures to their local circumstances. Successful outcomes are often the result of communities themselves working through the challenges they confront despite government policies and programs. Among the greatest impediments they have faced is the need to conform to new government regulations and unanticipated water crises, often with limited financial help from senior government. Efforts on the part of senior government to inject market-based principles into local systems have met with mixed success because at the local level some market-based efforts in support of solutions are seen to work well and others do not. Successful outcomes in the areas of social equity,
conservation and infrastructure financing depend on the compatibility of the measures employed with local hydrological and social conditions.

The author acknowledges that there are areas of the research effort that would have benefited from additional attention. Further research into the impacts of water rate increases on low-income households would be helpful in more clearly understanding the impacts of marginal full cost pricing on social equity. Another area where additional research would be welcome is in assessing the effectiveness of the Saskatchewan Ministry of Environment’s efforts on behalf of source water protection and the ecological integrity of riparian and in stream ecosystems. For the purposes of this thesis the author made the convenient assumption that the protection measures in place are sufficient. This may or may not be the case. The author’s experience with the research effort supporting this thesis suggests that the cooperation of agencies such as the Saskatchewan Urban Municipalities Association and the Saskatchewan Municipal Board (SMB), and access to SMB files, could provide the basis for developing of a province-wide profile of the water governance challenges identified in this thesis.
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EXPLANATION OF CODES AND TABLES

Sources of the interviews

The interview coding system presented below represents the codes employed by interviewers engaged in two research projects co-ordinated by Dr. Harry Diaz and the Canadian Plains Research Center University of Regina from 2006–2012. These two projects were the Institutional Adaptation to Climate Change (IACC) project 2006–2009 (IACC 2009, 2009a) and the Rural Communities Adaptation to Drought (RCAD) project 2009–2012 (RCAD 2012). The author of the preceding thesis, Jim Warren, worked as an interview coder and analyst for the IACC project and as an interviewer and research analyst on the RCAD project. He conducted 77 of the interviews listed below.

In addition, there is coding for interviews conducted independently by Jim Warren (JW) 2010 - 2013. Some of Jim Warren’s interviews were follow-up interviews with IACC and RCAD project respondents, and some were with interviewees who were not part of the RCAD or IACC projects. Jim Warren also participated as an interviewer for the RCAD project, conducting most of the interviews for the communities of Maple Creek and Shaunavon.

While Duck Lake and Assiniboia were not among the initial group of six communities studied under the RCAD project, Jim Warren conducted interviews in those communities to supplement the RCAD project and his thesis research.

Saskatchewan Watershed Authority (SWA)-RCAD co-operation

The Saskatchewan Watershed Authority participated in the RCAD project. A contract interviewer working for SWA, Lyle Thomson (LT), conducted interviews in the Old Wives Lake watershed and co-interviewed some respondents from Shaunavon with Jim Warren. While not all of the Old Wives Lake watershed fell within the parameters of the RCAD project they were used in support of the research for this thesis. Particularly helpful were interviews with participants in the Gouvernor and Cadillac irrigation projects.

Interviewer Abbreviations

The abbreviations for the RCAD project researchers/interviewers and the interviewer names are:
HD Harry Diaz
FL Fanny Luk
LT Lyle Thomson
SA Saima Abassi
SH Sam Hage
JW Jim Warren
The abbreviations for IACC project researchers/interviewers and the interviewer names are:

HD Harry Diaz
MH Margot Hurlbert

Defying Palliser book

The book *Defying Palliser: Stories of resilience from the driest region of the Canadian Prairies* (Warren and Diaz 2012) contains 21 interviews which were edited and subsequently approved by RCAD project participants, and eight interviews with ranchers and irrigators from Alberta. In the thesis text, the author usually cites the appropriate pages from the book (sometimes he refers to the original RCAD transcripts). The coding key provided below indicates the page numbers in the book which refer to the edited versions of the RCAD interviews.

Overview of the coding guides

The first coding guide table provided below is an alphabetical summary of the main community and agency code prefixes used for the RCAD and IACC projects and in the interview citations presented in the text of the thesis. This is followed by a series of tables for each of the RCAD project study communities, which is in turn followed by a series of tables for each of the agencies which correspond to IACC interviews. Unless otherwise indicated, there is a digital recording and printed transcript available for each of the interviews listed. For some of the interviews, short follow-up interviews in particular, the only material on file are interviewer notes. In these instances the entry will contain the notation: (notes only). Where the interviews cited in the thesis refer to IACC interviews the citation is italicized. If there is an NVIVO coded file for the transcript, the paragraph in the NVIVO version is listed.

Confidentiality and location of the interview transcripts

The names of RCAD and IACC respondents have not been reported in the preceding thesis or this document in accord with University of Regina Ethics Committee guidelines. The interview transcripts are stored in the data files of the Prairie Adaptation Research Collaborative (PARC) at the University of Regina, Regina, SK. Confidentiality regarding the names of participants remains a concern. Therefore, access to the transcripts is restricted. To inquire about gaining access to the transcripts contact Dr. Harry Diaz, Department of Sociology, University of Regina.

Discrepancies in codes

Some of the codes used by this author in the preceding thesis vary from those for the transcripts stored in the PARC files. Where the author is aware of a discrepancy he has listed the code used in the thesis first followed by the code for the file version in parentheses.
## ALPHABETICAL LISTING OF CODES

Alphabetical listing of RCAD and IACC project interview group codes, community and agency codes and codes for additional interviews added in support of this thesis.

<table>
<thead>
<tr>
<th>Study area codes</th>
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<th>Project</th>
<th>Town and country urban centre, agency or watershed</th>
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### RCAD PROJECT INTERVIEWS

**Assiniboia (supplemental RCAD interviews conducted by Jim Warren and Harry Diaz)**

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### Coronach Study Area

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CN26(28) RM 11 Mixed farmer RCAD/FL 07-08/10
CN27(29) RM 11 Rancher, dugouts, wells RCAD/FL 07-08/10
CN30(32) RM 11 Mixed farmer, postal worker, wells, haul drinking water RCAD/FL 07-08/10
CN31(33) RM 11 Mixed farmer, dugouts, wells RCAD/FL 07-08/10
CN32(34) Coronach Coal mine environmental engineer RCAD/FL 07-08/10
CN33(35) Coronach Grain elevator agent RCAD/FL 07-08/10
CN34(36) RM 11 Organic mixed farmer, well RCAD/FL 07-08/10
CN35(37) RM 11 Farmer, dozer operator at mine, well RCAD/FL 07-08/10
CN36.1 Coronach Town administrator RCAD/JW 09/12
CN36.2 Coronach Former town administrator

**Duck Lake (supplemental RCAD interviews conducted by Jim Warren)**

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**Gravelbourg Study Area**

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**Hanna Alberta/Alberta Special Areas (supplemental RCAD interviews conducted by Jim Warren)**

All of these interviews appear in Warren and Diaz (2012) *Defying Palliser: Stories of Resilience from the Driest Region of the Canadian Prairies*. Regina: CPRC Press. The respective page numbers from the book are provided in parentheses in the “Occupation and Role in Governance” column.

<table>
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<tr>
<th>Reference Code</th>
<th>Location</th>
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<tr>
<td>HA1.1</td>
<td>SA, Duchess</td>
<td>Ranchers, irrigators well (219 – 227)</td>
<td>RCAD/JW</td>
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<tr>
<td>HA1.2 (HA)</td>
<td>SA, Duchess</td>
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<tr>
<td>HA2.1</td>
<td>SA, Hanna</td>
<td>Ranchers wells (190 – 202)</td>
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<td>HA2.2 (HA)</td>
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<tr>
<td>HA3.1</td>
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<tr>
<td>HA3.2 (HA)</td>
<td>Lyn</td>
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<tr>
<td>HA4.1</td>
<td>SA, Wardlow</td>
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<td>HA4.2 (HA)</td>
<td>Pollockville</td>
<td>Ranchers, irrigators well (219 – 227)</td>
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<td>03/11</td>
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**Kindersley Study Area**

<table>
<thead>
<tr>
<th>Reference Code</th>
<th>Location</th>
<th>Occupation(s) and Role in Governance and Farm Water Source</th>
<th>Project and Interviewer</th>
<th>Date</th>
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<tbody>
<tr>
<td>KD1</td>
<td>RM 290</td>
<td>Farmer, farm club member, pipeline</td>
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<tr>
<td>Code</td>
<td>Location</td>
<td>Position/Role</td>
<td>Agency</td>
<td>Date</td>
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<td>KD3</td>
<td>Kindersley</td>
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<td>KD4</td>
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<td>KD4A</td>
<td>Plenty</td>
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<tr>
<td>KD5</td>
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<td>KD10</td>
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<td>KD31</td>
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<td>KD32</td>
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<td>KD39</td>
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**Maidstone Study Area**

<table>
<thead>
<tr>
<th>Reference</th>
<th>Location</th>
<th>Occupation(s), Role in Governance and farm water source</th>
<th>Project and Interviewer</th>
<th>Date</th>
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<tbody>
<tr>
<td>MD1</td>
<td>RM 471</td>
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<td>MD4</td>
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<td>MD5</td>
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</table>

**Maple Creek Study Area**

Some of these interviews appear in Warren and Diaz (2012) *Defying Palliser: Stories of Resilience from the Driest Region of the Canadian Prairies*. Regina: CPRC Press. The respective page numbers from the book are provided in parentheses in the “Occupation and Role in Governance” column.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Location</th>
<th>Occupation(s), Roles in Governance and farm water source</th>
<th>Project and Interviewer</th>
<th>Date</th>
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<tbody>
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<td>RCAD/JW</td>
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<td>MC2</td>
<td>Maple Creek</td>
<td>Grain elevator manager, well</td>
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<td>RM 111</td>
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<td>OWL1</td>
<td>Morse</td>
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**Old Wives Lake Watershed SWA-RCAD Study Area**
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<th>Date</th>
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<tbody>
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<td>Weinbender</td>
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<td>Rancher, dams and dugouts</td>
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<td>07-08/10</td>
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<tr>
<td>OWL14</td>
<td>Ponteix</td>
<td>Mixed farmer, spouse working off-farm, dugouts, haul drinking water</td>
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<td>OWL15</td>
<td>RM 104</td>
<td>Organic mixed farmer, pipeline</td>
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<td>OWL16</td>
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<td>Mixed farmer, family corral cleaning business, springs, dugouts</td>
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<td>OWL17</td>
<td>RM 77</td>
<td>Farmer, well</td>
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Shaunavon Study Area

Some of these interviews appear in Warren and Diaz (2012) *Defying Palliser: Stories of Resilience from the Driest Region of the Canadian Prairies*. Regina: CPRC Press. The respective page numbers from the book are provided in parentheses in the “Occupation and Role in Governance” column.

<table>
<thead>
<tr>
<th>Reference Code</th>
<th>Location</th>
<th>Occupation(s), Role in Governance and farm water source</th>
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<td>Shaunavon</td>
<td>Town administrator</td>
<td>RCAD/JW, LT</td>
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<tr>
<td>SH2.2 (SCC9)</td>
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<td>Town public works manager</td>
<td>RCAD/JW, LT</td>
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<tr>
<td>SH3 (OWL10)</td>
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<td>Municipal official</td>
<td>RCAD/JW, LT</td>
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<tr>
<td>SH4</td>
<td>Gull Lake</td>
<td>Print journalist</td>
<td>RCAD/JW</td>
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<td>SH5</td>
<td>Shaunavon</td>
<td>Radio personality</td>
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<td>SH6.1</td>
<td>Swift Current</td>
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<td>SH6.2 (SH7)</td>
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<tr>
<td>SH7</td>
<td>Swift Current</td>
<td>SK Watershed Authority manager (notes)</td>
<td>RCAD/JW</td>
<td>06/10</td>
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</tbody>
</table>
Taber Alberta, Outlook and Riverhurst irrigation projects Supplemental RCAD project interviews conducted by Jim Warren with agricultural producers not included in the Maple Creek Shaunavon or Old Wives interview groups whose dominant activity is irrigated crop production and irrigation management practitioners.

**Saskatchewan Watershed Authority Officials**

<table>
<thead>
<tr>
<th>Reference Code</th>
<th>Location</th>
<th>Occupation and/or role in water governance</th>
<th>Project and Interviewer(s)</th>
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<td>SWA2</td>
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**SaskWater Officials**

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<td>Follow-up interview</td>
<td>JW</td>
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<tr>
<td>SW4</td>
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**Saskatchewan Ministry for the Environment (SME)**

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<td>SE4</td>
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**Saskatchewan Ministry of Agriculture (SMA)**

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**IACC PROJECT**

**RESPONDENT CODES AND INTERVIEW IDENTIFICATION**

**Saskatchewan Watershed Authority Officials**

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<th>Project and Interviewer(s)</th>
<th>Date</th>
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<tr>
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<td>Irrigation Council (255 – 265)</td>
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<td>OL2</td>
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<td>OL4</td>
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**SaskWater Officials**

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<td>Regina</td>
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<td>Regina</td>
<td>SME official</td>
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<td>SE4</td>
<td>Regina</td>
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**Saskatchewan Ministry of Agriculture (SMA)**

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<tr>
<td>SMA1</td>
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### Federal and Inter-jurisdictional Agencies

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### Watershed Committees and Lobby Groups

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<th>Date</th>
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<tbody>
<tr>
<td>WC1 (CAB1) Oldhaber</td>
<td>Cabri</td>
<td>Watershed committee member and municipal official</td>
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<tr>
<td>WC2 (R1) Heron</td>
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<td>WC3 (R2) Martens</td>
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<td>WC4 (OUT1) McPherson</td>
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<td>SAV1 (R3) Williams</td>
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<td>SIPA1 R. Pedersen</td>
<td>Outlook</td>
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### Miscellaneous IACC Respondents

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</table>
Appendix 2
University of Regina Research Ethics Board project approval memo
DATE: March 22, 2011

TO: James William Warren
    Canadian Plains Studies

FROM: Dr. Bruce Plouffe
      Chair, Research Ethics Board

Re: Water Governance in Rural Saskatchewan: A case for a New Paradigm
    (File # 81S1011)

Please be advised that the University of Regina Research Ethics Board has reviewed your proposal and found it to be:

☐ 1.  APPROVED AS SUBMITTED. Only applicants with this designation have ethical approval to proceed with their research as described in their applications. For research lasting more than one year (Section 1F). ETHICAL APPROVAL MUST BE RENEWED BY SUBMITTING A BRIEF STATUS REPORT EVERY TWELVE MONTHS. Approval will be revoked unless a satisfactory status report is received. Any substantive changes in methodology or instrumentation must also be approved prior to their implementation.

☐ 2.  ACCEPTABLE SUBJECT TO MINOR CHANGES AND PRECAUTIONS (SEE ATTACHED). Changes must be submitted to the REB and approved prior to beginning research. Please submit a supplementary memo addressing the concerns to the Chair of the REB. ** Do not submit a new application. Once changes are deemed acceptable, ethical approval will be granted.

☐ 3.  ACCEPTABLE SUBJECT TO CHANGES AND PRECAUTIONS (SEE ATTACHED). Changes must be submitted to the REB and approved prior to beginning research. Please submit a supplementary memo addressing the concerns to the Chair of the REB. ** Do not submit a new application. Once changes are deemed acceptable, ethical approval will be granted.

☐ 4.  UNACCEPTABLE AS SUBMITTED. The proposal requires substantial additions or redesign. Please contact the Chair of the REB for advice on how the project proposal might be revised.

Dr. Bruce Plouffe

cc: Dr. Harry Diaz – Canadian Plains Studies

** supplementary memo should be forwarded to the Chair of the Research Ethics Board at the Office of Research Services (Research and Innovation Centre, Room 109) or by e-mail to research.ethics@uregina.ca

Phone: (306) 585-4775
Fax: (306) 585-4803
www.uregina.ca/research