Connecting Watershed and Land Use Planning in Manitoba: Exploring the Potential of Collaboration as a Form of Integration

By

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Abstract

Watershed planning and land use development planning are two different planning processes dealing with many of the same water and land resources. Watershed planning is conducted on watershed boundaries; land use development plans focus on municipal or planning district boundaries. It is important that these plans are properly integrated so they are mutually supportive of one another. This study focuses on Manitoba, where land and water issues include potential floods and droughts, poor water quality in major lakes, and the need to protect drinking water for human use. The severity of these issues could increase in the future as Manitoba is projected to experience climate change that will further impact water and land resources in the province.

The research explores different modes of integration, finding that collaboration is valuable in some circumstances in terms of maximizing collective resources, but that it is important to build upon strong cooperation and coordination. Results indicate that land use planners have a role to play in watershed management, using both technical and soft skills to protect watershed health through land use planning tools and plans. Watershed management planning and land use planning integration in other Canadian provinces is explored. The study concludes with a conceptual framework for integrating watershed and land use plans, as well as recommendations for improving integration in Manitoba, including: ongoing public education, pooling existing resources, more collaboration between watershed and land use planners, consideration of future water-related land use regulatory authority for watershed-based organizations, establishing clear responsibility for ensuring integration, continued learning by doing, creating a guiding framework for integrating watershed plans and land use plans, and using an adaptive management approach in both planning processes.

Key words: Watersheds, Land Use, Planning, Integration, Cooperation, Coordination, Collaboration, Manitoba.

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1. Introduction

The integration of watershed management and land use planning is increasingly being seen as a critical public policy and planning challenge, spanning these obviously inter-related fields (Mitchell, 2005, p.1341; Carter, Kreutzwiser, and de Loë, 2005; Plummer, de Grosbois, de Loë, and Velaniskis, 2011). This integration can be pursued in many ways, such as coordination and cooperation (common in the past). More recently there has been interest in pursuing integration via collaboration, focused on moving beyond consensus to results - with a gradually accumulating body of related experience, and learning potential. This study documents some of this experience, and identifies the associated learning, based on recent initiatives focused on watershed and land use planning in Southern Manitoba. The focus is on how integration has been approached and operationalized, and the extent to which this has reflected varying degrees or forms of collaboration, explicitly or implicitly, successfully or otherwise.

The study has been conducted from a planning (rather than management) perspective, with the role of planners – and especially land use planners – foremost in mind. However, the concern is very much with the interface of water and land, with the management of watersheds (and water) as well as the related, and relevant, planning of land use and development. Integration and collaboration are targeted for particular consideration, with an interest in their effectiveness in serving the interface.

Land use planners have a heightening role to play in water/watershed management, a role currently being more definitively articulated by the Canadian Institute of Planners (CIP, 2011). In Manitoba it is now mandated by provincial policy that watershed plans and land use/development plans be integrated (Manitoba Local Government [MLG], 2011), but at this point the actual 'integration' is relatively informal. Focusing on what skills and knowledge land

use planners need to have, this practicum explores the nature, form and success - or otherwise - of any 'collaboration' represented in the 'integration' pursued during and following the latest wave of watershed planning in a sample of Southern Manitoba sub-basins of the Red River Basin (mainly referencing the past five years or so - approximately 2007 to 2012). What can be learned from the experience so far? What efforts merit highlighting as being 'best practice'? What further improvements may be contemplated to better achieve integration, through collaboration, spanning the water/land interface?

The research is of particular importance since Lake Winnipeg is currently in a degraded state (Lake Winnipeg Stewardship Board [LWSB], 2011). The Red River Basin drains into Lake Winnipeg and is a significant source of pollutants draining into the lake (LWSB, 2011). The region is also subject to periodic flooding (Red River Basin Commission [RRBC], 2005) and both human and animal populations in the region are dependent on an adequate supply of clean water for multiple uses. Land uses - and activities/developments on the land - clearly have a major impact on watersheds, and vice versa (Mitchell, 2005, p.1337).

The study was conducted using the following research methods: a targeted literature review, including selected relevant precedents from elsewhere; and case studies of particular Southern Manitoba sub-basins which have been subject to recent watershed planning, including key informant interviews with those involved in such planning processes, as well as those with an oversight role or with a more external perspective on the processes. A conceptual framework of factors contributing to effective watershed and land use plan integration was established, based on the findings of the research. This framework was used to assess the current potential for integration in Manitoba, as well as to provide recommendations for improvement.

The research has sought a clearer appreciation of what integration might mean in such contexts, and an improved understanding of collaboration as a route to such integration - in the broader environmental planning and management context. The role of land use planners in watershed/water management - especially a clearer definition and fuller development of that role - has been of particular interest. The study has also been conducted with a view to informing the development of guidance, for planners, overseers, and participants in planning processes, to facilitate more effective 'integration via collaboration' of Integrated Watershed Management Plans and municipal/inter-municipal (Land Use) Development Plans in Manitoba.

1.1 Statement of Purpose

The purpose of this practicum research is discussed below - outlining the research problem, goals and objectives, and research questions.

1.1.1 Research Problem:

Environmental and ecosystem-based planning initiatives often fail to achieve results because they are not properly integrated with land use development plans (Brody, 2003, p.407). Likewise, watershed plans also often fail to achieve results because they are not effectively integrated with land use development plans (Mitchell, 2005, p.1345). Mitchell, who specializes in integrated water resource management, has suggested searching "for a way to achieve integration through coordination and collaboration" (Mitchell, 2005, p.1341).

For the purposes of this study, integration is defined by the author as bringing together, incorporating and/or combining elements of separate entities, i.e. watershed plans and land use plans, to create a more unified, consistent and cohesive whole. The author is defining

collaboration as autonomous stakeholders coming together, co-creating, and rolling multiple actions into one to achieve common goals. Richard Margerum, who has conducted extensive research on collaboration in planning, defines collaboration as "an approach to solving complex problems in which a diverse group of autonomous stakeholders deliberates to build consensus and develop networks for translating consensus into results" (Margerum, 2011, p.6). Communication, consultation, conflict resolution, consensus building, cooperation, and coordination, are terms often used synonymously with collaboration, but they are different. All may fall under the umbrella of collaboration, but collaboration sees the process through… i.e. beyond consensus, to results (Margerum, 2011, p.9). Mitchell (2005, p.1345) notes that land use plans have the ability to implement watershed plan initiatives and achieve results. Because of its emphasis on results, collaboration as a form of integration warrants further exploration to ensure that environmental planning initiatives, such as watershed planning, are properly integrated with land use development plans, achieving results.

Given the importance of land use planning in achieving results in this integration process, the role of land-use planners is of paramount importance. The Canadian Institute of Planners (2011) is in the process of "developing a national strategy for water management and land use planning" (CIP, 2011). With the push to integrate environmental planning and watershed planning with statutory land use planning it will be necessary for planners to be more acutely aware of their role in this process, including what they need to know and do for effective, results-oriented integration to take place.

Collaboration as a form of integration, and the role of land use planners in integrating watershed plans with land use development plans, is timely and potentially highly practical in the current Manitoba context. The Province of Manitoba is in the process of creating Integrated

Watershed Management Plans [IWMP]. These plans take an 'integrated' approach to land and watershed planning and management. Municipal/District Development Plans must consider IWMP outcomes (MLG, 2011) and vice versa. At this point the integration of these plans is relatively informal. Manitoba Water Stewardship (MWS) and MLG staff indicated, during informal preliminary research, that it would be valuable to have a more formalized process for integrating these plans to ensure this is done effectively and consistently, achieving positive results.

1.1.2 Goals and Objectives:

The first goal of this practicum has been to develop a better understanding of collaboration as a form of integration, and why some processes are more successful than others in what Margerum (2011) articulates as 'moving beyond consensus into action', achieving results. There is a particular focus on how collaboration as a form of integration can improve the linkages between watershed planning and land use development planning. Objectives include an exploration of the characteristics of successful collaborative efforts, and the identification of strategies for ensuring effective collaboration.

To achieve this goal and these objectives, a targeted literature review was conducted, researching theories of collaboration, integration in environmental/ecological planning, and watershed planning, with a particular emphasis on collaboration as a form of integration, as well as examining precedent studies of related collaborative processes. Emphasis was also placed on how collaboration and integration have evolved over time, and what they could potentially be.

The second goal was to better define the land use planner's role in watershed planning/water management, and its better integration with land use planning – through

collaboration in particular. The objective here was to gain a greater understanding of what the role of land use planners has been in the past with regards to integrating watershed plans with land use development plans, what it is presently, and what it could be, with particular emphasis on what planners need to know to effectively integrate these plans going forward. To achieve this, key informant interviews were conducted - supplemented by the targeted literature review.

The third goal was to develop a set of principles and guidelines for effectively integrating IWMPs and DPs in southern Manitoba. The practicum setting features different sub-basins (in southern Manitoba) that have an experience of completed IWMPs and DPs. The objective was to determine what has gone well and how the process could be improved to ensure effective integration and positive results. To achieve this, the results of the targeted literature review were applied to the setting to consider how theory can inform practice. Case studies of sub-basins in southern Manitoba were undertaken to determine how effectively land use development and watershed planning are being integrated at the present time, and what could be improved, through recommendations. Individual interviews with key informants were conducted to gain insight into the process, as well as suggestions for what could be improved.

1.1.3 Research Questions:

What are some key indicators of effective integration-via-collaboration and how is it achieved? How has integration-via-collaboration, particularly with regards to watershed and land use planning, evolved over time and what is the potential going forward?

What is the role of land use planners in the (potentially) collaborative process of integrating watershed plans with land use development plans? What knowledge and skills are required?

What level of integration has been achieved between Integrated Watershed Management Plans [IWMP] and Municipal/Inter-municipal Development plans in jurisdictions outside Manitoba?

What level of integration is being achieved between Integrated Watershed Management Plans [IWMP] and Municipal/Inter-municipal Development plans in Manitoba? How could the processes be improved and formalized?

1.2. Background

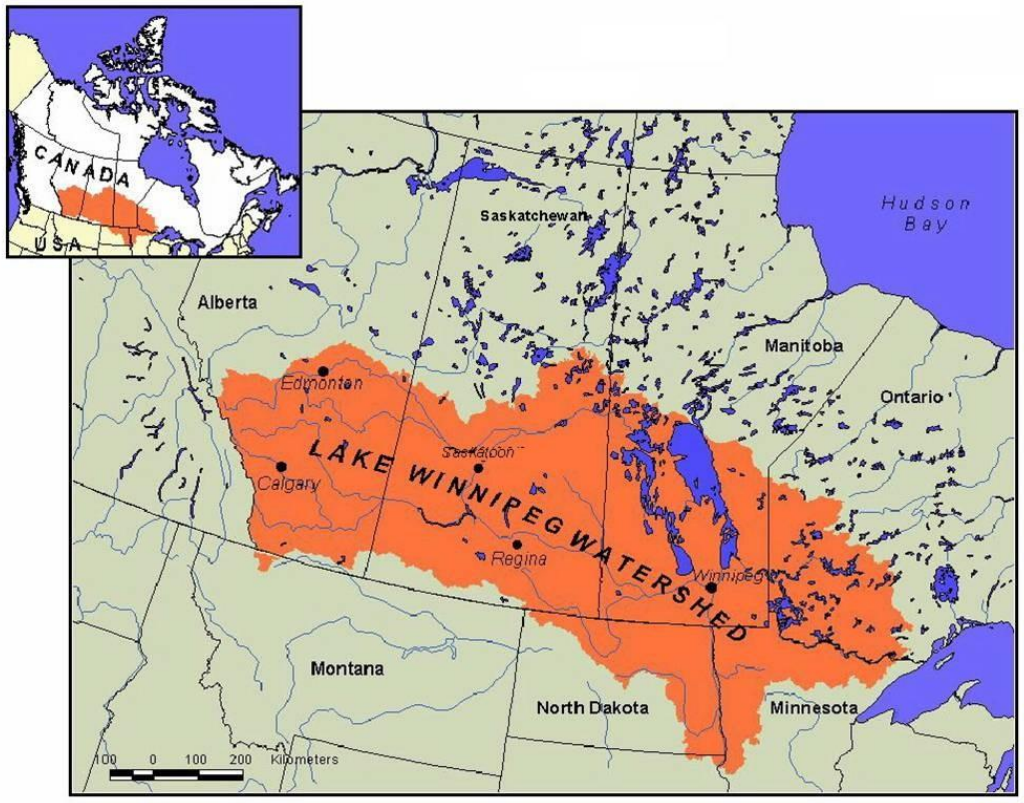
The following section provides background on the Lake Winnipeg and Red River Basins, the relationship between land and water, the history of land and water in Manitoba, and the current context in Manitoba.

1.2.1 Lake Winnipeg and the Red River Basin

The Lake Winnipeg Watershed (Figure 1) covers several provinces and states. Used mainly for fishing, recreation and other activities, Lake Winnipeg is in a degraded state (LWSB, 2011). "Algal abundance has increased between 300 percent and 500 percent since 1900. Algal blooms of up to 15,000 square kilometres have now begun to appear in the lake annually" (Sanford, 2012). These algal blooms are limiting light and oxygen from entering the lake, speeding eutrophication of the lake (Sanford, 2012). Large numbers of cyanobacteria have also

emerged, toxins that are harmful to fish, wildlife, and humans (Sanford, 2012). "The concentration of cyanobacteria in Lake Winnipeg has increased 1,000 percent since 1990" (Sanford, 2012). Sanford (2012) describes Lake Winnipeg "as the most ecologically compromised of the world's great lakes" (Sanford, 2012).

Figure 1: Lake Winnipeg Watershed (LWSB, 2012) © Used with permission from the Lake Winnipeg Stewardship Board.



Multiple river basins drain into Lake Winnipeg, with the Assiniboine, Saskatchewan, Winnipeg, and Red Rivers being amongst the largest systems in terms of water quantity and nutrient loads. The Red River Basin (Figure 2) is the largest source of nutrient overloads entering Lake Winnipeg. "While providing only 11 percent of annual water flows into Lake Winnipeg, the Red River Basin actually contributes 30 percent of nitrogen and over 60 percent of

annual phosphorus loads to the lake" (International Institute for Sustainable Development [IISD], 2011, p.7).

Figure 2: Red River Basin (Red River Basin Commission, N.D.) © Used with permission from the Red River Basin Commission.

Sanford (2012) argues that land use changes and other human activities have been and are continuing to affecting the climate and hydrological cycle of the Canadian Prairies, with southern Manitoba being one of the most affected regions. Much of southern Manitoba is part of a flood plain. Significant and costly floods have occurred since 2000. "The flooding problem has been made much worse by the draining of up to 90 percent of the natural wetlands throughout the region so as to improve agricultural productivity" (Sanford, 2012). These wetlands previously

stored water and also sequestered and filtered nutrients. Sanford (2012) notes that flood events carry flush nutrients from the landscape, increasing the nutrient loads entering Lake Winnipeg. Sanford (2012) argues that climate change and warming will further increase the severity of these problems.

1.2.2 Land and Water Connection

While activities on land have a strong effect on water quality and quantity, water also has a strong effect on land use (Mitchell, 2005, p.1337). Flooding, water quality, water supply, and aquatic ecosystems all influence what planners should consider when determining appropriate uses for land. Local human and animal populations are highly dependent on having a clean source of drinking water to ensure good health. Humans are highly dependent on having an adequate water supply, while also influencing this supply. Aquatic ecosystems are also affected by and affect land use.

1.2.3 History of Land and Water in Manitoba

Manitoba has long had a tenuous relationship between water and land. Since the arrival of European settlers, residents of Manitoba have been draining the land, farming, and building settlements in what is naturally a wet prairie, with soils that do not drain water quickly and a climate that is highly variable from year to year (Stunden-Bower, 2011). Venema, Oborne, and Neudoerffer (2010, p.iii) note that improved integration of land and water has been advocated since 1921, and incrementally attempted since 1959. They elaborate four distinct eras of water management in Manitoba:

> "The pre-confederation era (pre-1870) land and water connected, the drainage era (1870-1959) land and water severed, the first watershed era (1959-1990) conservation districts

> emerge, and the second watershed era (1990-2008) sustainable development and Lake Winnipeg; and the adaptation era (2009-)" (Venema et al., 2010, p.35).

The pre-confederation era was characterized by a predominantly agrarian society that did not have a substantial impact on the ecosystem (Venema et al., 2010). Land and water were well connected. During the drainage era, humans began to have an increasingly negative impact on the environment. Land clearing and drainage to accommodate incoming settlers were a common occurrence in this era, leading to an increasingly disconnected relationship between land and water. Liberalism and state assistance in draining land was a key characteristic in this era, as a major focus was on helping people to generate economic capital (Stunden-Bower, 2011). In the second watershed era, the first institutional efforts at better integrating land and water were made in Manitoba. *The Conservation Districts Act* came into effect in 1959 (Venema et al., 2010, p.35).

Stunden-Bower (2011) notes that over time the public developed distrust towards the Province of Manitoba over what they – the people - perceived to be poor environmental management by the provincial government, causing damage to their crops and land. Mistakes were made, but at the same time Stunden-Bower (2011) advocates further public education to help people better understand the natural climate and environment they live in, leading to a greater understanding of the challenges of water management in Manitoba - and potentially to more buy-in for watershed-based approaches to water management.

In the second watershed era, sustainable development became an increasingly strong driver of watershed management, encouraging the integration of water and land through the need to integrate environmental, social, and economic factors and concerns (Venema et al., 2010). A key feature of this era was the commencement of integrated watershed management planning as

part of *The Water Protection Act* implemented in 2006 (Venema et al., 2010, p.35). Integrated watershed management is the philosophical approach currently being taken by the Province of Manitoba to effectively manage water resources.

In the emerging 'adaptation' era, integrated watershed management planning continues, but with more of an emphasis on the need to adapt to change in the natural environment. Venema et al. (2010, p.iii) argue that effective integration will be crucial in the future as climate change begins to have stronger effects on the region, likely leading to more extreme weather and arid conditions. Sanford (2012) argues that climate change is already occurring in Manitoba and one of the first signs of an impending water crisis in Canadian Prairies. Sanford (2012) argues that land and water issues such as flooding could become so severe that they would render parts of the prairies, including Manitoba, economically unsustainable to do flooding and other water related disasters.

Venema et al. (2010) further argue that a driving characteristic of this new era of watershed management will be the need to adapt to climate change. They note that increased research into the integration of land and water in Manitoba is needed, lending validity to this research:

> "The deeper challenge of realizing the Adaptation Era lies in overcoming fractured governance and programming at the water-land interface, repurposing existing resources for watershed management and governance, and designing new instruments to support and strengthen watershed management and governance" (Venema et al., 2010, p.69).

1.2.4 Current Manitoba Context:

As noted, it is essential to integrate watershed plans with land use development plans. Integrated Watershed Management Plans [IWMP] are being implemented throughout southern

(agro) Manitoba (Manitoba Water Stewardship, 2011). The Province of Manitoba has mandated that Development Plans [DP] consider and be supportive of IWMP policies, and vice versa (MLG, 2011).

The Manitoba Planning Act and the new Provincial Planning Regulation require land-use development plans to consider the outcomes of watershed plans.

> "When preparing a development plan or amending or re-enacting a development plan by-law, a board or council must consider the application of the following insofar as they relate to land within the planning district or municipality: (a) any regulation made under section 5 of *The Water Protection Act* governing, regulating or prohibiting any use, activity or thing in a water quality management zone designated under that Act; (b) any watershed management plan approved under *The Water Protection Act*" (Province of Manitoba, *The Planning Act*, 2011, s.62.1).

Likewise, The Water Protection Act mandates that watershed plans consider land use development plans.

> "In preparing a watershed management plan, a water planning authority must consider the following:.. (f) relevant provincial land use policies, development plans, and zoning by-laws" (Province of Manitoba, *The Water Protection Act*, 2011, s.15).
>
> "A watershed management plan must:.. (c) specify linkages between water management and land use planning so as to facilitate the adoption, in a development plan or other planning instrument, of some or all of the provisions of the watershed management plan" (Province of Manitoba, *The Water Protection Act*, 2011, s.16.1).

This legislation is important; Mitchell (2005, p.1344) notes that many integrated watershed plans do not receive priority treatment and are not implemented because they have no obvious legal basis. Early evidence in Ontario indicates that the *Clean Water Act*, similar in some ways to Manitoba's Water Protection Act but formally requiring official community plans to align with source water protection plans, has been stimulating integration between watershed

management plans, particularly source water protection planning, and land-use plans in several jurisdictions in Ontario (Plummer et al., 2011, p.11).

Integrated watershed management plans were first initiated in Manitoba in 2006. The plans are directed by Manitoba Conservation and Water Stewardship, led by conservation districts, and developed in-house. The IWMP process is participatory with a strong emphasis on local knowledge, while giving the residents of the watershed an opportunity to dictate the priorities of the plans. All watershed plans must also incorporate drinking water and aquatic ecosystem protection. The hope is that the plans will be more readily adopted by communities due to their involvement in the planning process.

The first generation of (land use) development plans in Manitoba were mostly prepared by staff of the Manitoba Local Government. Comprehensive 5-year reviews of these plans are often prepared by consultants and reviewed by staff of key departments represented on the Interdepartmental Planning Board, pursuant to The Planning Act.

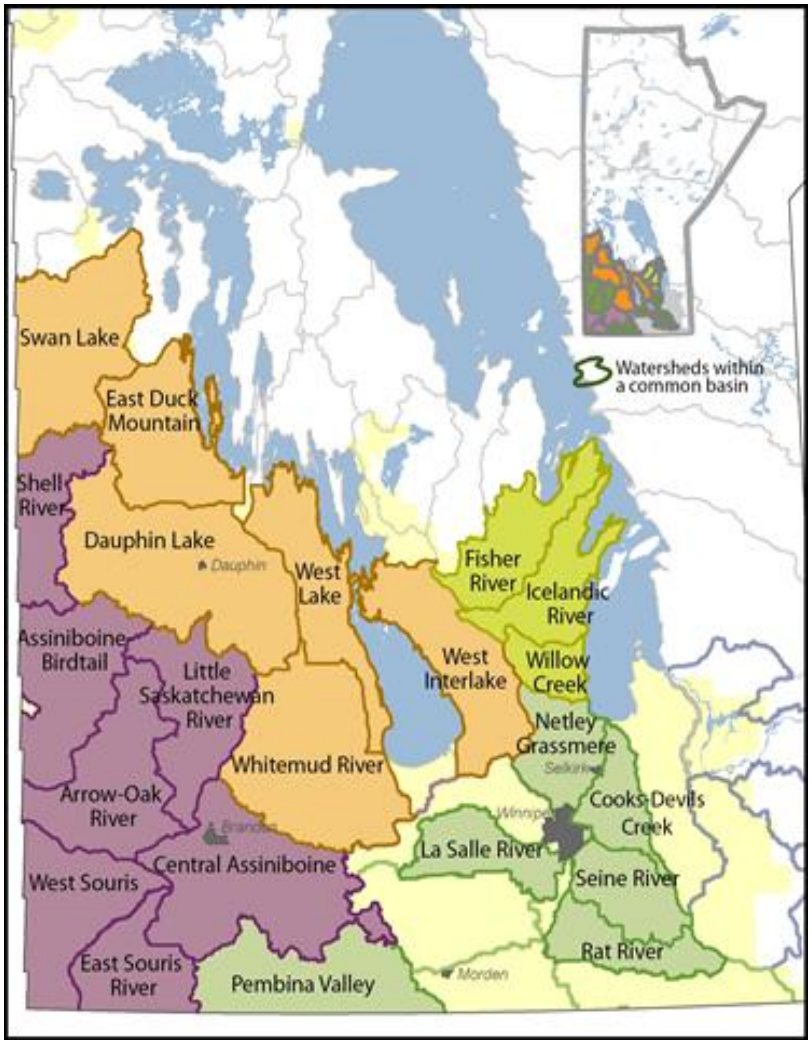
Twenty-three watersheds (Figure 4) are currently involved in creating and implementing IWMPs. Eleven planning processes have been completed (Figure 3) and twelve are in various stages of the process. IWMPs take approximately two years to develop and eight to ten years to implement (MWS, N.D.). At this stage, with less than 50% of IWMPs completed, the integration of IWMPs with DPs is just beginning.

Figure 3: Completed IWMPs in Manitoba (MWS, N.D.)

Watersheds with completed IWMPs	Year of Completion
East Souris River	2006
Icelandic River and Washow Bay Creek	2008
Arrow-Oak	2009
Seine River (Red River Basin)	2009
La Salle River (Red River Basin)	2010
Shell River	2010
Little Saskatchewan River	2011

Netley-Grassmere (Red River Basin)	2011
Pembina River (Red River Basin)	2011
Willow Creek	2012
Assiniboine Birdtail	Unknown

Figure 4: Integrated Watershed Management Plans in Manitoba (MWS, N.D.) © Used with permission from the Government of Manitoba.



There are some collective efforts already taking place. Local government planners and planning district planners are invited to watershed team meetings, provide input on existing

environmental restrictions related to water management in development plans, and review watershed plans at different points in the IWMP process. Local representatives from other governmental and non-governmental organizations are also invited to team meetings.

The Red River Basin Commission is – potentially - one example of a long-term collaborative effort in the Red River basin that involves working with multiple stakeholders to orchestrate holistic solutions for the Red River watershed (RRBC, 2005). Many water management initiatives 'fall apart on boundary edges' for different authorities (Mitchell, 2005, p.1341). To address these challenges, the Red River Basin Commission was formed. The vision of the Red River Basin Commission is: "a Red River Basin where residents, organizations and governments work together to achieve basin-wide commitment to comprehensive integrated watershed stewardship and management" (RRBC, 2005, p.pdf2).

1.3 Significance of the Research

This research seeks to contribute an improved understanding of integration via collaboration, shedding light on their meaning and significance as forms of intervention, singly and – especially – in combination, with planners in mind. Through literature review and the two Manitoba sub-basin case studies - including key informant interviews, insights have been gained into the key attributes of truly collaborative processes, as well as how collaboration has evolved over time, and the potential for future evolution of collaboration. The focus on the practice of collaboration has yielded greater clarity on the key characteristics - such as the necessary capacities, competencies, sensibilities, and attitudes – required of those involved in effective collaborative practice.

As the role of planners in water management is currently being defined (in the field of urban and regional planning, by the Canadian Institute of Planners) it is useful to gain a clearer sense of what this role should be and could be. This involves examining the historic role - and the current involvement - of planners, in implementing watershed plans through land use development plans, to better understand how this role could evolve in the future. Given the emphasis in the literature on the importance of land use planning in water management, defining this role more clearly is potentially of great value.

Staff at both MLG and MWS indicated in preliminary discussions that it would be valuable to have some basic guidelines for how to best integrate integrated watershed management plans with development plans. It is recommended in Appendix A that a guide be developed on how to on best integrate IWMPs and DPs within the province of Manitoba, to help ensure that the integration is being done, and done well. The practicum concludes with suggestions of areas requiring and/or meriting further exploration.

1.4 Biases and Limitations

One potential bias is that all the interviewees in the Pembina River and Netley-Grassmere case studies participated in integrated watershed management planning processes, but not necessarily land use development planning processes. Attempts to balance this were made through engaging development planning consultants and others with more experience in land use planning, with the end result being close to half and half for familiarity with watershed planning and land use planning.

It should also be noted that the researcher acquired employment as a watershed planner with Manitoba Conservation and Water Stewardship as of June, 2012. Due to this position the

researcher became more familiar with the watershed planning processes in Manitoba than an outside investigator might potentially have. All efforts have been made to maintain an objective perspective during the research.

Another limitation may be a lack of interviews conducted with those involved with integrating watershed and land use planning in other jurisdictions, such as southern Ontario. It was a challenge trying to balance where to focus the research efforts. The researcher decided to use selected peer-reviewed academic articles, discussing precedent empirical studies from Southern Ontario (that incorporated the results of many interviews with officials, land use planners, water managers, conservation authority staff, private sector representatives, and special interest groups) on the topic of integrating watershed and land use planning. Direct interview efforts in Manitoba focused on interviewing local area land use planning and watershed planning staff and participants, as well as senior level provincial and non-governmental staff involved in the planning processes.

1.5 Summary

This practicum explores the potential of collaboration as a form of integration in a particular planning context. Collaboration is being promoted by academics and practitioners as a means to resolve many of the 'wicked problems' in the world, including how to holistically plan for watersheds and human settlements in a way that incorporates both of these sectors into one overarching system. The complex interconnected nature of problems like this require moving away from silo-style management to more linked and potentially collaborative forms of management.

The Global Water Partnership (2000) indicated the need for further research on integrating watershed plans and land use development plans. Land use planning plays a vital role in effective watershed management and human settlements and activities are strongly influenced by watershed processes. Effective integration can ensure a holistic approach is taken towards planning for watersheds and land use.

The integration of watershed planning with land use planning has a timely application to the Manitoba setting. *The Planning Act* and *The Water Protection Act* mandate the integration of these plans in Manitoba, yet these plans are currently being integrated relatively informally. Preliminary discussions indicated that it would be useful to explore how to make the integration process more formal to help facilitate the effective integration of these plans.

The research involved a targeted literature review and two Manitoba sub-basin case studies including interviews. The case study locations examined include the Pembina River Watershed and the Netley-Grassmere Watershed. Interviews were conducted with watershed planners, land use planners, conservation district staff, senior level provincial staff, elected officials, consultants, and non-government participants.

This practicum research provides insight on the present state of collaboration as a form of integration and its future potential in Manitoba. The role of land use planners in watershed management is clarified. An understanding was gained of how integration is occurring in other jurisdictions, including ideas gained for facilitating watershed and land use planning integration in Manitoba. Finally, this research establishes the basis for guidance on how to integrate these integrated watershed management plans with land use development plans in Manitoba.

The second chapter outlines the research methods used in this research study – a literature review, case studies of select Manitoba sub-basins, and semi-structured interviews. The third

chapter is a literature review of collaborative planning, watershed planning, and the integration of watershed planning and land use planning. The fourth chapter explores watershed planning and land use planning integration in Canadian provinces outside Manitoba. The fifth chapter summarizes the results of Manitoba sub-basin case studies. The sixth chapter documents the responses of interviewees to questions exploring collaboration and the integration of watershed planning and land use planning in Manitoba. The seventh chapter is an analysis and synthesis of the results of the literature review, precedent studies, Manitoba sub-basin case studies, and interviews in the order of the research questions. The final chapter is conclusion outlining key findings including a summary table of cooperation, coordination, and collaboration as forms of integration, and a conceptual framework of factors contributing to effective integration – including an assessment of where Manitoba currently is at as well as recommendations for improvement.

2. Research Methods

A literature review and two Manitoba sub-basin case studies - including semi-structured interviews with those directly involved in the local plan-making processes, consultants, as well as senior level provincial and non-governmental staff - were the main research methods employed to address the research questions.

To explore the potential of collaboration as a form of integration, the outcomes of the literature review were summarized. This established a definition and examples of collaboration, as well as coordination and cooperation. These summary results were compared to the findings of the literature review, to see if and how collaboration, coordination, and cooperation are being utilized to integrate watershed and land use plans in Manitoba, and to explore what the pros and cons are for each as modes of integration.

To facilitate assessment of the integration of watershed and land use planning in Manitoba, a conceptual framework on factors contributing to effective integration of watershed and land use plans was developed. As of January, 2013 there had been little to no crossover between plans. Because of this the assessment focused on factors that enable and are necessary for integration, rather than an assessment of crossover and consistency between plans. Factors were qualitatively rated as low, medium or high, and may or may not require cooperation, coordination and collaboration as modes of integration.

2.1 Literature Review:

A targeted literature review was utilized to provide a theoretical foundation for this practicum, connecting the empirical study to literature and ideas that support the study.

> "All empirical studies—qualitative, quantitative, or mixed methods—must be connected to literature or concepts that support the need for the study, be related to the study's purpose statement, and situate the study in terms of previous work" (Rocco and Plakhotnik, 2009, p.120).

The literature review explored theme areas associated with the research, including: collaboration and planning, integrated watershed management planning, and the nexus of land use development planning and integrated watershed management planning – with an underlying interest in integration via collaboration.

The literature review was approached as a form of creative inquiry (Montuorri, 2005). Questions were asked of the literature, based on the established research questions and research problem, and the responses gained shaped the progress/trajectory of the practicum. The review identified themes in the literature, both historic and current, and identified where potential gaps may exist. One area suggested for research in the literature was the integration of community and regional land use planning with watershed planning, a core focus of this study.

2.2 Case Studies

Case studies were focused on selected sub-basins in Manitoba that had recently completed integrated watershed management plans and which were identified by Manitoba Conservation and Water Stewardship staff to have interesting land use planning issues for the purposes of this study. While each IWMP area has its own land use planning issues, these locations provided a base from which to explore broader concepts that could be applied in other areas of Manitoba as well. The Manitoba sub-basin case studies served largely as the vehicle by which to focus in on issues that are prevalent throughout Manitoba, in a manageable context.

The locations of the case studies were the Pembina River Watershed (Canadian side) and the Netley-Grassmere Watershed. The Pembina River Watershed has several lakes that are

experiencing significant eutrophication, and are also surrounded by cottages. Having a firm number as to how many cottages could be built around the lakes could help facilitate land use planning - to potentially set a cap on cottage development, helping to protect water quality in the lakes. The Netley-Grassmere Watershed was recommended for its sensitive areas under consideration as source water protection zones. These needed to be aligned with vulnerable areas in development plans using the appropriate land use designations. Beyond these issues, there were other suggested linkages to development planning in the IWMPs. Both Manitoba sub-basin case study locations had multiple development plans in place, which addressed water management, but all preceded the completion of the IWMP. These Manitoba sub-basin case studies and precedents from other locations, particularly southern Ontario, were analysed in conjunction with recent theory work (Healey, 2006; Innes and Booher, 2010; Margerum, 2011) on collaborative planning/approaches, to assess how well these align, and to tease out key meanings around integration, collaboration, and integration via collaboration.

Semi-structured interviews were the main research tool used in this case study research. Interviews were a useful tool since integrated watershed management planning remains in its infancy in Manitoba (approximately six years old now); the integration of land use and integrated watershed management planning similarly remains in its infancy as well in Manitoba. Semi-structured interviews allowed the researcher to gain a clearer understanding of the integration taking place thus far, and also provided the opportunity to ask additional questions related to the integration process.

Cross-analysis of plans has been used in similar studies and was utilized in some of the precedent studies in the literature. This study did not perform a quantitative analysis of linkages between plans. Due to timing of plan completions, no development plans in either Manitoba

sub-basin case study have been completed or updated since the completion of the IWMP. The research did however read through each IWMP and development plan, summarizing existing crossover/integration areas between the IWMPs and development plans, outlining similarities and differences.

2.3 Interviews

A total of fourteen semi-structured interviews were conducted, ranging in duration from twenty minutes to one hour. Interviewees were contacted by phone and email at their work offices or at other locations when the researcher was directed to do so. The researcher first contacted Manitoba Water Stewardship staff involved in developing the IWMPs in the selected sub-basins under study. These staff provided names of others involved in the process who were then contacted for interviews. This created a snowball effect accumulating leads to other people who would be useful to interview. Fifteen people were contacted, fourteen responded and completed interviews; one did not respond to the request for an interview. Interviews were conducted at interviewees' work offices or in public locations decided upon by the interviewer and interviewee. All interviews were recorded; no interviewees declined being recorded.

Semi-structured interviews with watershed planners, regional and local government planners, Manitoba Agriculture Food and Rural Initiatives (MAFRI) land use specialists, conservation district staff, local elected officials, local non-government participants, and a development planning consultant, as well as more senior level staff and management. All helped to assemble views on what is - and is not - working in terms of integrating watershed plans with local and regional development plans, with a specific assessment of the collaborative element of

these processes. These interviews also helped facilitate the articulation of the role of land use planners in the integration process.

Given that a part of this research focuses on inter-agency collaboration, it was important to interview watershed planners from Manitoba Water Stewardship and planners from Manitoba Local Government who oversee the development planning process. The elected officials afforded a local political perspective on how these plans fit together, as well as their own perspectives on the integration process. Non-government participants were non-governmental organization representatives or participants with no organizational affiliation who were involved in the planning processes. These people provided a non-governmental perspective on how well the agencies and government organizations are collaborating, as well as opinion on how effectively the plans are being integrated. Through these initial interviews, it was suggested to interview development planning consultants, MAFRI staff, and senior level provincial staff on their perspectives. These additional follow-up interviews expanded on the original data and also provided an opportunity to gain perspective on some of the initial findings. This diverse range of interviewees was important to obtain perspectives from all sides on the integration process.

These interviews, in combination, provided insight into the different levels of integration occurring between these plans, the barriers, the successes, and ideas for improvement. The wide range of interviewees expressed views from their positions, providing a holistic view of the integration process. Common themes emerged in the interviews and it was determined that an adequate understanding of the integration between land use and watershed planning in Manitoba had been reached, with sufficient data for the researcher to analyze.

All the interviews were recorded and transcribed. The collection of interview data was assessed using open coding to identify themes in the interviews. This method yielded a

qualitative assessment of what was heard, and was useful in gaining an overall understanding of what was being said by the interviewees. Themes were identified and the outcomes of the results are synthesized, with the outcomes of the literature review and Manitoba sub-basin case studies, in the chapters seven and eight.

2.4 Validation of Research Methods

Scholars who have engaged in research on this topic have used similar research methods. Margerum (2011) reviewed literature on collaborative theory and other areas, researched multiple case studies to ground the research in practice, conducted observations of collaborative processes, and interviewed a range of stake-holders involved in these collaborations. Many of his case studies focused on watershed planning, with some on regional land use planning. Innes and Booher (2010) also utilized these methods as well as drawing on experiences gained through working as scholars and practitioners in the field. Durley (2007) used similar methods in researching the linking of integrated community sustainability planning and watershed planning in the Niagara region of Ontario. Carter et al. (2005) and Plummer et al. (2011) also used similar methods in their study, focused on the integration of water management and municipal land use planning in the region of Southern Ontario.

Several researchers in collaborative land use planning and collaborative watershed planning have also used observation as a research method. Employing observation would be dependent on opportunities to observe processes in action. Given the limited opportunities and time-frame for observing planning processes, the researcher did not have the opportunity to use observation as a method. However, the other research methods used were sufficient. The common usage of literature reviews, case studies, and interviews as research methods in previous

studies in this field indicates that these would be effective methods for researching how integration via collaboration is achieved, what roles planners could play in these processes, and how the integration of land use development plans with IWMPs could be improved and formalized in Manitoba.

2.5 Summary

The literature review on collaboration in planning, integrated watershed management planning, and the integration of land use planning with watershed planning helps ground the empirical research in current planning theory. The Manitoba sub-basin case studies provided local insight into the levels of integration taking place in Southern Manitoba, common challenges, successes and ideas for how to improve integration between watershed and land use planning in Manitoba. The semi-structured interviews with participants in the IWMP and land use development planning processes, a development planning consultant, as well with more senior level provincial and non-governmental staff, afforded further insight into how effective the integration currently is - and how it could be improved in the future. Together, these research methods were successful in gaining a theoretically grounded as well as practical perspective on what is happening and what could happen in the future, particularly in terms of collaboration as a form of integration.

3. Literature Review: Collaboration as a Form of Integration in Linking Watershed Planning and Land Use Planning

To explore the potential of collaboration as a form of integration - in the context of integrating development plans and integrated watershed management plans - three main fields of literature were examined: collaborative planning, integrated watershed management planning, and studies focused on the integration of land use and watershed planning. The literature review furnished increasing rationale to support the research. Questions were asked of the literature to investigate the research questions of the practicum. The literature review was also used to develop a conceptual framework, envisioning what different types of integration might look like with regards to watershed and land use planning, and exploring the feasibility and potential of each.

The collaborative planning literature focused on theories and empirical studies related to collaborative planning. Many watershed planning authorities stress they are striving for collaboration and certain authors (Mitchell, 2005; Plummer et al., 2011) emphasize the importance of coordination and collaboration in integration. While this practicum does not advocate collaboration as the sole mode to achieve integration, it will explore the potential of collaboration as a form of integration, while also further elaborating on other potential forms of integration such as (low-level) communication (information-sharing), and higher-level communication such as cooperation, and coordination.

The watershed planning focus was on contemporary literature on integrated watershed management planning (IWMP) including: The theory behind IWMP, the benefits of IWMP, and its associated challenges. IWMP, also known as integrated water resources management (IWRM), is the most widely accepted approach to watershed management today and is the

approach to watershed management being taken by the Province of Manitoba. Thus IWMP/IWRM was the focus of the literature related to watershed management.

Studies concerning the integration of land use planning with watershed planning were also critically important, as this is a core aspect of the research. This section examines precedent empirical studies from other jurisdictions, most notably from Southern Ontario, and explores potential lessons learned that could be applied to the Manitoba context. These studies were also used to guide the research and Manitoba sub-basin case study/interviews conducted as a part of the research.

3.1 Collaborative Planning

Collaboration, coordination, cooperation and other terms referring to collective work efforts are frequently used in water management and land use planning. All of these imply various forms of working together. Much of this relates to integration, in how groups and individuals bring their efforts together. While collaboration can be a form of integration, groups can also work collaboratively without integrating all of their goals and actions. It depends on where the specific goals and actions of different individuals and groups align. The following section describes different potential modes of integration, with a special focus on collaboration - while also exploring collaborative management processes.

Margerum (2011, p.11) notes that there is a growing demand for integrated solutions, rather than dealing with single issues separately, and that collaboration has a role to play in this. Collaboration has recently become more prominent in planning (Healey, 2006), as well as in water governance (Simms and de Loë, 2010). Planning processes have been shifting from top-down processes (planning <u>for</u> people) with little collective involvement, to processes that are

more bottom-up and top-down, involving extensive public input and inter-agency collaboration (planning with people) (Healey, 2006).

Collaboration is a term frequently used in planning and environmental management today (Margerum, 2011; Innes and Booher, 2010). As a result, its meaning has become diluted (Margerum, 2011). Richard Margerum defines collaboration as "an approach to solving complex problems in which a diverse group of autonomous stakeholders deliberates to build consensus and develop networks for translating consensus into results" (Margerum, 2011, p.6). Margerum (2011, p.7) also makes an effort to distinguish how collaboration differs from - but also incorporates - other collective approaches, such as communication, consultation, conflict resolution, consensus building, cooperation, and coordination.

3.1.1 Differences between Collaboration and the other C's

Many of the afore-mentioned terms are often confused with collaboration. Margerum (2011) discusses the seven C's, which can be a part of collaboration but are not the same as collaboration.

- "*Communication* involves the sharing of information. It can be one-way (a letter or brochure) or two-way (an email exchange or a conversation)" (Margerum, 2011, p.7). Denise (1999) notes that communication does not necessarily lead to results, it makes parties in a collective aware of where the others stand. Denise also notes that many group efforts are often admonished for not communicating enough, i.e. with an emphasis on information output, but often failing to recognize the importance of reading, listening and absorbing incoming information.

- "*Consultation* is a formal process of communication with a community of people that may be conducted by governmental or non-governmental organizations" (Margerum, 2011, p.8).
    - This can involve significant or minimal information exchange and may or may not affect decision-making. Presenting is easy. It is more difficult to ensure feedback is meaningful enough to affect decision-making (Margerum, 2011).
- "*Conflict resolution* describes a range of formal and informal processes for resolving the differences between two or more parties" (Margerum, 2011, p.8).
    - This is an important part of collaboration and requires effective communication. Parties must communicate with one another to resolve their problems or conflicts. Conflict resolution differs from collaboration in that it focuses narrowly on a problem, rather than the shared vision created by common goals that stakeholders collectively establish.
- "*Consensus building* refers to the series of steps through which individuals come together, share information, and reach a mutual agreement about problems, goals, and actions" (Margerum, 2011, p.8).
    - This implies complete agreement rather than majority. Consensus building uses communication and conflict resolution as part of the beginnings of collaboration.
- "*Cooperation* is defined as a process whereby participants work independently toward a common goal" (Margerum, 2011, p.8).

- Cooperation can work well when collective goals are established and implementation actions are independent. Blank et al. (N.D.) note that with cooperation – relationships are informal and individuals/organizations do not undertake joint planning. Communication occurs, but only when the need for information exchange arises. Often involves a shorter time frame, with individuals/organizations retaining their own individual authority and separate resources, and generally low risk (Social Entrepreneurs Inc., N.D.). Denise (1999) notes that cooperation can be important, but so is divergence, and this can lead to something new - a feature of collaboration.

- "*Coordination* is defined as a process whereby participants work jointly toward a common end" (Margerum, 2011, p.8).
    - There is a common goal and people must adapt, adjust and function together. Coordination is more interdependent than cooperation, and often requires ongoing interaction. "In many cases, coordination boils down to two conditions: that people and units know what they are to do and when they are to do it; and that they see the relationship between what they do and what the coordinated whole achieves" (Denise, 1999, p.2).

Another framework for assessing collective efforts and distinguishing between different types of efforts, developed by Ethan Seltzer and adapted by Ian Wight, specifically focused on Metro Regions (Figure 5), but this could also be used for assessing what forms and depth of integration are taking place between watershed planning and municipal land use planning.

Figure 5: City-Region Interaction

Isolation	Organizations proceed with little attention to neighbours or potential partners, and with the firm belief that all forces acting on their community of interest can be held accountable at the local or organizational level
Communication	A willingness to at least let other organizations know what they plan to do, and an awareness that others are taking action or addressing issues of common interest
Coordination/Cooperation	Organizations begin to move beyond largely ceremonial communication to more functional interactions that synchronize actions in time or results in space; may or may not amount to active 'cooperation', as low level collaboration
Collaboration	A more fundamental merger of interests, where organizations recognize that taking action together, making several actions into one, can make it possible to achieve individual organizational objectives more efficiently, leveraging more out of the same net level of effort expended through coordination or cooperative partnerships
Partnership	The development of common objectives and a true merger of interests. Responsibility for the outcome, good or bad, is assigned to the partnership rather than to the individual collaborators

(Adapted/abstracted by Ian Wight from Ethan Seltzer, 'Responsibilities to Our Regions', IGA/APA Intergovernmental Affairs Division Newsletter, No. 43, February 1995, p1 and p10-13) © Used with permission from Ethan Seltzer and Ian Wight.

3.1.2 Characteristics of Collaboration

Since a core aspect of this study involves exploring collaboration as a form of integration, it is useful to go into more detail about the nature of collaboration. Collaborative planning processes are diverse, and are taking place in many different geographic locations and across a range of topics. Collaborative planning is occurring in water management, regional development, transportation planning, and community economic development - among other settings (Margerum, 2011; Innes and Booher, 2010). With the diversity of locations and topics involved in collaboration there is no 'one size fits all' strategy for creating effective collaboration

that leads to positive, action-oriented results. However, there are commonalities that can be learned from observing and studying collaborative planning and governance in practice.

Both watershed and land use planning in Manitoba and other jurisdictions require planners to work with a diverse range of professions and organizations. Goldstein and Butler (2010) discuss how this is occurring in many locales out of a need to address planning and governance challenges that cannot be solved by conventional, sectoral approaches. The complexity of a problem sometimes requires collaboration as it cannot be solved by individuals or individual organizations (Margerum, 2011, p.5). Goldstein and Butler (2010) also note that planners now must work collaboratively at several organizational, temporal and spatial scales, forcing planners to further build their collaborative planning tools and maximize their skills as facilitators and organizers (p.247).

Both Margerum (2011) and Innes and Booher (2010) note that collaborative processes can achieve outcomes that would not be possible if a simpler, more individualistic, and more sectoral approach is taken. The success of collaborative processes can move beyond agreement; at times they serve to build capacity as well:

> "These agreements may be the least of the consequences, however, as the processes themselves build capacity for self-management in communities, improve policy knowledge, and create innovative strategies tailor-made to the unique conditions of particular situations" (Innes and Booher, 2010, p.7).

Results are a significant aspect of collaborative efforts. Blank, Kagan, Melaville, and Ray (N.D.), Denise (1999), Margerum (2011), and Social Entrepreneurs Inc. (N.D.) all discuss the importance of results. Blank et al. (N.D.) and Denise (1999) state a common feature of collaborative efforts is that they have clear results they are targeting. Collaborations often produce something new (Goosen, 2009).

The success of collaborative processes depends on a range of factors. Innes and Booher list three core conditions necessary for processes that are collaboratively rational. The key facets of Innes and Booher's DIAD theory are **d**iversity, **i**nterdependence, and **a**uthentic **d**ialogue (Innes and Booher, 2010, p.35): "For the process to be collaboratively rational, all participants must also be fully informed and able to express their views and be listened to, whether they are powerful or not" (Innes and Booher, 2010, p.6). With respect to challenges, Margerum (2011) points out the three most common issues in convening a collaborative are: reluctance and restrictions on participants' time and money; limitations imposed by policy or legislation; and staff turnover in collaborating agencies (p.77).

While collaborations are diverse, Margerum (2011) discusses three main typologies under which most collaborative planning processes fit: the action level, the organizational level, and the policy level. *Action level* collaborative processes are the most 'on-the-ground' in focus: "At the action (operational) level, collaboratives stress direct action or on-the ground activities, such as monitoring, education, service delivery, and community action [Margerum 2007, 2008; Imperial, 2005]" (Margerum, 2011, p.23). *Organizational level* collaboratives often involve government agencies, groups sanctioned by government agencies, and non-governmental organizations: "At the organizational level, collaboratives focus on the roles and programs of organizations" (Margerum, 2011, p.23). *Policy level* collaboratives primarily focus on policies and administrative rules: "At the policy level, collaboratives work on government legislation and policies [Imperial, 2005; Margerum, 2007, 2008; Gregg, Born, Lord, and Waterstone, 1991]" (Margerum, 2011, p.25). While some collaborative processes fit clearly under one of these typologies, others could fit in any one, or cut across all three (Margerum, 2011).

For assessing *action* collaboratives, the focus is 'on the ground' activities and how they may affect future outcomes (Margerum, 2008, p.498). For evaluating *organizational* collaboratives, the focus is on how "organizations are aligning policies, regulations, and budget allocations to support collective outcomes" (Margerum, 2008, p.498). Evaluating *policy* collaboratives focuses on how policies are being implemented by the different organizations designated to implement related actions (Margerum, 2008, p.498).

The Manitoba sub-basin case study focus of this practicum, integrating Local/Municipal/Inter-municipal Development Plans with Integrated Watershed Management Plans, would include aspects of all three of these typologies. Integration of policies is necessary, agencies must work together and integrate their activities in the required areas, and local land owners and elected officials are also involved, as are conservation districts, as major implementation actors of IWMPs.

To guide implementation and translate consensus into results, networks are needed. Margerum argues that reaching consensus is easy – the challenge is to follow through to results (Margerum, 2011, p.7). McGinnis, Woolley, and Gamman (1999) point out that bottom-up support is important in collaborative watershed planning, that social networks are critical to long-term planning, and that the community - built through common agreed-upon values - facilitates implementation through building a desire to protect the community's watershed. The importance of networks and community values has particular relevance to the Manitoba context as IWMPs have been drafted and are now moving into the implementation phase, where multiple organizations need to be involved and take action. Having networks in place to facilitate communication around implementation will go a long way to achieve results, and ensuring effective integration between watershed and land use planning in Manitoba.

An important aspect of collaborative efforts is to measure success. Margerum suggests several categories for assessing collaborative efforts. "Input indicators measure the quality of the information, data, and analysis that goes into planning and management" (Margerum, 2011, p.276). Process indicators focus on benchmarks. These could be the approval process in planning or matters such as the consultation aspect of planning process (Margerum, 2011, p.276). "Output indicators measure the products of the planning process, such as plans, policies, and regulations" (Margerum, 2011, p.276). Performance indicators examine short term measures of plan or policy success (Margerum, 2011, p.276). "Outcome measures (also called long-term outcomes or impact measures) assess the actual on-the-ground changes that result from the combination of policies, plans and social, economic, and environmental trends" (Margerum, 2011, p.276). Program logic examines how a policy, plan, or program connected objectives to outcomes (Margerum, 2011, p.276).

Margerum (2011) argues that collaboration, or whatever future terms may be used to describe collaboration, will continue to be needed and utilized in the future to address the complex, interconnected problems in existence in the world - that require a range of stakeholders to develop collective, integrated solutions. Sectoral approaches to water resource management, land use planning, climate change and other issues are unable to be addressed by single sector solutions. Collaboration has the potential to play a role in building a more interconnected relationship between planning for land and water.

3.1.3 Adaptive Management

Many problems are long-term, complex, and not solved by one-time solutions, requiring ongoing adaptation (Margerum, 2011, p.11). Adaptive management has been recently defined as

"a hypothesis-driven, experimental approach to natural resource management and conservation" (Hansen and Hoffman, 2011, p.207). Watershed plans and land use plans both require ongoing adaptation as new information arises.

An important aspect of watershed management and many longer-term collaboratives is the ability to adapt to changes in the system. A key feature of adaptive management is that the system learns through experimentation. "Adaptive management applies the concept of experimentation to the design and implementation of natural-resource and environmental policies" (Lee, 1993, p.53). Part of adaptive management is having adaptive policies. "An adaptive policy is one that is designed from the outset to test clearly formulated hypotheses about the behavior of an ecosystem being changed by human use" (Lee, 1993, p.53). Without experimentation change comes about slowly, and in working in situations involving rapid change the lack of adaptability can be problematic (Hansen and Hoffman, 2011, p.199). The lack of experimentation also has the effect of stunting learning. "Without experimentation reliable knowledge accumulates slowly, and without reliable knowledge there can be neither social learning nor sustainable development" (Lee, 1993, p.54).

There are several characteristics that facilitate adaptive management: decision making is not bound by jurisdiction but rather has an eco-systemic approach that crosses boundaries and links activities; a larger ecosystem or population is being managed rather than an individual, and there must be tolerance for individual failures in order to take risks and test ideas; and the time frame is environmental, a biological generation, rather than dependent on business or political cycles (Lee, 1993, p.62). Immediate needs and short term benefits should not always have priority over longer-term sustainability (Hansen and Hoffman, 2011, p.200). Risk taking is a key part of the process, as this opens up the possibility of surprising outcomes (Lee, 1993).

Lee notes that there are certain institutional conditions that favour adaptive management:

> "There is a mandate to take action in the face of uncertainty; decision makers are aware that they are experimenting anyway; decision makers care about improving outcomes over biological time scales, preservation of pristine environments is no longer an option, and human intervention cannot produce desired outcomes predictably; resources are sufficient to measure ecosystem-scale behavior; theory, models, and field methods are available to estimate and infer ecosystem scale behaviors; hypotheses can be formulated; organizational culture encourages learning from experiences; and there is sufficient stability to measure long-term outcomes; institutional patience is essential" (Lee, 1993, p.63).

Lee also notes that an assumption is not made that adaptive management will be executed by rational individuals in a perfect world; it will require two-way adjustments (Lee, 1993, p.86).

> "On one side, to suggest institutional designs and practices that can compensate for the inevitable weaknesses and unavoidable failings of real institutions; and on the other, to temper and frame expectations of what is attainable in an imperfect world" (Lee, 1993, p.86).

Despite its flaws this is the reality of the world. Through learning via experimentation improvements can be made as to how to effectively manage land and resources, such as watersheds.

Given current and future changes being brought about by climate change there is a need for systems to be adaptable. Climate change requires holistic planning that reaches across different sectors. "To make integrated planning a reality, we may need governance structures and regulatory mechanisms that can reach across sectors, or at least foster coordination among them" (Hansen and Hoffman, 2011, p.200). This relates directly to the integration of land and water in Manitoba, as climate change is projected to impact the ecosystem with more variable and increasingly arid conditions (Venema et al., 2010), and there is a strong need to approach the system holistically - planning in an integrated way that is cross-sectoral. McGinnis et al. (1999) also point out that as a greater understanding of a watershed is gained through a collaborative community-based process, there will likely be a need to adapt - to incorporate new knowledge.

With the ongoing effects of climate change, adaptation of existing plans and processes is required. Venema et al. (2010) and Sanford (2012) argue that adaptation is a must in Manitoba and throughout the Lake Winnipeg Basin region in order to effectively deal with the impacts of climate change. New information needs to be brought into plans as it is experienced by the system. A proper balance needs to be struck between rigid government structures that ensure the integrity of the work with enough flexibility to meet new challenges as they arise (Hansen and Hoffman, 2011, p.203). Likewise, any efforts at integrating watershed planning and land use planning in Manitoba should perhaps be approached from an adaptive, experimental perspective. This will facilitate social learning and help determine the most effective methods of integrating these streams of planning, as part of a holistic system.

3.2 Watershed Planning

It is well recognized that water is affected by many different influences. Industry, agriculture, development, waste management, land use and other influences all have the potential to affect water. While – historically - many of these fields may have functioned in sectoral silos, it is becoming increasingly recognized that effective water management demands an integrated approach. This section outlines what integrated water resource management (IWRM) is, the role of integrated watershed management planning in Manitoba, and some of the challenges experienced with IWRM.

3.2.1 Integrated Water Resource Management

Integrated water resource management [IWRM] is being promoted globally as a route to more sustainable water management.

> "Integrated Watershed Management (IWM) is viewed as a multidisciplinary and iterative process that seeks to optimize the contribution of aquatic resources to the social, environmental, and economic welfare of Canadians, while maintaining the integrity of aquatic ecosystems, both now and into the future" (Environment Canada, 2010).

This approach is more holistic, cross-sectoral and integrated – compared with more traditional, sectoral approaches to water management.

> "An IWRM approach 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" (GWP, 2004, p.7).

Integration is the operative word in integrated watershed management. As such it incorporates many different aspects of water management, with many different stakeholders and institutions, all striving to operate in an integrated and coordinated system. "This includes more coordinated development and management of: land and water, surface water and groundwater, the river basin and its adjacent coastal and marine environment, upstream and downstream interests" (GWP, 2004, p.7).

Over time IWRM has shifted, from a focus on coordination and integration of government activities prior to the 1990s, to an evolution in the 1990s that acknowledged the importance of local community members in IWRM (Ferreyra, de Loë, and Kreutzwiser 2008).

> "IWRM has commonly involved the creation of multi-stakeholder watershed partnerships that are to rely on collaboration to develop a common environmental vision to be achieved through integrated, watershed-based policies and programs" (Ferreyra et al., 2008, p.305 citing Singleton, 2002; Blomquist and Schlager, 2005).

Policy development should be cross-sectoral (GWP, 2004, p.7), something recently implemented in Manitoba with changes to the *Water Protection Act* and *The Planning Act*. Stakeholders need to have a voice (GWP, 2004, p.7), something that has been emphasized as important in the most recent wave of watershed planning in Manitoba. And finally, water

management needs to be balanced and linked with economic development, while also blending water objectives with broader social, environmental, and economic goals (GWP, 2004).

Environment Canada has several principles related to integrated watershed management. Within integrated watershed management it is important to recognize the values and interconnection of water to the economy, environment and society as well as the importance of stakeholder involvement and support (Environment, 2010). Governance should be transparent and action coordinated (Environment Canada, 2010). "Partners and stakeholders collaborate at basin and sub-basin levels, and decision-making is integrated, timely and adaptive" (Environment Canada, 2010)

Environment Canada (2010) also notes how water is interconnected with land use, different environmental issues, and a vital part of ecosystems. Actions need to be balanced to ensure effective implementation (Environment Canada, 2010). Integration is a vital component; policies, programs, and management should be integrated to encompass the different issues of water management and their interconnections (Environment Canada, 2010). Environment Canada (2010) recommends "design and deployment of a mix of measures [voluntary, regulatory, and market-based instruments]". The federal government in Canada also stipulates desired results of action: "Effective and efficient programs, measures and actions are in place to achieve desired outcomes" (Environment Canada, 2010).

There are several advantages to an IWRM approach. It facilitates problem solving (GWP, 2004). Many water related problems such as poor water quality, flooding, and aquatic ecosystem degradation cannot be solved by single sector approaches (GWP, 2004, p.7). Problems like these require holistic approaches that incorporate multiple sectors and organizations in the problem solving process. With IWRM, solutions are arrived at by multiple

organizations, ensuring that a solution created by one organization does not create a problem in another area (GWP, 2004, p.7).

Another advantage is IWRM helps avoid financial mistakes and promotes good investments (GWP, 2004). IWRM advocates multi-sectoral solutions and a long-term time frame. Often environmental impacts lose out in the short-term to immediate economic needs, but over the long-term these simplistic, short term solutions cause more harm and serve little advantage (GWP, 2004, p.9). IWRM also helps to ensure water is used strategically (GWP, 2004, p.9). This helps to ensure that water is used efficiently, managed on a basin wide level, and sustained over the long-term.

There is a push in the field of water management today to integrate watershed management with other plans for a more holistic approach (Kidd and Shaw, 2007). A key aspect of IWRM involves linking water management to land use planning: "Water problems cannot be treated in isolation, and indeed should be considered in relation to land-based and land-use planning issues" (Mitchell, 2005, p.1336). Activities on land and changes to the landscape have a significant impact on watersheds and vice versa (Mitchell, 2005, p.1337).

Land use has been identified as one of the key areas capable of contributing to source water protection (Simms, Lightman, and de Loë, 2010, p.47). Water quality and supply issues are generally tied to urban and rural land use; for this reason it is important to integrate source water protection with other community plans (Simms, Lightman, and de Loë, 2010).

3.2.2 Challenges to implementing IWRM

While integrated watershed management has become the prescribed norm for watershed management and planning, it is challenging to implement to a level that could be considered

truly integrated. Many challenges exist, mostly around how institutions involved in IWM should collaborate and coordinate to ensure watershed management is truly integrated. Political boundaries, traditional institutional silos, and lack of resources all create challenges for IWM.

One of the primary challenges of water management is boundary or edge issues. Water is often an 'orphaned' resource due to lack of clarity over who is responsible for it as the water passes through multiple jurisdictions (Mitchell, 2005, p.1341). Cervoni, Biro, and Beazley, 2008) citing Ramin (2004: 6-7) states "watersheds are 'natural integrators of water quality and quantity, land-water-air interactions, and upstream and downstream effects…. they form a geographic unit that supports interdisciplinary work' " (p.337). Ferreyra et al. (2008) note that while the watershed is often used as the de facto scale for managing water resources, efforts at integration and collaboration should be flexible enough to incorporate the social and political scales of a particular area as well.

While the watershed is the most logical natural boundary from which to manage water resources, it does not resolve all the political issues involved in watershed management. Blomquist and Schlager are authors who take the position that integrated watershed management never fully achieves integration as those striving for integrated watershed management envision, and that challenges always remain.

> "We find that as a unit of organization, 'the watershed' does not resolve fundamental political questions about where the boundaries should be drawn, how participation should be structured, and how and to whom decision makers within a watershed are accountable" (Blomquist and Schlager, 2005, p.102).

Redrawing political boundaries, while a possible strategy, ignores the fact that political boundaries have meaning even if they were not logically drawn from an environmental perspective.

> "A watershed represents one commonality among persons, but so do communities defined by other boundaries. Shifting to the watershed as the focus of attention cannot render sub-watershed or supra-watershed communities irrelevant" (Blomquist and Schlager, 2005, p.105).

Different communities may be within one watershed, but they may identify their sense of place and commonality on boundaries other than the watershed, meaning these political boundaries are meaningful and not easily changed. The watershed is not the only commonality between communities. "The promise of easily defined and sensible boundaries that would promote integrated management cannot be realized" (Blomquist and Schlager, 2005, p.105).

Mitchell (2005) argues it is important to acknowledge that boundary related problems in water management will always exist (p.1348). Rather than focus on how to redraw boundaries, Mitchell (2005) suggests focusing on how to arrange institutions to best minimize the negative impacts of edges. "This is usually best achieved by establishing processes and mechanisms, and by nurturing organizational cultures and individual attitudes, to encourage the collaboration and coordination required in IWRM" (Mitchell, 2005, p.1348).

Blomquist and Schlager (2005) are doubtful that integrated watershed management can be implemented in the collaborative manner that some envision. They argue that the challenges around boundaries and decision-making cannot be overcome by creating one overseeing body.

> "Collective choices about the scope of management, who participates and how, and how collective decisions are revised and challenged cannot be avoided by creating a single watershed authority with broad powers to comprehensively address watershed problems" (Blomquist and Schlager, 2005, p.113).

In contrast to this, Carter et al. (2005) found that the presence of an overseeing lead group did in fact improve integration between land use plans and watershed plans in their study of three cases in Southern Ontario.

Blomquist and Schlager (2005) find that efforts at integrated watershed management often resemble more of a polycentric approach than a fully collaborative approach. Some argue that this emerges from a logical basis that incorporates both horizontal (interagency and stakeholders) and vertical (different levels of government) integration, as well as accountability - while still recognizing communities of place and common interest. While criticized, these polycentric communities in watersheds "can also be viewed as means by which affected communities assert contested claims for inclusion, articulate and protect their values and interests during decisions about the watershed, and invest those decision-making arrangements with mechanisms for accountability and change" (Blomquist and Schlager, 2005, p.113). In this view integrated watershed management is occurring, but perhaps in a far less collaborative manner and a more decentralized arrangement than many who advocate IWM as the prescribed watershed management approach may envision.

Economic inter-linkages with watershed planning can help get people involved in a process, but they can make it difficult to reach successful outcomes. Agricultural land owners can have a strong interest in joining a collaborative watershed planning process but may be restricted in what they can do because of their dependence on their land for income (Margerum, 2011, p.61). Rural residential land owners can be more difficult to involve, but their ability to implement conservation actions is at times greater because they do not rely on the land for income (Margerum, 2011, p.61).

There is sometimes distrust from urban and rural community members toward government in regards to planning and management programs, partly due to community engagement occurring very late in the process (Margerum, 2011, p.11). "Because of the rural character of many watershed communities, resource agencies are seeking management

approaches that support local control over local resources" (McGinnis et al., 1999, p.2). With the IWMP process in Manitoba, community engagement is one of the first steps in the process and is used to help set priorities for the plan and conservation districts, provincial-municipal partnership organizations that are locally governed, are typically the water planning authority for an IWMP.

Another challenge encountered is that integrated watershed management plans don't have a legal home, as in the case of Manitoba where they are voluntarily implemented. Mitchell (2005) notes this can result in recommendations having a low priority (Mitchell, 2005, p.1345). One way of working around this is to develop IWMPs with connections to related initiatives, such as land use planning, that have a statutory basis. In Manitoba, plans are being developed in this manner, and as noted *The Planning Act* and *The Water Protection Act* require that development plans and IWMPs be mutually considerate of the recommendations and outcomes of each plan.

3.2.3 Watershed Planning Conclusion

Despite the associated challenges, the ability of IWRM to manage a complex interconnected web of water related resources, IWRM's ability to negotiate potential conflicts, means – arguably – that IWRM continues to be the most effective means of managing water resources. The process is multidisciplinary and integrated, acknowledging that a range of stakeholders needs to be involved. Land and water in a watershed is one of the most significant interconnections. The following section focuses on the integration of land use planning with watershed planning.

3.3 Integration of Watershed and Land Use Planning

Land and water are intertwined and must be planned for in an integrated manner, as suggested by IWRM. Linking municipal/inter-municipal land use planning with watershed planning is a key aspect of integrating land and water management. Studies conducted on the integration of land use planning with watershed planning suggest further research on the integration is needed (GWP, 2000). The two main academic study areas for integrating water management and land use planning are source water protection and water supply. But flooding, ecosystem protection, and other related areas should also be considered for efforts at integration. The following section presents an overview of the integration of watershed and land use planning, especially focusing on land use planning in water supply and source water protection, with a focus on challenges to integration, as well as the roles and tools of land use planners.

3.3.1 Watershed and Land Use Planning Integration

One common theme is that the land and water sectors are often not integrated as might be preferred (Mitchell, 2005; Bates, 2011). Water management is often seen as the realm of engineers while development and land use planning is seen as the realm of land use planners (Carter et al., 2005, p.116). This leads to disconnection between these fields, as the system linkages are not recognized when approached from a sectoral perspective, and the focus of each becomes narrower than it should be. Often the linkages are ignored: "It is all too common for critical links between land use planning and water management to be ignored, or only tacitly recognized" (Carter et al, 2005, p.116). Carter et al. (2005) focused their research on strengthening the linkages between land use planning and water management, connecting the whole system. When planning for future development, it is vitally important to ensure that water

resources are capable of meeting future needs, that changes in land use do not adversely impact water resources, and that potential future climate changes are taken into account (Bates, 2011).

Carter et al. (2005) define integrated management "as policies, programs and activities that consider the relationships between increased development and the availability of ground and surface water supplies" (p.116). This integration needs to occur on different levels. Government, community and non-governmental actions need to be coordinated, resource sectors integrated, stakeholders must participate, and there must be a willingness to acknowledge the needs of others and compromise (Carter et al., 2005, p.116).

An important part of integrating land use planning with water management is the involvement of the public. Stakeholder involvement increases the likelihood of support for implementation (Ivey, de Loë, and Kreutzwiser, 2006). Stakeholders from across the watershed must participate, as water can be affected by land use throughout the watershed, regardless of municipal boundaries. "As more people become involved, and as efforts are made to coordinate across sectors, the likelihood of conflicts increases" (Carter et al., 2005, p.117). Planning for land use and watersheds in an integrated manner helps to reduce and resolve potential conflicts that may otherwise emerge from these planning processes.

Carter et al. (2005) found in their research that the presence of a lead agency in charge of coordinating land use and water management is an important factor in successful integration. "The presence of such an agency can help to ensure that undue overlap between management efforts, and conflicts between goals, are reduced" (Carter et al., 2005, p.119). This agency should incorporate land use and water management stakeholders (Carter et al., 2005, p.119) in an effort to incorporate the knowledge and concerns of each, helping to ensure that plans are complementary and integrated - and any potential conflicts are dealt with.

Integration must also occur at the legislative and policy level. Legislation and policy directives should promote integration, not be contradictory, and ideally provide direction for how to integrate effectively. In Canada, multiple provinces are now in the process of updating policy and legislation to better bridge the gap between water and land use planning (Simms, Lightman, and de Loë, 2010). In Manitoba, *The Planning Act* and *The Water Protection Act* have recently been updated. As recent research by Plummer et al. (2011) in Ontario attests, policy and legislative changes aimed at promoting and requiring integration can have a strong effect on improving the merger of these fields.

3.3.2 Challenges

There are multiple reasons cited as leading to the failure to acknowledge water-land use planning linkages. These include limitations in capacity, insufficient knowledge, institutional arrangements that do not facilitate integration, and a lack of clear goals and targets (Carter et al., 2005, p.116). Limited time, financial, technical, and human resources also inhibit integration (Ivey et al., 2006) as well as a lack of tools (procedural guides, institutional authority) (Carter et al., 2005). All of these factors limit integration, and are not easily overcome.

There is at times a need to rely on other organizations with legal authority to implement the plan, and these organizations may or may not have adequate resources or interest to do what is needed (Ivey et al., 2006). Sometimes, implementing land use policies for watershed protection are limited by municipal zoning by-laws not being retroactive (Ivey et al., 2006, p.204), which is the case in Manitoba.

Another challenge is that many land use planning tools, zoning for instance, are too inflexible and imprecise (Ivey et al., 2006, p.204). For example, zoning can restrict potentially

hazardous activities in a source water protection area, but also often can restrict other activities as well that have limited risk, making this a potentially unpopular means of protecting drinking water sources (Ivey et al., 2006, p.204).

To combat these challenges, Ivey et al. (2006) suggest municipalities be given new authority.

> "New municipal powers, they argue, should include the ability to require disclosure of onsite chemicals, implementation of BMPs (Best Management Practices), registration of agreements on development applications, control of new and abandoned wells and septic systems, notification of historical contaminants discovered during redevelopment, and regulation of existing land use activities" (Ivey et al., 2006, p.205).

These new powers would help to combat some of the noted challenges regarding implementation of integrated approaches to watershed planning and land use planning, particularly with regards to source water protection.

Another highlighted area of need is to strengthen regional planning. Ivey et al. (2006) in discussing their Ontario research context suggest "a formal means of inter-municipal planning, as exists in other Canadian provinces (e.g., Alberta), could improve watershed-scale source protection planning, and increase consistency in implementation of the various measures" (p.205). Recharge areas for municipal groundwater can often be located outside of municipal boundaries, making regional coordination important to protect drinking water sources, particularly in areas that are dependent on groundwater for their drinking water source.

3.3.3 Water Supply

Linking water supply to development and growth management planning is one area of focus for integrating land use and water management. Tied to this is water quality, as changes in water quality can also influence the available supply. Bates (2011) notes that development

planning is often not linked with water supply as it should be, and that this could lead to significant future consequences.

Human usage of water for drinking, agriculture, industry, and other uses must remain within the capacity of the ecosystem. Human development has the potential to alter the watershed ecosystem in ways that limit its ability to recharge aquifers and other water sources. "Urban growth and the loss of 'green space' can result in the loss of groundwater recharge areas" (Carter et al., 2005, p.124). The impacts of development on groundwater supplies must be assessed and monitored to ensure that sustainable development occurs.

The relationship between water supply and growth in development is a particular issue in the south-western United States, where rapid growth has been occurring in an arid environment with limited supplies of water. This has implications for the future, where it remains to be seen if water supply will be able to keep up with the growth in development, particularly in the face of climate change (Bates, 2011). Both Bates (2011, p.4) and Carter et al. (2005) argue that land use decisions should take into account the social, environmental and economic implications - for where the water is going to come from, as well as the implications of development on the watershed system.

Calgary is another western Canada region dealing with water supply constraints (Tyler and Quinn, 2010). Calgary has a semi-arid climate and has been experiencing rapid development growth, which has the potential to strain the ability of the eco-system to supply water for the region. It is noted that the sustainability of the region, including the hydro-geological cycle, will be in part related to land use distribution and development (Tyler and Quinn, 2010). The importance of resilience and adaptive management is also noted, the system must be flexible enough to adapt to feedback and change (Tyler and Quinn, 2010). Tyler and Quinn (2010, p.83)

argue that a paradigm change is needed in moving from economically-focused growth-oriented development to land use planning for development that is based on ecological goods and services.

The research of Tyler and Quinn (2010) on social ecological systems related to land use and water management interconnections in the Calgary region is ongoing. Some initial lessons learned suggest: adaptation is needed to react to feedback from systems, economic systems are supported by the natural processes on the landscape and land use decisions must reflect this, government decision making must recognize not only short term economic benefits but also the long-term impacts of decisions on ecological systems, scenario building of potential futures of land use can assist with decision making, and the hierarchical interconnections between people and natural systems must be recognized across multiple scales (spatial, temporal, and organizational) (Tyler and Quinn, 2010, p.83). Tyler and Quinn (2010) argue that recognizing the impact of human influence on the landscape and the subsequent impact on the hydrologic cycle are especially important to recognize in semi-arid climates such as the Calgary region. Efforts must be made to avoid what Tyler and Quinn (2010) refer to as ecological infrastructure debt.

While water supply can be an issue for land use planning in areas experiencing growth and arid conditions, it could become more of an issue in other areas as well due to climate change. Climate change is expected to have a major effect on weather patterns throughout North America, with some regions feeling the effects stronger than others. The Prairies of Canada are noted to be in an area that will experience a high level of impact as a result of climate change, with the expectation being more arid conditions and extreme weather in an area with already high levels of variability (Venema et al., 2010, p.14). This risk further necessitates the need to

consider future water supply in the course of land use and development planning decisions being made in the Canadian Prairies, including Manitoba. The increased likelihood of more extreme weather in Manitoba as a result of climate change (Venema et al., 2010) also has the potential to increase flooding in an already flood-prone region.

Sanford (2012) argues that while the past water management decisions may have been made on the basis of stable weather patterns, this is no longer the case. Changes to the landscape of Manitoba and the Lake Winnipeg basin over the last one hundred years and climate change are and will continue to change the supply and availability of water. Both Venema et al. (2010) and Sanford (2012) that the need to adapt land and water management to the impacts of climate change is a matter of great urgency.

Land use planning can help to mitigate flooding by preserving natural water retention areas, such as wetlands. Sanford (2012) argues that stopping the draining of wetlands in the prairies is the first thing that needs to be done to adjust water management practices in the region. The second is adopting agricultural practices that are resilient towards extreme and varied weather events (Sanford, 2012). Riparian areas should be protected. New developments should contain plans to manage storm-water and normal runoff effectively. Developments should not be located in flood-prone areas, without appropriate precautions.

3.3.4 Water quality

Another major concern in the integration of water management with land use planning is that of water quality, both surface and groundwater. Source water protection for drinking water has become especially prominent, and is garnering attention in studies exploring land use planning and water management (Plummer et al., 2011; Simms, Lightman, and de Loë, 2010;

and Ivey et al., 2006). Surface water quality in rivers and water bodies, such as Lake Winnipeg, is also a driving concern behind the emphasis on integration, particularly in Manitoba as there are significant concerns regarding the state of Lake Winnipeg (LWSB, 2011). Beyond having good water quality for drinking, it is also important to acknowledge the impact that water quality can have on the ecosystem.

3.3.5 Source Water Protection

> "Source water protection (SWP) is broadly defined as watershed and aquifer management for the protection of drinking water supplies and is operationalized through land-use management programs with the specific goal of protecting drinking water sources against contamination" (Patrick, 2009, p.209 citing National Research Council 2000; Harrigan-Farrelly 2002; Ivey et al. 2006).

Patrick (2011) argues that source water protection - at its core - is land use planning, with many factors to take into account based on the watershed scale.

> "These components are specific to each watershed and broadly include: delineation of watershed or groundwater recharge areas, inventory of potential contamination sources, vulnerability assessment of each potential contamination source and implementation of a watershed management plan" (Patrick, 2009, p.211 citing Lacy 2003; Ontario 2004; Ivey *et al.* 2006).

While drinking water quality has long been a concern in Canada, recent incidents affecting drinking water quality have raised the importance of source water protection. Incidents in North Battleford, Saskatchewan, and especially in Walkerton, Ontario, have pushed source water protection to prominence in the water management agenda. In the case of Walkerton there were several deaths and hundreds of people who became very ill. An inquiry arose out of this hearing and source water protection emerged as a high priority for protecting drinking water quality.

Source water protection is part of the multi-barrier approach to drinking water protection. Mitchell (2005) noted that Justice O'Connor, of the Walkerton inquiry, recommended several

barriers to be used in protecting drinking water: "five barriers are commonly used in relation to the provision of drinking water: (1) source protection, (2) treatment, (3) distribution-system security, (4) monitoring, and (5) practised responses to adverse conditions" (p.1347).

Municipalities as well as provincial agencies involved in land use planning have an important role to play with regards to source water protection. "Land use planning is a municipal responsibility, but municipalities are creatures of the provinces in Canada. Thus, the provinces define the planning system, and the powers and responsibilities of municipalities" (Ivey et al., 2006, p.199). This must be coordinated with water supply and wastewater treatment as well. When different organizations and activities are integrated, it can facilitate joint assessment and help balance the competing interests - such as protecting drinking water supplies and economic development (Ivey et al., 2006, p.196).

Research on source water protection and land use planning has been emerging from across Canada, but especially from Ontario. Plummer et al. (2011), Ivey et al. (2006), and Carter et al. (2005), all address the role of land use planning in source water protection and the integration of land use planning with water management in relation to source water protection. Further results of these studies will be discussed in greater detail in the following chapter.

3.3.6 Tools for integration

Several different tools have emerged for land use planners to use in facilitating the integration of watershed plans with municipal/inter-municipal land use plans. Policy changes regarding land use planning and source water protection have been occurring across Canada. Simms, Lightman, and de Loë (2010) documented land use planning as one of the tools to be

used in source water protection. Within land use planning there are several mechanisms that can be used to ensure source water protection such as:

> "… policy frameworks including regulatory land use policies and land use frameworks, regional land use plans including general development plans and targeted regional plans, municipal plans and zoning by-laws, municipal subdivision and development regulation and by-laws, non-regulatory municipal plans, public land use policy frameworks, public land use planning and designations, and public land use programs" (Simms, Lightman, and de Loë, 2010, p.viii).

These tools and mechanisms are being implemented across Canada, with different provinces doing different things. Regulatory tools such as zoning by-laws can be used in source water protection, in ensuring flood zones are not developed or developed with appropriate precautions, among other uses.

Frameworks or procedural guides for ensuring effective integration can aid the process. One example of a previous guide - on how to integrate watershed and land use planning - was produced by the Ontario Ministry of Environment and Energy (OMEE) (1993). This document focused on how to integrate watershed plans with municipal plans in Ontario, and encourages municipalities to work across boundaries on a watershed-wide basis. This document will be discussed in greater detail in the following chapter.

Ivey et al. (2006) outline areas where land use planning tools have been effective and ineffective. Land use planning has been effective in incorporating water resources in the policies of municipal plans, planning at the watershed scale, buffering wellheads and reservoirs through zoning, facilitating brownfield redevelopment (removing harmful materials from the environment), and in protecting shorelines and wetlands (Ivey et al., 2006, p.195). As previously noted as a challenge, land use regulation is typically not retroactive, meaning some municipalities need to acquire land, engage in public education, and offer financial incentives to

promote best management practices in an effort to protect water resources (Ivey et al., 2006, p.195). While this has some effect, it is not as effective as the previously noted land use planning tools.

3.3.7 Role of Land Use Planners

While some may have historically perceived the fields of land use planning and water management to be separate sectors, it is clear that land use planners have a role to play in water management. Land use planners can work to protect groundwater resources, through wellhead protection and through more general source water protection strategies (Patrick, 2005).

> "Unlike surface supplies that are often located in Crown-owned watersheds, local governments do have the jurisdiction and legal means to protect groundwater recharge areas around well fields through their Official Community Plans and land use bylaws (assuming those areas are mapped, inventoried, and assessed)" (Patrick, 2005, p.9).

Planners can in similar ways contribute to protecting surface water resources through the use of these tools and the aforementioned tools noted by Ivey et al. (2006).

Many different organizations and stakeholders are involved in watershed planning and source water protection. Planners can help to facilitate "communication between all watershed users regarding timing of activity, intensity of activity, partnerships around maintenance such as cattle fencing, joint signage, and improved education and awareness" (Patrick, 2005, p.9). Planners often bring together divergent groups, and this can be a valuable skill in ensuring the protection of drinking water sources. "The collaborative skill-set of the land use planner as a facilitator, particularly in rural resource regions, could play a vital role in building relationships between the often disparate actors to plan for safe drinking water" (Patrick, 2005, p.9).

3.4 Summary

Below is a summary table outlining some of the key outcomes of the literature review. Different modes of integration are briefly defined and examples of each mode of integration are provided as they may appear in the context of integrating land use plans and watershed plans. This summary table was used to analyze the Manitoba sub-basin case studies and interviews for what forms of integration are being used, as well as the benefits and challenges of each, with a particular focus on collaboration. While the table below separates cooperation, coordination, and collaboration, it is important to remember that cooperation and coordination can be part of collaboration. It is also important to remember that one planning process may exhibit multiple modes of integration.

Figure 6: Summary – Cooperation, Coordination and Collaboration as Modes of Integration

Mode of Integration	**Definition**	**Examples**
Low-level communication	Sharing information	Making information on land use plans and watershed plans available.
Cooperation	Moving separately towards common goals	Establishing common goals. Watershed plans and land use plans are developed with consideration for the other.
Coordination	Moving jointly towards common goals	Ensuring policies and regulations of both processes are fully consistent. Updating land use plans when watershed plans are completed and requiring consistency between plans.
Collaboration	Co-creating, rolling multiple actions into one	Bringing together multiple types of expertise to solve problems related to both land use planning and watershed planning. Joint oversight of both planning processes.

Integration of watershed and land use planning is important, as evidenced by the literature review. The literature suggests further research on this topic is needed and some sources suggest exploring coordination and collaboration as modes of integration. Some of the key factors contributing to effective integration between watershed planning and land use planning are: knowledge/education; resources – human, financial, technical, and scientific; the involvement of watershed planners/managers and land use planners in the development, review and implementation of plans; legislation, policy, and regulation; clear responsibility for ensuring integration; social learning through experience; guidelines or a framework for integration, and adaptability. These factors are used in the final chapter to develop a conceptual framework to assess levels of integration and explore how to improve integration between watershed planning and land use planning.

Collaboration has potential as a form of integration due to its comprehensiveness and focus on results, but is also challenging in some ways, making cooperation and coordination potential options as well. Integrated watershed management planning has become the philosophy of choice in watershed planning today, due to its integrated and holistic approach to water management. However achieving the envisioned integration remains a challenge. Achieving full consistency and strong linkages between watershed and land use plans has been a growing focus area in recent years, which has experienced challenges, but which also continues to hold potential for greater levels of integration in the future. The following chapter explores the integration of watershed and land use planning in jurisdictions outside of Manitoba, with an emphasis on other Canadian provinces, particularly Ontario.

4. Watershed and Land Use Planning in Canadian Provinces

Different jurisdictions take different steps to integrate watershed management and land use planning - different policies, institutional authorities, and planning processes. This means that integration will look different in different settings.

> "Therefore, what may be an accessible tool in one jurisdiction (e.g., land use zoning based on chemical usage) may not be implementable in another, due to differences in the institutional environment (e.g., legislation, policies)" (Ivey et al., 2005, p.195).

It is important that institutions be flexible during efforts at integration.

> "In recognition of the fact that there is no ''one size fits all'' solution to local source water protection, it is important that the institutional environment remain flexible" (Ivey et al., 2006, p.206).

Particularities of a location affect how planning is conducted. Flexibility allows for adaptation to local settings to occur more effectively. Resource availability also plays a role (Ivey et al., 2006), as jurisdictions with robust human, financial, technical and knowledge resources will approach integration differently than jurisdictions with limited resources.

The following will explore what is happening throughout provinces in Canada with regards to integrating watershed planning and land use planning.

4.1Canadian Provinces

The following summarizes watershed management planning in different provinces across Canada and some of the efforts to integrate watershed and land use planning in Canada, moving from west to east.

4.1.1 British Columbia

As of January, 2013, no provincial legislation requires or stipulates the need for watershed planning in British Columbia - only a requirement to develop a water management plan. There is no standardized process to follow (Fraser Basin Council, N.D.). However, many communities throughout BC have voluntarily developed watershed plans (Fraser Basin Council, N.D.).

BC also has the Fraser Basin Council, a watershed-based council that is a non-profit organization promoting sustainable practices and development in the Fraser River Basin. This organization includes members from federal, provincial, municipal, and First Nations governments as well as private stakeholders (Fraser Basin Council, 2012). The FBC encourages an integrated approach to watershed planning (FBC, N.D.). Improvements in some watersheds within the Fraser River Basin have been seen which may have been influenced by FBC activities, but it is hard to assess (Unger, 2009, p.16). The FBC has also improved the ability of government, First Nations, and private stakeholders to work around political boundaries to address watershed issues (Unger, 2009, p.17). One weakness of the FBC model is the need for the FBC to rely on government partners to implement FBC plans and programs; these partners may or may not implement recommended actions (Unger, 2009, p.17).

The Province of British Columbia is currently in the process of updating the *Water Act* (Government of BC, N.D.). One aspect of this modernization is improving water governance arrangements. Part of this includes improving involvement in watershed planning and the governance arrangements associated with watershed planning; consideration is being given to empowering watershed-based authorities who operate with provincial direction (Government of BC, N.D.).

British Columbia has multiple planning tools related to water including:

- Water management plans (legally binding or non-legally binding);
- Water Allocation Plans (technical plans to assist with making water licensing decisions (Vancouver Island only));
- BC Hydro Water Use Plans (for BC Hydro's water facilities);
- Fish recovery plans (site specific);
- Official community plans;
- Regional growth strategies;
- Strategic Land & Resource Management Plans;
- Sustainable Resource Management Plans (planning for provincial Crown land) (Government of BC, N.D.).

The Province recognizes the need to incorporate water and watershed considerations into official community land use plans and regional growth strategies (Government of BC, N.D.). In BC, land use and watershed plan integration focuses on the utilization of a 'watershed lens' in local and regional land use planning (Unger, 2009, p.15). Resource management plans are also developed using this lens. Watershed plan implementation relies on voluntary actions.

4.1.2 Alberta

Alberta recently renewed the Water for Life strategy used to manage water in the province of Alberta (Government of Alberta, 2012). The three main goals of this strategy are protecting drinking water, preserving aquatic ecosystem health, and ensuring available supplies of water to support a sustainable economy (Government of Alberta, 2012). This strategy and an associated action plan for managing Alberta's water resources are used as a road map to guide decision making regarding water in the province.

Many watersheds in Alberta are involved in watershed planning and have completed watershed plans. Watershed planning and advisory councils lead the development of these plans. These councils are independent non-profit organizations that lead watershed planning involving

a range of stakeholders, including multiple levels of government, aboriginal communities, industry, environmental groups, and residents (Government of Alberta, 2012). Stakeholders work together to reach consensus on goals and actions for managing the watershed. As well as leading watershed planning efforts, these watershed planning and advisory councils also monitor the condition of their watersheds, provide education, and engage in stewardship actions (Government of Alberta, 2012).

Also involved in managing watersheds in Alberta are watershed stewardship groups. Watershed stewardship groups are volunteer organizations who engage in community level actions to maintain and improve the health of their watersheds (Government of Alberta, 2012). There are over one hundred and forty of these groups in place in Alberta, involved in watershed stewardship activities (Government of Alberta, 2012).

The *Alberta Land Stewardship Act* references the need for integrated planning and proper environmental care including managing land, water and air, but does not directly refer to ties to watershed planning (Government of Alberta, 2011). Efforts are underway to ensure water concerns are incorporated in Alberta's Land-Use Framework (Water Matters, N.D.). Alberta's land use framework makes references to watershed protection and the seven planning regions established by the framework were based on major watershed regions. Planning region boundaries were created to align with a mix of watershed and existing municipal boundaries (Government of Alberta, 2008, p.24).

Regional advisory councils provide input on regional land use planning initiatives and include a range of stakeholders representative of the region, including other planning bodies, such as watershed planning and advisory councils (Government of Alberta, 2008, p.29). One responsibility of regional advisory councils is to provide input on the cumulative effects of land

use decisions, including the impact on the natural environment, such as impacts on watershed health (Government of Alberta, 2008).

Currently in Alberta "watershed plans reflect the province's effort to integrate water and land management as espoused by the *Water Act*, the *Framework for Water Management Planning*, and the renewed *Water for Life* policy" (Unger, 2009, p.7). Alberta is exploring methods to successfully implement watershed plans, with some of the implementation involving integration with land use planning. In a report produced by Unger (2009) for The Environmental Law Centre, several ties between watershed and land use plans are recommended. These include: all involved municipalities need to independently decide on approving a watershed plan; that approved watershed plans be incorporated into and hold the same level of importance as a regional plan within the *Alberta Land Stewardship Act*, and that statutory municipal plans and bylaws abide by the watershed plan; and to provide regulating authority to the Lieutenant Governor, for watershed plans in areas that are not presently included under the *Alberta Land Stewardship Act* (Unger, 2009, p.vii).

4.1.3 Saskatchewan

In Saskatchewan, the Saskatchewan Water Security Agency is responsible for managing water resources. This organization is newly renamed and has a twenty five year water security plan in place to follow, including recognition of the need for comprehensive planning regarding water (Saskatchewan Water Security Agency, 2012 A). Watershed plans have been developed by "Watershed Advisory Committees and Technical Committee members" (Saskatchewan Water Security Agency, 2012 B). Some of these plans encompass all issues in the watershed, others are exclusively source water protection plans.

Watershed Advisory Committees lead watershed planning efforts with input from technical committee members. Watershed plans are voluntarily implemented (Unger, 2009, p.15). Recommendations from these plans are voluntarily adopted by government agencies, such as the Saskatchewan Watershed Authority (now the Saskatchewan Water Security Agency) (Unger, 2009).

In Saskatchewan community land use plans must address several watershed-related issues. "Under the *Planning and Development Act* (2007), the Official Community Plan is required to address source water protection, the management of lands that are subject to flooding, erosion and instability, and the management of environmentally sensitive lands" (Simms, Lightman, and de Loë, 2010, p.53). While these plans require the involvement of a professional planner, it is not mandated that communities must have an official plan.

4.1.4 Manitoba

Manitoba will be discussed in detail in the following chapter.

4.1.5 Ontario

Areas of Southern Ontario, such as the Grand River Valley, are noted leaders in IWRM and integrating water management with land use planning. However, there is still room for improvement and multiple efforts are being made at ensuring increasingly effective integration of watershed and land use plans, particularly with regards to source water protection. It is important to note that this region is well-resourced, possessing the human, technical, financial, and knowledge resources that are needed, likely contributing to the effectiveness of its integration (Ivey et al., 2006). Public support is also strong and the region has been involved in

watershed planning for several decades - longer than many other jurisdictions. The Walkerton incident, a tragic event - where there were a number of deaths and many ill due to contaminated drinking water, has also played a role in increasing concerns related to watershed health and source water protection.

In Ontario, conservation authorities generally lead watershed planning efforts (Unger, 2009, p.12). These are watershed-based organizations - with land use regulatory powers related to their mandate - who implement watershed plans, both with voluntary actions and regulatory authority. Ontario Conservation is the provincial department that supports and provides the mandate for conservation authorities to carry out integrated watershed management.

Under *The Clean Water Act,* land use planning must correspond with source protection planning (Plummer et al., 2011). The *Lake Simcoe Protection Act* provides a legally binding statutory power to watershed planning around Lake Simcoe (Unger, 2009, p.13). Community land use plans must be consistent with the Lake Simcoe Protection Plan (Unger, 2009, p.13). These acts are distinct - compared to the other acts in Canada - in that they require consistency between source water protection plans in the Lake Simcoe area, the Lake Simcoe Protection Plan, and community land use plans.

Jurisdictions in Southern Ontario can be looked to in some regards as a model for integrating water management and land use. Robust resources, public support, experience in integrating, and increased regulatory authority related to watershed management all have the potential to contribute to effective integration. But it is important to maintain flexibility, and what works in one setting may not be suitable in another (Cervoni et al., 2008).

4.1.6 Quebec

Quebec is using integrated watershed management as its approach for water and land management. The Quebec Water Policy was developed in 2002 and IWM was a key action in this policy (Gouvernement du Québec, 2002). Quebec is aiming to move towards more local and regional management of watersheds through watershed-based organizations (Gouvernement du Québec, 2002).

Watershed or basin organizations in Quebec are made up of a range of stakeholders including local and regional governments, environmental groups, residents, and others (Gouvernement du Québec, 2002). The hope is that this approach will assist with consensus building and increase local accountability in the watersheds of Quebec. The government of Quebec supports these integrated watershed management initiatives through the provision of both financial and technical support (Gouvernement du Québec, 2002).

Multiple Quebec government departments are involved in supporting the Quebec Water Policy and the associated integrated watershed management taking place in the province. *The Sustainable Regional and Local Land Use Planning Act* contains references to water, requiring consideration for the protection of natural water resources and the protection of drinking water supply sources through land use tools such as zoning bylaws (Gouvernement du Québec, 2010). Integrated watershed management is not mentioned in the act.

4.1.7 New Brunswick

New Brunswick has no official integrated watershed planning programs (Huck, 2012, p.18). However New Brunswick has a provincial Watershed Protection Program (WPP) in place for watersheds that supply drinking water sources for people (Government of New Brunswick,

2012). "The WPP is a focused land use planning and development regulation established under the NB Clean Water Act" (IISD, 2009, p.75).

The watershed protection program includes three different zones in a watershed: "Zone A is: the watercourse, Zone B: the 75-meter setback (from the watercourse); Zone C: the balance of the watershed area (remaining watershed area)" (Government of New Brunswick, 2012). In each zone, particular land uses and activities are restricted in an effort to protect water quality in watersheds supplying public drinking water. In some cases conditional uses may be permitted. These regulations apply to thirty watersheds in New Brunswick that supply drinking water (Huck, 2012, p.18).

4.1.8 Nova Scotia

The Government of Nova Scotia recently released a 'Water for Life' Strategy outlining goals and a plan for water resource management in the province over the next ten years (Government of Nova Scotia, 2012). One aspect of this plan is integrated water management, including the establishment of a watershed advisory group consisting of representatives from outside of government to partner with the province on delivering integrated water management (Government of Nova Scotia, 2012). This involves working with multiple government departments and making decisions on a watershed basis. There are over fifty watershed organizations operating in the province, which rely heavily on the work from volunteers (Government of Nova Scotia, 2012).

6.1.9 Prince Edward Island

The majority of watersheds on Prince Edward Island are involved in watershed management planning. PEI has the 'watershed planning initiative' that was initiated in 2007 (Roy et al., 2009). Watershed stewardship organizations have historically been the lead watershed management organizations for PEI. The province is leading the watershed planning initiative, and watershed stewardship organizations are encouraged to utilize IWRM as a guiding framework for managing their watersheds (Roy et al., 2009, p.79). A guide to watershed planning on PEI has been produced providing background on the history of watershed planning on PEI and instruction for groups on how to develop a watershed plan, including what resources are available to them (Government of Prince Edward Island, N.D.).

6.1.10 Newfoundland and Labrador

Newfoundland and Labrador have municipally-led watershed management planning (Huck, 2012). In Newfoundland and Labrador, many local governments own their water sources and can request the province to establish a "protected public water supply area" (Roy et al., 2009, p.78). There is also a guide to municipal watershed planning. This guide was based in part on a watershed plan developed by the Town of Stony Brook, NL (Hearn, 2007). Part of this guide includes specific land use development zone designations and buffer strips around certain water bodies (Hearn, 2007, p.45).

6.1.11 Summary of watershed planning in Canadian Provinces

Most provinces in Canada have voluntarily developed and implemented watershed management plans. New Brunswick takes a different approach, managing watershed resources

entirely through land use regulation. Several provinces have recently updated legislation and policy to incorporate watershed management planning, such as Alberta, Saskatchewan and Nova Scotia, with BC in the process of updating its water legislation. As of January, 2013, Ontario had some of the most rigorous watershed management planning in Canada, including strong connections to land use planning. The following section reviews a guide to integrating watershed and land use planning from Ontario and includes short precedent study summaries of the Grand River Valley and Credit River Valley.

4.2 Ontario Guide to Integration

As noted earlier, one arena that has the potential to facilitate integration is the provision of guidelines that help to ensure effective integration. As Carter et al. (2005) explain "We argue that local land use planners and water managers need practical ways of applying the concepts of integration and sustainability, and of measuring progress at the local scale" (p.116). Guides are one way of potentially achieving this.

Carter et al. (2005) point to a collection of three documents that were developed by the Ontario government:

- "a set of three documents, produced by the MOE and MNR, addressing the integration of water management objectives into municipal planning documents (Ontario Ministry of the Environment and Ontario Ministry of Natural Resources, 1993)" (Carter et al., 2005, p.);
- a watershed action guide, produced by the MNR (Ontario Ministry of Natural Resources, 1998); and

- watershed and sub-watershed plans, produced by conservation authorities (e.g. NVCA, 1996)" (Carter et al., 2005, p.124).

Municipalities in Ontario create official plans with goals and objectives which guide land use policy and development decisions based on the *Planning Act (Ontario)*, and there is a need to incorporate watershed and sub-watershed planning goals and objectives into the official municipal plan for both to be effective (Ontario Ministry of Environment and Energy [OMEE], 1993, p.iii).

The guide includes specific directions for this integration. "The policies of the official plan should clearly recognize the importance of the quality of surface water and related resources to the environmental, social and economic wellbeing of the municipality" (OMEE, 1993, p.5). Municipalities should strive to be involved in the water resource management projects of other organizations to support comprehensive integration (OMEE, 1993, p.6). The official plan should contain provisions to maintain and protect natural watercourses (OMEE, 1993, p.6).

Municipalities, when possible, should avoid releasing "untreated municipal sanitary sewage and contaminated storm-water runoff and land drainage to receiving water bodies" (OMEE, 1993, p.7). Municipalities should implement water conservation policies (OMEE, 1993, p.7). Policies should be put in place that all land use changes "address potential impacts on the quality and quantity of water" (OMEE, 1993, p.7).

Municipalities should develop policies to identify and protect sites of hydro-geological importance (OMEE, 1993, p.8). Inland lakes should be protected by producing shoreline management plans (OMEE, 1993, p.8). "Policies should be included in the Official Plan to prohibit land uses which threaten human life and property due to the presence of water-related

hazards including: flood-prone lands, soils prone to water-related slope instability, (and) unstable soils" (OMEE, 1993, p.9).

The implementation strategy focuses on three levels - watershed plans, sub-watershed plans, and site management plans - from large to small scale (OMEE, 1993, p.11). The Ontario Ministry of Environment and Energy (1993) guide also emphasized that while the guide could be useful for producing more effective integration, each setting is different and flexibility is needed.

The advice in these documents could be used more effectively in Ontario. "Greater adoption of available guidelines should occur in both the land use planning and water management sectors" (Carter et al., 2005, p.124). Carter et al. (2005) believe that organizations need be aware of these documents and that their utilization would help facilitate effective integration.

> "The achievement of integrated and sustainable land use planning and water management would be furthered in study municipalities by the adoption of available guidelines, promotion of a more holistic approach to planning and management and strengthening the capacity of implementing staff" (Carter et al., 2005, p.124).

Since the development of these guides in 1993, legislation in Ontario has changed, such as *The Clean Water Act*, meaning aspects of these guidelines may need to be updated.

4.3 Grand River Valley

The Grand River Valley in Southern Ontario is one example of a watershed where there have been attempts at integrating watershed and land use planning, with a particular emphasis more recently on source water protection. The Grand River Basin had a watershed management plan developed and implemented between 1977 and1982 which included integrating watershed planning with municipal land use planning (Conservation Ontario, 2003, Appendix D). Over the

last few decades this watershed has been recognized for its importance (it was designated a Canadian Heritage River in 1994) and in 2000 the watershed management partners won the Thiess River prize, a prestigious international award acknowledging excellent river management (Conservation Ontario, 2003, Appendix D, p.16). The region has also won awards in recognition of exemplary water management and sustainable community planning (Ivey et al., 2006).

The Grand River Basin is the largest basin to flow into Lake Erie, three quarters of the land is farmed, and it includes the cities of Kitchener, Waterloo, Guelph, Cambridge, and Brantford - for a population of 925,000 that is expected to grow by 300,000 by 2031 (Plummer et al., 2011, p.6). "Approximately 80% of those living in the watershed receive drinking water from municipal systems, which draw from a mixture of groundwater wells and surface waters" with the remainder accessing their water from private wells (Plummer et al., 2011, p.6).

"The RMOW (Regional Municipality of Waterloo) has the largest groundwater-dependent population in Canada, and is a well-recognized leader in source water protection in Canada" (Ivey et al., 2006, p.198). The Grand River Conservation Authority is noted to be one of the best resourced conservation authorities in Ontario (Ferreyra et al., 2008). The GRCA is financed mostly through municipal levies and profits from the management of parks and campgrounds (GRCA, 2012). It is also a noted leader in the integration of land use planning and water management.

> "This level of integration of land use planning and water management is atypical in Ontario, and is reflective of the Region's strong political commitment to integration, good working relationships with other organizations (e.g., GRCA, other municipalities), and access to adequate financial and staff resources" (Ivey et al., 2006, p.203).

The Grand River Conservation Authority (GRCA) also has regulatory authority over activities "affecting areas in and near rivers, streams, floodplains, wetlands, slopes and the Lake

Erie shoreline" (Grand River Conservation Authority, 2012). The GRCA also reviews development applications in conjunction with municipalities to ensure they meet Ontario's environmental standards (GRCA, 2012).

"The Region and GRCA's source protection experiences, along with those of a select few other municipalities, have strongly influenced planning in the Oak Ridges Moraine, and the shape of the draft *Drinking Water Source Protection Act*" (Ivey et al., 2006, p.203). The region is also noted to have strong public support for watershed and source water protection initiatives, likely partly due to the fact that the public is involved in the development of the incentive programs, community development plans, and source water protection plans throughout the process (Ivey et al., 2006).

The Waterloo Regional Official Policies Plan has several strategies aimed at source water protection. These include discouraging private wells and septic fields, preventing development in the flood plain that utilizes harmful substances, consideration of water system capacity during growth planning, when a land use change is put forward an environmental review ensures a contaminated site will be properly cleaned up, having a bylaw regarding sewer use, and working with commercial and agricultural stakeholders to reduce environmental impacts (Ivey et al., 2006, p.202). A 'countryside line' has been created as a boundary for development over the next 40 years, with a chief goal of this line being to protect sensitive areas and drinking water recharge areas of the regions (Ivey et al., 2006, p.202)

In a recent study that included the Grand River, Upper Thames, and Lake Simcoe watersheds, Plummer et al. (2011) conducted a cross-analysis of municipal level land use and watershed level plans for components and indicators of source water protection. They also conducted key informant interviews.

Based on the cross-analysis, several themes emerged.

> "The protection of sensitive land, the mitigation of impacts on water resources, and safeguarding ground and surface waters are the three indicators with the greatest number of policy occurrences in both land use and watershed planning documents in all three cases" (Plummer et al., 2011, p.9).

From the interviews there were three main themes: "Planners within conservation authorities and municipalities identified watershed and sub-watershed plans as having a positive and sustained influence on regulatory policies such as official plans and watershed development regulations" (Plummer et al., 2011, p.10). Land use planners noted many wellhead protection areas were already identified and sometimes protection was also in place (Plummer et al., 2011, p.10). It was also determined from the interviews that there is "a perceived gap in relation to land use and watershed-based planning in regard to the indicators of source water protection" (Plummer et al., 2011, p.10).

This study highlighted that the *Clean Water Act* in Ontario has the potential to initiate previously unseen levels of integration between land use and water management and that coordination and collaboration are important in the integration process (Plummer et al., 2011, p.11). The study also noted some challenges to this integration, particularly with regards to implementation. These included a lack of guidelines for the new governance structure (priority of - and waiting on - source water protection plan approval, before implementing municipal policies to support source water protection), a shortage of funding for land acquisition, the cost of land use limitations, the lack of incentive-based tools, and limited funds for decommissioning private wells and septic systems (Plummer et al., 2011). The study concluded by noting that the Global Water Partnership (2000) indicated there is a critical need for further exploration regarding how integration occurs (Plummer et al., 2011, p.11).

4.4 Credit Valley

The Credit Valley watershed is located in Southern Ontario, just west of Toronto. In the early 1990s significant urbanization was projected to occur until 2011, much of which would influence conditions in the watershed - and this triggered the need for a watershed plan (Conservation Ontario, 2003, Appendix B, p.4). The watershed plan began in 1990 and was completed in 1992. Since that time it has been judged to be a successful collective effort involving multiple agencies, including political representatives and members of the public (Conservation Ontario, 2003, Appendix B, p.5). The implementation was particularly successful. A component of this plan included integrating the watershed plan with municipal land use plans.

The process began by assessing management alternatives. "The Credit River Watershed alternative measures to address future growth included both proactive measures, which protect or enhance the environment as future land use changes occur, and rehabilitation strategies for improving existing areas which are degraded" (Conservation Ontario, 2003, Appendix B, p.7). The next step was to establish a baseline of current conditions and pollution sources, with an assessment of the impact of future land use changes, including proposed land use changes (Conservation Ontario, 2003, Appendix B, p.7). Four land use classes were used: urban, pasture/idle land, agricultural, and forest (Conservation Ontario, 2003, Appendix B, p.7). Land use changes were assessed for their impact on water quantity (flow) and water quality. For implementation of the plan there was a clear delineation of responsibilities, though these were developed and implemented via a collective effort. After implementation, monitoring occurred to assess the success of the plan.

One of the lessons learned by those involved in watershed management in the Credit Valley is that watershed and sub-watershed plans are one component of watershed management. Another was that "clear linkage between environmental degradation and urbanization required that Credit Valley Conservation would have to provide upfront sub-watershed data information to be integrated into the land use planning processes carried out by member municipalities" (Conservation Ontario, 2003, Appendix B., p.13). There was a clear need for partnerships. "Closer ties to the public works and planning departments within member municipalities were developed in order to provide advice on land use changes and infrastructure choices" (Conservation Ontario, 2003, Appendix B., p.13). There was also recognition that there needs to be better integration of the findings by the different disciplines involved (Conservation Ontario, 2003, Appendix B., p.14). Consultation was important, as was buy-in from key partners, such as member municipalities, starting at the beginning of the planning process (Conservation Ontario, 2003, Appendix B., p.14).

4.5 Summary

Lessons can be learned by observing what is occurring in other jurisdictions with regards to integrating watershed plans with land use plans. Across Canada, different provinces are recognizing the importance of integration and making efforts to integrate watershed and community land use plans. Elements to consider for improving integration include: balancing (equalising out) the importance of plans; regulatory authority for watershed planning agencies; requiring consistency between plans through legislation, resourcing, public involvement, political support; and experience.

The following chapter focuses on Manitoba, exploring how existing policy and legislation is contributing to the integration of integrated watershed management plans with development plans. Two Manitoba sub-basin case studies outline how existing development plans and integrated watershed management plans address watershed issues.

5. Manitoba Sub-Basin Case Studies

This chapter begins by reviewing the guiding legislation, policies, and regulations for watershed and land use planning in Manitoba, as they relate to watershed management. The focus will then proceed to the two Manitoba sub-basin case study locations – providing an overview of each IWMP and portions of planning district development plans that address water management. The two case study locations for this research are the Pembina River watershed (only the Canadian portion of watershed) and the Netley-Grassmere watershed. The Pembina River watershed includes: the 23 West Planning District; Killarney Turtle Mountain Municipality; Louise Planning District; Morden, Stanley, Thomson, Winkler Planning District; Morton-Boissevain Planning District; Pembina Manitou Planning District; Roblin-Cartwright Planning District; and South Central Planning District. The Netley-Grassmere watershed includes the East Interlake Planning District, Fisher Armstrong Planning District, Selkirk and District Planning Area, and the South Interlake Planning District.

5.1 Manitoba Legislation and Policy

The following section will provide a summary of the main legislation and policy directing land use planning and watershed planning in Manitoba.

5.1.1 Planning Act

The Planning Act is the guiding legislation for land use planning in the Province of Manitoba. As noted, the Planning Act requires development plans to consider the outcomes of integrated watershed management plans:

> "When preparing a development plan or amending or re-enacting a development plan by-law, a board or council must consider the application of the following insofar as they relate to land within the planning district or municipality: (a) any regulation made under section 5 of *The Water Protection Act* governing, regulating or prohibiting any use, activity or thing in a water quality management zone designated under that Act; (b) any watershed management plan approved under *The Water Protection Act*" (Province of Manitoba, *The Planning Act*, 2011, s.62.1).

Development plans must also consider other relevant legislation such as *The Sustainable Development Act* of the Province of Manitoba and also Federal legislation that pertains to lands that fall under federal jurisdiction.

5.1.2 Provincial Land Use Policies (1994)

The previous Provincial Land Use Policies (PLUPS) for the Province of Manitoba were in use from 1994 until 2011, when the new Provincial Planning Regulation came into effect. All of the development plans that have been fully approved in the two Manitoba sub-basin case study settings had regard for these policies, from 1994, as provincial direction for the development plans. The PLUPS address water in two primary areas: water and shoreland (Policy 4); and flooding and erosion (Policy 7). Other areas also relate to water more indirectly.

The overall goal of Policy 4: Water and Shoreland, is: "Development should complement the sustainability of waterways, water bodies, shoreland and groundwater having major environmental, economic, recreational or cultural significance" (Province of Manitoba, 1994, p.34). The two main objectives are "to maintain and manage land and water resources to meet important needs" (p.34); and "to support use, development of, and access to the province's waterways, water bodies and shoreland where appropriate" (Province of Manitoba, 1994, p.34).

There are five main policy application areas under water and shoreland. The first is to develop land in a way that sustains water resources (Province of Manitoba, 1994, p.35). The

second is to identify and protect water resources (groundwater, surface water, shoreland, etc.) in need of protection and tailor protection strategies specific to the unique needs of each situation (Province of Manitoba, 1994, p.35). The third is to create parks and reserves to protect surface water resources and shoreland where appropriate (Province of Manitoba, 1994, p.35). The fourth is that development shall not inhibit the sustainability of the supply and quality of aquifers (Province of Manitoba, 1994, p.35). The fifth is that areas sensitive to potential groundwater pollution need to have appropriate protection/precautions taken (Province of Manitoba, 1994, p.36).

The main goal of Policy 7: Flooding and Erosion is "The development of lands subject to significant flooding, erosion or bank instability should be sustainable, minimizing risks to health, the environment and land uses" (Province of Manitoba, 1994, p.42). Objectives include: minimizing property expenses and destruction resulting from flood prevention or damage, limiting personal damage and expenses as a result of flooding and erosion, to limit development that potentially causes damage to the environment, to support the natural ability of waterways to handle flood flows, and to limit development that negatively affects existing flood control measures.

There are four policy applications under flooding and erosion. The first focuses on ensuring land use and development is appropriate based on area flood conditions; supporting the health of water ways and limiting personal and property damages (Province of Manitoba, 1994, p.44). The second defines flood areas as land that would be affected by one hundred year flood events or floods potentially exceeding this level (Province of Manitoba, 1994, p.45). The third defines land affected by erosion as land that would be eroded away by water under a fifty year period (Province of Manitoba, 1994, p.45). The fourth is "land subject to bank instability … on

or above a slope that, upon inspection by the Province, is found to be subject to subsidence as a result of downslope soil movement" (Province of Manitoba, 1994, p.45).

5.1.3 Provincial Planning Regulation

Land use planning in the Province of Manitoba, as of June 20, 2011, is guided by the Provincial Planning Regulation, established by *The Planning Act.* The Provincial Planning Regulation:

> "Reflects the provincial government's interest in land and resource use and sustainable development, and provides policy direction for a comprehensive, integrated and coordinated approach to land use planning. It also serves as a guide to planning authorities in preparing, reviewing and amending development plans and regional strategies" (Manitoba Local Government, N.D., Provincial planning regulation portal).

The Provincial Planning Regulation is new in Manitoba, and replaces the Provincial Land Use Policies. "It (Provincial Planning Regulation) contains three distinct parts: provincial land use policies, development plan requirements and livestock operation requirements" (Manitoba Local Government, N.D., Provincial planning regulation portal). The Provincial Planning Regulation was registered on June 20, 2011 (MLG, N.D., Provincial planning regulation portal). After this date all newly completed or updated development plans are assessed using the Provincial Planning Regulation.

One focus of the review process of the provincial land use policies in updating to the Provincial Planning Regulation was to "better link land use, infrastructure, transportation and watershed planning" (MLG, N.D., Provincial planning regulation portal). The PPR notes the importance of integration. Land use needs to be integrated with other plans and programs (MLG, N.D., p.8). Watershed management plans are noted in the PPR as one planning tool for integration with land use planning (MLG, N.D., p.8).

Policy Area 5 of the Provincial Planning Regulation specifically focuses on water. This section promotes land use planning that protects the long-term sustainability of water resources, acknowledging the importance of water to social and economic sustainability of communities and regions, as well as its role in ecosystem health (MLG, N.D., p.27).

> "Wise use of land and sustainable development practices will help to:
> - protect quality and quantity of *water bodies*, surface water and groundwater;
> - protect important aquatic ecosystems;
> - ensure clean sources of drinking water;
> - reduce risk to people and property due to flooding; and
> - protect cultural and *heritage resources*" (MLG, N.D., p.27)

The PPR stresses the importance of integrating water and land use development planning at the watershed scale (MLG, N.D., p.27). IWMPs are recognized as the mode for planning for water, land and aquatic ecosystem sustainability within a watershed. Climate change – including increased potential for floods and droughts – must be considered as part of integrating water management with land use planning (MLG, N.D., p.27). Water scarcity could also be a future issue – communities must prioritize water allocation while also making efforts towards water conservation (MLG, N.D., p.27).

Part 4 of the Provincial Planning Regulation focuses on development plans. Development plan by-laws establish goals and policies to guide development for a planning area. "They are the cornerstone for decision-making related to land use and development and must be kept current to reflect the goals and vision the community is trying to achieve" (MLG, N.D., p.42). Development plans must generally be in accordance with the Provincial Land Use Policies (PLUPs). "Once a development plan by-law is adopted, the PLUPs no longer apply to the planning area until a plan is being amended or reviewed" (MLG, N.D., p.42).

This section of the Provincial Planning Regulations also addresses development plan ties to IWMPs:

"Coordination
2(1) A planning authority must ensure that its development plan reflects and is coordinated with
(a) other relevant plans, and that the policies within the various plans are mutually supportive; and…
2(2) For the purposes of subsection (1), and without limitation, a planning authority must consider the following when preparing its development plan:…
(c) integrated watershed management plans and basin or aquifer plans that have been done for any part of the planning area" (MLG, 2011, p.43).

Water resources are also addressed:

"Studies to be done as part of development plan
4(1) In preparing, amending or replacing a development plan, a planning authority must undertake the analysis and surveys of the planning area that are appropriate and necessary, including analysis and surveys of…
(c) the capacity of resources, such as water, in the planning area to support development" (MLG, 2011, p.44)

5.1.4 The Water Protection Act

Integrated Watershed Management Planning gains direction from and has its legislative basis in *The Water Protection Act*. As noted earlier, this act requires watershed plans to consider land use policies, plans, and studies:

"15 In preparing a watershed management plan, a water planning authority must consider the following:
(c) studies that the authority considers relevant relating to water, land use, demographics, the capacity of the environment to accommodate development, and any other matter related to present or future physical, social or economic factors…
(f) relevant provincial land use policies, development plans, and zoning by-laws" (Province of Manitoba, 2005).

The detailed content requirements of a watershed management plan also have points that directly tie to the relationship with land use planning:

"Content of a watershed management plan:
16(1) A watershed management plan must
(a) identify issues relating to the protection, conservation or restoration of water, aquatic ecosystems and drinking water sources in the watershed;

(b) contain objectives, policies and recommendations respecting some or all of the following:
(i) the protection, conservation or restoration of water, aquatic ecosystems and drinking water sources,
(ii) the prevention, control and abatement of water pollution, including wastewater and other point-source discharges, and non-point sources of pollution,
(iii) land drainage and flood control, including the maintenance of land drainage and flood control infrastructure,
(iv) activities in water quality management zones, riparian areas, wetlands, flood areas, flood plains and reservoir areas,
(v) water demand management, water use practises and priorities, the conservation of water supplies, and the reduction of water use and consumption during droughts and other periods of water shortage,
(vi) the supply, distribution, storage and retention of water, including measures to ensure persons in the watershed have access to clean potable water,
(vii) emergency preparedness to address spills, accidents and other emergencies that may affect water, an aquatic ecosystem or a drinking water source;
(c) specify linkages between water management and land use planning so as to facilitate the adoption, in a development plan or other planning instrument, of some or all of the provisions of the watershed management plan; and
(d) identify ways in which the plan can be implemented, monitored and evaluated, recognizing the need to implement the plan with the assistance of individuals, groups, and organizations" (Province of Manitoba, 2005).

The policy and legislation requires linkages between watershed plans and land use development plans in Manitoba.

5.2 Watershed Planning in Manitoba

The Province of Manitoba is using integrated water resource management as the framework within which to plan and manage water resources. Manitoba Conservation and Water Stewardship initiated integrated watershed management planning throughout municipal Manitoba. This approach places an emphasis on involving a wide range of stakeholders, relying on science, and coordinating actions with other organizations.

Integrated watershed management planning in Manitoba involves managing water on a watershed scale. "A watershed is a topographically defined area of land where the water within

flows to a common point" (Manitoba Water Stewardship, N.D., p1). All IWMPs in Manitoba are developed using watershed boundaries.

In Manitoba several key groups are involved with the creation of watershed plans: a water planning authority, a project management team, and a watershed team. The water planning authority is responsible for developing the IWMP. Water planning authorities are traditionally Conservation Districts, but other organizations can be designated as well. Conservation Districts are intended to be based on watershed boundaries and are locally governed municipal-provincial partnership organizations that strive for environmental health in their area, with the main focus being on watershed health. The project management team includes a member of the water planning authority, those with a special interest in the development of the plan, and a watershed planner. The watershed team is a group of people (thirty-fifty) who can make technical or other contributions to the development of the IWMP. The planning process takes one to two years, and the plan is to be updated every eight to ten years (MWS, N.D., p.3).

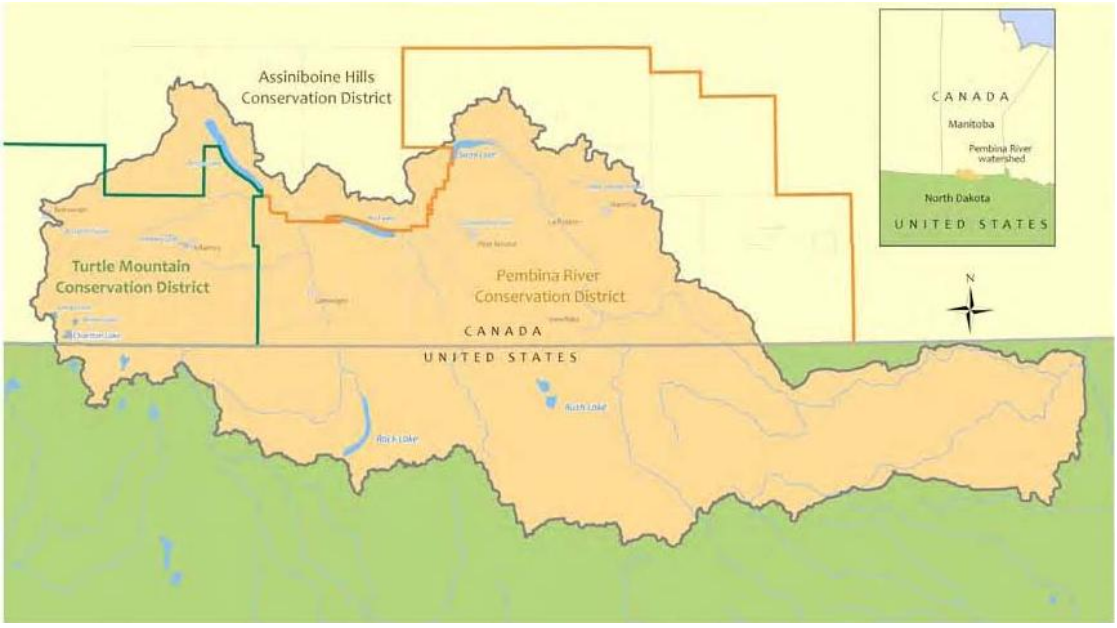
Water planning authorities are provided with twenty-five thousand dollars to assist with the development of an IWMP (MWS, N.D., p.4). The time and expertise of those involved in developing the plan also constitute a strong contribution to the project. Implementation is carried out by many different organizations and individuals, with conservation districts often playing a lead role.

The following section examines how existing development plans and IWMPs align with regards to watershed related policies.

5.3 Pembina River Watershed

The Pembina River Watershed (Figure 7) is located in south-central Manitoba and extends across the Canada-US border. The watershed has a total area of 10,521 square kilometers, with 5,155 square kilometres on the Canadian side (Pembina Valley Conservation District [PVCD], 2011, p.6).

Figure 7: Pembina River Watershed (MWS, 2011, p.7) © Used with permission from the Pembina Valley Conservation District.



The IWMP is primarily focused on the Canadian portion of the watershed. The soils of the watershed are very fertile, with 78% of the land classified on a scale of 1 – 7 (Canada Land Inventory - Class 1 being most suitable for agriculture, Class 7 as least) as Class 1, 2, and 3 (PVCD, 2011, p.9). Annual cropland and grassland pasture are the predominant land uses (PVCD, 2011, p.21).

"The plan consists of four goals for the watershed:

1. Improve and maintain drinking water quality throughout the watershed (p.23);

2. Reduce algal blooms and improve surface water quality for residents, wildlife, and recreation (p.26);
3. Protect our lakes and rivers from excess erosion (p.28)
4. Improve surface water management to reduce flooding, wetland loss, and protect aquatic ecosystems (p.30)" (PVCD, 2011, p.4).

The Pembina River IWMP also contains a list of recommendations for adoption in development plans. These are:

"The following policies should be adopted in future development plans.
1. Intensive and high-pollution risk development activities, (land uses and structures that have a high risk of causing pollution and include, but are not limited to chemical/ fertilizer storage facilities, disposal fields, fuel tanks, waste disposal grounds, wastewater treatment facilities) will be restricted in public drinking water source zones (Figure 10). Where restriction is not possible, development may be considered in public drinking water source zones provided:

- the proponent can prove by adequate engineering or hydro-geological investigation that the proposed activity will not cause pollution of the public drinking water supply or;
- appropriate precautionary measures have been taken to sufficiently mitigate the risk of endangering the quality of the water supply for public drinking water supply purposes.

2. To Ensure the protection, retention and, where required, rehabilitation of riparian areas, the following conditions apply to development along waterways or water bodies (as per pending regulation under the Water Protection Act, and the Crown Lands Act):

- That a setback as large as possible be applied to provincially designated "vulnerable water bodies" and the following lakes or reservoirs: Boissevain Reservoir, Killarney Lake, Mary Jane Reservoir, Pelican Lake, Rock Lake, Swan Lake, and William Lake. Where a substantial setback is not possible, that minimum setback of 30 metres be considered adjacent and upslope of the high-water mark.
- That the natural vegetative cover be retained or rehabilitated within the above setback distances in the above noted water bodies;
- That no alteration is made to the near shore aquatic habitat unless the activity adheres to a Fisheries and Oceans Canada Operational Statement or is reviewed by Fisheries and Oceans Canada.

3. To Review the "Development Capacity" of all the major lakes in this watershed. This process involves conducting a study to determine the number of cottages and housing developments that a lake can support without compromising the lake's water quality or ecological functions. Working in partnership with Manitoba Water Stewardship, the Water Planning Authority can hire expertise to better understand the feasibility of establishing a development capacity for lakes within the watershed" (PVCD, 2011, p.35).

Development plans created in the Pembina River IWMP area were all created prior to the completion of the Pembina River IWMP. Because of this, these planning districts have not had an opportunity to incorporate IWMP recommendations as of yet into their development plans. All existing development plans in the watershed were reviewed as part of the IWMP process. The plans listed below were based on the 1994 PLUPs, with many watershed-related policies being similar from plan to plan. For this reason, the first plan listed here will include a short summary of watershed related policies as an example; others will be more brief. Each plan was reviewed to identify any existing crossover with development plan recommendations from the IWMP. IWMP recommendations typically focus on areas of importance arising during the IWMP process or fill in water-related gaps in existing development plans. Flooding, erosion, shoreland, ground and surface water quality are addressed in all plans. Livestock operations and agriculture are addressed in most, as well as how these can also affect water resources.

5.3.1 23 West Planning District

The development plan became effective as of December 11, 2009 (Borgfjord, M. and Genivar Engineering Ltd., 2009a). This development plan has watershed-related sections referred to as: flooding, sensitive areas, and erosion; and water & shoreland. Other areas that impact water include agriculture, livestock operations, and recreation.

Flooding, sensitive areas, and erosion policies include: encouraging development not occur in sensitive areas, allowing only low-intensity uses in high-risk flood areas, allowing development in sensitive areas only if proper precautions are taken (includes criteria for development in sensitive areas), referring proposed developments in flood-prone areas to Manitoba Water Stewardship, and ensuring that development proposals in potentially hazardous

locations include proper studies of implications (Borgfjord, M. and Genivar Engineering Ltd, 2009a, p.18).

The water and shoreland section policies include: ensuring water resources (surface and groundwater) are protected with regards to development locations and building processes; protecting riparian areas and shorelines; water use and drainage for developments must be approved through proper licenses; and taking precautions to ensure groundwater pollution does not occur from developments that may cause contamination (Borgfjord, M. and Genivar Engineering Ltd., 2009a, p.20).

Pembina River IWMP land use recommendation ties to the 23 West Development Plan:

1. The first IWMP land use planning recommendation repeats the need for drinking water protection, similar to the development plan and the PLUPs (1994). Maps are also provided in the IWMP outlining drinking source water protection focus areas.
2. Strengthens existing development plan policies by recommending a maximum setback be put in place around vulnerable water bodies, with a minimum of a 30-metre setback when a more substantial setback is not possible. Repeats the importance of preserving and restoring natural vegetation in these setback areas. Repeats the need to not alter aquatic or near-shore habitat unless the change follows Fisheries and Oceans Canada guidelines, or as reviewed by this organization.
3. Suggests a specific initiative to gain a strong understanding of the capacity of lakes in the watershed to determine how many houses and cottages vulnerable lakes can support, while still remaining in a healthy natural state. This is more specific than the development plan policy which directs that development should occur in a way that water resources are sustained.

This development plan also draws attention to the IWMP being developed by the Assiniboine Hills Conservation District and the need to consider this plan as it relates to land use in the planning district (Borgfjord, M. and Genivar Engineering Ltd., 2009a, p.57). The development plan also notes that subdivision applications are to be circulated to the CD board.

5.3.2 Killarney Turtle Mountain Planning District

Development plan effective as of December 16, 2009 (Borgfjord, M. and Genivar Engineering Ltd, 2009b). Includes watershed-related sections on flooding, sensitive areas, erosion, and water and shoreland management.

IWMP recommendations ties are the same as for the 23 West Planning District. Development plan water policies are almost identical between these two development plans.

5.3.3 Louise Planning District

This development plan was effective as of September 27, 2010 (Manitoba Intergovernmental Affairs, 2010). Contains watershed-related section on hazardous lands, flooding, and erosion; and water and shoreland management.

IWMP recommendation ties are the same as for the 23 West Planning District with a few differences: The Louise Planning District specifically recognizes the Pembina Valley Conservation District and its role in identifying and protecting water through its environmental programs (Manitoba Intergovernmental Affairs, 2010, p.13). This development plan also names water bodies whose supply needs to be sustained and provides more specific criteria for protecting fish habitat.

5.3.4 Morden, Stanley, Thompson, Winkler Planning District

Development plan effective as of January 17, 2007 (Landmark Planning and Design, and Manitoba Intergovernmental Affairs, 2007). Includes watershed-related sections on: hazard lands, flooding, and erosion policies; and water and shoreland management.

IWMP recommendation ties are the same as for the 23 West Planning District with a few differences: This development plan recommends a 7.6m public reserve buffer be acquired around Dead Horse Creek in all new developments (Landmark Planning and Design, and Manitoba Intergovernmental Affairs, 2007, p.20). This is a shorter distance than in the IWMP for vulnerable water bodies, but Dead Horse Creek is not listed as one of the vulnerable water bodies in the IWMP. Also contains more specific criteria for fish habitat protection.

5.3.5 Morton Boissevain Planning District

The Morton Boissevain Planning District Development Plan became effective as of April 1, 2010 (Morton Boissevain Planning District, 2010). It has two sections directly related to watersheds: hazard lands, flooding, and erosion; and water and shoreland management.

IWMP recommendation ties are the same as for the 23 West Planning District with a few differences: This development plan makes specific setback recommendations for riparian areas for different orders of drains (Morton Boisevain Planning District, 2010, p.15).

5.3.6 Pembina Manitou Planning District

This development plan came into effect August 26, 2004 (Lombard North Group (1984) Ltd. Planners and Landscape Architects, 2004 A). This plan includes watershed-related sections on hazard lands, flooding and erosion; and water and shoreland management.

IWMP recommendation ties are the same as for the 23 West Planning District with a few differences: This development plan makes suggestions for lands prone to ponding, includes livestock operation consideration for effect on nutrient management, and recognizes the need for precautions around the Mary Jane Reservoir - a noted vulnerable water body in the IWMP - but does not provide specifications for setbacks (as does the IWMP).

5.3.7 Roblin-Cartwright Planning District

This development plan came into effect November 15, 2004 (Manitoba Intergovernmental Affairs, 2004); includes watershed-related sections on hazard lands, flooding, and erosion; and waterways and groundwater.

IWMP recommendation ties are the same as for the 23 West Planning District with a few differences: procedures described for lands for which there is no available flood information. There are also additional references in this development plan to lakes in the planning district, and the effects of residential developments on these lakes.

5.3.8 South Central Planning District

This development plan came into effect December 8, 2004 (Lombard North Group (1984) Ltd. Planners and Landscape Architects, 2004b). Includes watershed-related sections on hazard lands, flooding, and erosion; and water and shoreland management.

IWMP recommendation ties are the same as for the 23 West Planning District with a few differences: includes suggestions for lands prone to ponding, reference to livestock legislation in relation to water, encouraging best management practices for agriculture, and nutrient management.

5.4 Netley-Grassmere Watershed

The Netley-Grassmere Watershed is located in south-central Manitoba, just east of the Red River and bordering the southern end of Lake Winnipeg. The watershed is approximately 2,363 square kilometers and contains close to 40,000 people (East Interlake Conservation District [EICD], 2011, p.5). The watershed area is predominantly agricultural, but also contains a substantial amount of residential development due to its proximity to the cities of Selkirk and Winnipeg. During the summer months, the area sees an influx of cottagers.

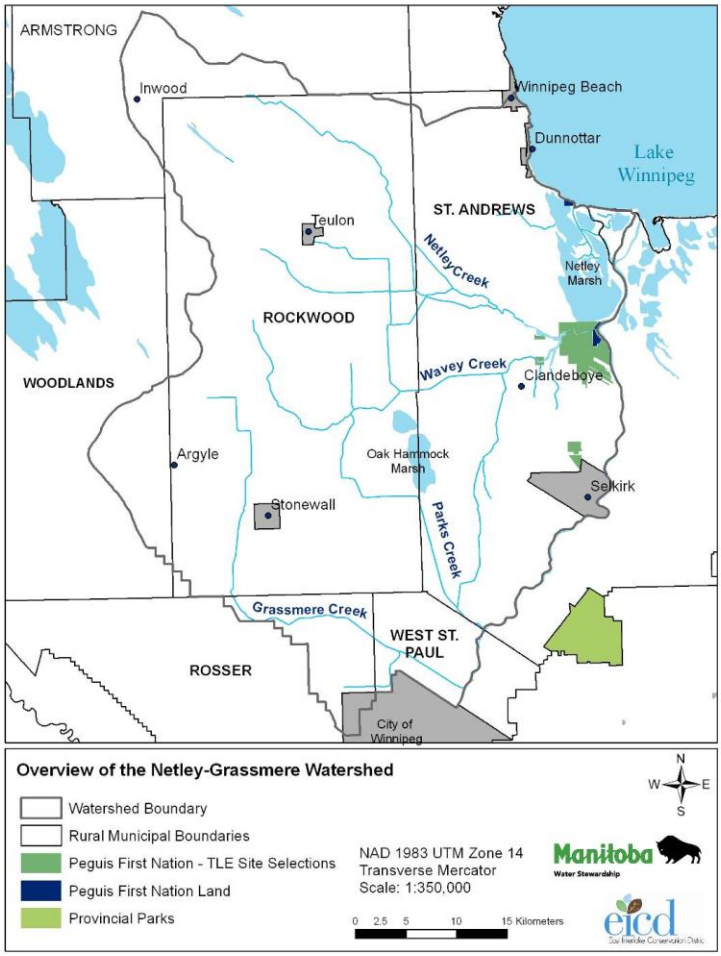


Figure 8: Netley-Grassmere Watershed (EICD, 2011) © Used with permission from the East Interlake Conservation District.

Four main watershed goals were established:

1. "Improve surface water quality in waterways within the Netley-Grassmere Watershed
2. Adopt a watershed-based approach to surface water management
3. Protect and improve the quality of drinking water
4. Protect and restore the quality and integrity of natural areas to maintain a healthy watershed" (EICD, 2011, p.7)

The Netley-Grassmere IWMP also contains recommendations for adoption in development plans. These are listed on p.40 of the Netley-Grassmere IWMP:

> "Rural Municipalities and Planning Districts should consider the following recommendations:
> 1. Develop policies that restrict intensive and high-pollution risk developments (developments, activities, land uses and structures that have a high risk of causing pollution and include but are not limited to chemical/fertilizer storage and application, septic systems, petroleum storage, waste disposal grounds, industrial factories and wastewater facilities) in source water protection zones around all public drinking water systems and in areas with less than six meters of overburden;
> 2. Limit future development along the shores of Lake Winnipeg, Netley Marsh and in areas that have significant recreational value, including a 100 metre buffer to minimize impact on natural areas and decrease shoreline erosion;
> 3. Continue to restrict the sale of crown lands that contain permanent or semi-permanent wetlands or land that is prone to flooding to minimize the loss of natural areas and the need for drainage improvements and the associated impacts to downstream residents;
> 4. Establish development restrictions in flood prone areas, especially along the Red River to above the 1997 high water levels and the 2009 ice jam water levels;
> 5. Include East Interlake Conservation District as a commenting agency for all applications for new or expanding livestock facilities, new residential and subdivision developments and conditional use licenses;
> 6. Implement policies for the mandatory sealing of wells in areas that become serviced by public water systems;
> 7. Implement policies for new subdivisions to include extra green space for temporary surface water storage during spring melt and after summer rainstorms due to the increases in impervious surfaces; and
> 8. Develop policies to encourage water conservation and efficiency, such as the installation of water saving appliances in new homes" (EICD, 2011, p.40).

All the development plans were completed prior to the completion of the Netley-Grassmere IWMP, so they did not have opportunity for full integration of recommendations from the

completed IWMP. All the development plans in this watershed area were created/updated in the era of the 1994 PLUPS.

5.4.1 East Interlake Planning District

This development plan came into effect February 3, 2011 (East Interlake Planning District, 2011). Includes watershed-related sections on hazard lands, flooding, and erosion; and water and shoreland.

IWMP recommendation ties (to the East Interlake Planning District Development Plan):

1. Development plan contains policies to direct development away from sensitive groundwater areas and requires precautions if development is to proceed. Does not completely restrict development in source water protection and areas with less than six metres of overburden. Also states the planning district will make efforts at source water protection.
2. Contains policies related to minimum elevations and setbacks from the shores of Lake Winnipeg. Does not specifically reference the 100 meter buffer from shoreline erosion, but does state development should be located in areas that can withstand up to 50 years of lake shoreline erosion. Exceptions can be made given the appropriate studies are completed.
3. Refers to the importance of protecting wetlands and precautions regarding developments that may affect wetlands. Does not specifically reference "restrict the sale of crown lands that contain permanent or semi-permanent wetlands or land that is prone to flooding" (EICD, 2011, p.40).

4. Refers to avoiding development in the 100 year flood zone; does not specifically refer to water levels of the 1997 and 2009 high water levels.
5. Directs that new land use applications should be forwarded to the East Interlake Conservation District for comment.
6. Does not reference sealing of abandoned wells as being mandatory in areas that acquire public water systems.
7. Does not reference the inclusion of green space in new subdivisions to assist with water storage.
8. Does not reference water conservation or water efficiency.

5.4.2 Fisher Armstrong Planning District

This development plan came into effect February 17, 2003 (Landmark Planning and Design and Manitoba Intergovernmental Affairs, 2003). Includes watershed-related sections on hazard lands, flooding, and erosion; and water and shoreland reserves.

Ties to IWMP recommendations (relating to development plans):

1. Discusses the need to avoid development in groundwater-sensitive areas or proceed with suitable precautions, does not indicate restrictions in relation to, or refer specifically to, areas with less than 6 metres of overburden.
2. The Fisher Armstrong Planning District does not border Lake Winnipeg or Netley Marsh and thus does not include policies related to these shorelines.
3. Does not contain policies specific to wetlands.
4. Refers to avoiding development in the 100 year flood zone (p.26); does not specifically refer to the 1997 Flood and 2009 Ice Jam high water levels.

5. Does not reference the East Interlake Conservation District (this organization did not exist at the time this development plan was adopted).
6. Does not reference sealing of abandoned wells as being mandatory in areas that acquire public water systems.
7. Does not reference the inclusion of green space in new subdivisions to assist with water storage.
8. Does not reference water conservation or water efficiency.

5.4.3 Selkirk and District Planning Area

This development plan came into effect July 20, 2011 (Selkirk and District Planning Area, 2011). Includes watershed-related sections on water, hazard lands, flooding, and erosion.

Ties to IWMP recommendations (relating to development plans):

1. Discusses the need to avoid development in groundwater-sensitive areas or proceed with suitable precautions; does not indicate any restriction in relation to, or refer specifically to, areas with less than 6 metres overburden. Also notes the potential impact of quarries on groundwater (p.42).
2. Does not list the 100 metre buffer, but does list a minimum buffer, that developments in these regions be referred Manitoba Conservation, and avoiding lands subject to erosion within a 50 year period (p.42).
3. Does not reference wetlands on crown lands, but does discuss the importance of precaution around Oak Hammock Marsh and Netley Marsh (p.42).
4. Refers to avoiding development in the 100 year flood zone (p.41), also makes note of the high water events in 1997 and 2009 (p.37).

5. Refers to the East Interlake Conservation District and their role in surface water management (p.37), but does not reference referring land use applications to them for comment.
6. Corresponds by stating abandoned wells are to be sealed (p.42).
7. Includes comments on ensuring development does not adversely impact water flows, but does not make direct reference to water retention green space in new subdivisions.
8. Corresponds by making references to promoting water conservation (p.43), with many additional references to sustaining natural water supply in the district.

5.4.4 South Interlake Planning District

This development plan came into effect July 26, 2011 (South Interlake Planning District, 2011). Includes watershed-related sections on hazard lands, flooding, and erosion; and water and shoreland.

Ties to IWMP recommendations (relating to development plans):

1. Discusses the need to avoid development in groundwater sensitive areas or proceed with suitable precautions, does not indicate any restriction in relation to, or refer specifically to, areas with less than 6 metres of overburden (p.16).
2. The South Interlake Planning District does not border Lake Winnipeg or Netley Marsh and thus does not include policies related to these shorelines.
3. Recommends precautions regarding developments that may affect wetlands (p.34). Does not specifically reference “restrict the sale of crown lands that contain permanent or semi-permanent wetlands or land that is prone to flooding” (EICD, 2011, p.40).

4. Refers to avoiding development in the 100 year flood zone (p.13), does not specifically refer to water levels of the 1997 and 2009 high water levels, but is also not directly adjacent to the Red River.
5. Corresponds to say that new land use applications should be forwarded to the East Interlake Conservation District for comment (p.29).
6. Corresponds by stating abandoned wells are to be sealed (p.44).
7. Does not reference the inclusion of green space in new subdivisions to assist with water storage.
8. Does not reference water conservation or water efficiency.

5.5 Summary

While the selected Manitoba sub-basin plans did not afford the opportunity for full integration because of the timing of plan completions, they do illustrate some of the existing interconnections between the two types of plans and the water-related information contained in existing development plans. Some of the more recent plans show evidence of increased integration, indicating that some consideration of in-progress IWMPs and Development Plans may have taken place. The integration process remains in its infancy and IWMPs, especially, are new to the province. The Provincial Planning Regulation is also new. As the processes evolve, it will be important to monitor how these plans are becoming more consistent with one another over time, adapting where necessary. The next chapter provides an overview of the interview results.

6. Interviews

This chapter outlines the results of the interviews by question - as listed in the interview guide (Appendix B), with additional comments inserted where most appropriate. There are 15 sub-sections addressing each research question focusing on: the necessary participants, low-level communication, cooperation, coordination, collaboration, sharing of responsibility, other jurisdictions, the effectiveness of integration, barriers to integration, implementation, legislation and policy, the role of land use planners, lessons learned, a guide to integrating watershed plans and land use plans in Manitoba, and additional comments from interviewees.

6.1 Necessary Participants

A wide range of individuals and organizations were recognized by interviewees including: Municipal councillors, planning board members, conservation district board members, planning district planners, provincial land use planners, land use planning consultants, provincial watershed planners, Manitoba Agriculture and Rural Initiatives staff, the public, the federal government, non-government participants representing organizations such as the Red River Basin Commission, Ducks Unlimited, or anyone with an interest in watershed health and land use issues who were involved in watershed planning and/or land use planning processes.

Municipal councillors were the most frequently identified stakeholders, with many interviewees indicating these individuals played an integral role in the process.

> *"I think number one is councils. Elected officials, they really need to be involved because they are their plans. Even if they adopt them, they have to implement them, or at least be involved with implementing them. So unless you want them to be new provincial plans or want them to be provincially implemented you have to have councils on board I think"* – Land Use Planning Consultant.

Municipal councillors are sometimes members of both planning and conservation district boards. Their role as elected officials overseeing and directing both planning processes gives them an important role in the process.

The importance of provincial land use planners and watershed planners was consistently stated by interviewees, with their role as professional planners looking into the ties between the processes, being an important role. Most interviewees also acknowledged the public, as there are opportunities to be involved in both planning processes.

6.2 Low-level Communication

All interviewees indicated that efforts were made to include potential partners in the integration process.

> *"Certainly there's a clear interest. Municipalities will suggest to us that we need to have conservation districts involved in our plan and I've been invited to meetings with conservation district representatives writing plans for watersheds"* – Government Land Use Planner.

> *"Absolutely the more parties the better. You have to see things from all sides of the equation, and when you involve all forms of government it makes it go much easier because us lay people don't really have a clue what the rules and laws are and there are some government people there that can direct you in the right direction"* –Local Elected Official.

> *"There is certainly a valiant effort to try and do that, and staff try and do that – there are involvements and there are workshops – and I certainly have participated in those workshops, as have a fair number of people and government people from other departments. But it is not perhaps as good as it could be"* – Government Land Use Planner.

6.3 Cooperation

Again, all interviewees said something along the lines that there is a willingness to let others know what is being planned. However it was also stated by interviewees that some

individuals and organizations were more open than others. A few interviewees indicated that cooperation is more practical and tangible, a realistic way to integrate watershed and development plans in Manitoba – good cooperation is a place to start, and then building towards coordination and collaboration.

> *"There is a willingness to let other organizations know from the grassroots up, but I feel from the province and the feds down, there is not a lot of information passing"* – Local Elected Official.

> *"You can go a long ways with good cooperation…I'd be satisfied with cooperation – achieve that and build from there. Basic building blocks of people working together, sharing information, that kind of thing, that's a good place to start. It's like you've got to walk before you run, and that's the walking part. Cooperation is a lot more tangible too, you can agree to meet, you can agree to share data, you can agree to work together. But bringing together other minds and aspirations in that pure collaborative sense is a lot more challenging. Should be strived for." – Senior* Provincial Staff.

6.4 Coordination

Many interviewees indicated efforts are made by the province, municipalities, and community stakeholders to coordinate. Government staff were typically the most positive when describing efforts at coordination, elected officials also - but stating more frequently that improvements could be made, while non-governmental participants were the most critical, although they also acknowledged that efforts were being made.

> *"We try to, when we get the development plans and meet with the municipal planning groups. The very first thing we do is look what they have in their plan because they may already have actions in there. The public has identified issues and may have actions that address the public's concerns, but the public doesn't always know their development plan has that policy already in place. The shoreline setbacks are an example. So we first make sure there is not already an existing policy in place and if there's not, if there's a gap there, that's where the watershed plan can recommend a policy for the local planning districts to adopt when they develop their development plan or renew their existing plan every 5 years"* – Watershed Planner.

"Certainly it wasn't made a few years ago (an effort) to synchronize actions, but the province has done a good job to ensure there is integration, they are mandating it, planners are exploring it from both sides" – Non-Government Participant.

6.5 Collaboration

Several interviewees pointed out the benefits of collaboration in terms of saving on time and resources, indicating that opportunities for these types of savings would be popular with local elected officials involved in both plans, while also saving staff time and resources for planners associated with both processes.

"Whatever we'd do we'd have to come to it from all sides, I think it would be more efficient from the RM perspective too, I've talked to a lot of RM councilors who've said we've just finished a five year process for our development plan and now we have to do a watershed plan, they feel like there are a lot of government employees coming to them and asking them to develop plan after plan after plan" – Watershed Planner.

"So is there a way of synchronizing efforts? Those things could build on each other in time so that you do some work that would be beneficial to both parties? Certainly some of the background study work that needs to be done probably has relevance to both processes, and there could be cost savings if they could be tied together" – Government Land Use Planner.

One interviewee indicated the only way to achieve collaboration between watershed plans and development plans is to shift municipal boundaries to watershed boundaries. Several interviewees stated that this was discussed in the past at an Association of Manitoba Municipalities conference but that the idea had/has not gained much traction. Others felt that shifting the municipal boundaries was unnecessary for effective integration.

"(Effective integration through collaboration cannot happen)…until we accept watersheds as their natural boundaries and link that to the boundaries of the municipalities, either you're going to go with it or not go with it, … an expectation should be put out there that says there should be a movement towards natural boundaries of municipalities" – Non-Government Participant.

"There has been discussion in the province about looking at and trying to determine whether or not planning districts should be enlarged to encompass watersheds. And

I've heard that for a number of years, but there hasn't been strong commitment and desire to move into that direction at this time" – Government Land Use Planner.

While there was definitely an interest in collaboration and many parties indicated this is something to be strived for, it was also acknowledged that there are challenges to this. Collaboration takes more time to initiate, to discern what to collaborate on, and to build truly collaborative working relationships. Considering the integration process in Manitoba is still relatively new, this objective may be something to be worked towards over time. Some interviewees indicated through their responses that they were of the opinion it would be difficult to move beyond coordination.

"Working together always takes time. It is always easier and faster to go alone, but not always in your best interest to do that. So the challenge then really comes down to deciding and determining…which issues those two organizations collaborate on and which issues you need to engage others and then do so in the best way they can" – Non-Government Participant.

"Ideally you would go with something along the collaboration line. I don't know how that would work though. Like I can't see it being anything other than coordination, because of the timing of watershed plans take over a year or two years to develop and finish. Development plans have to be reviewed every 5 years but that can turn into 10 years before it's actually adopted" – Land Use Planning Consultant.

Others acknowledged that while it is good to strive for collaboration, this objective may not be prudent at this point. There are advantages to maintaining more separate processes – different strengths can be highlighted. Some believed that if collaboration was to be the goal, a new model for collaborative planning would need to be developed to incorporate the strengths of the different planning processes in Manitoba and strike a healthy balance community and regional land use planning and watershed planning.

"I worry what that means for our ability to put our environmental and local governance mandate first. (Pushed down) by a model that's been around a lot longer and that people are more comfortable with and knowledgeable on. (Risk of moving to collaboration) too quickly, I think it can be done, we'd certainly have to

have some pretty intense conversations and we couldn't just adopt one of the existing models. I think it would have to be a new hybrid" – Senior Provincial Staff.

6.6 Shared Responsibility

Interviewees frequently stated that there are common goals but they appeared more reluctant to say that there was a merger of interests, or that responsibility falls collectively upon the group of involved organizations, individuals, and stakeholders. Some indicated that while working together is important, it is also important to clearly outline who is responsible for what, to ensure things get done.

"There are going to be certain organizations whether it's a CD or an RM that is responsible for certain services or goals and while they may integrate because there is some overlap, there has to be clear lines of jurisdiction and accountability and if that gets muddied because of this business of sharing, a couple of things happen. One is nobody takes ownership" – Non-Government Participant.

6.7 Other Jurisdictions

Some interviewees stated they had no knowledge of how the integration of watershed and land use planning was conducted in other jurisdictions. Others, usually local stakeholders involved in planning in one specific watershed/community in Manitoba, said they looked to other parts of Manitoba for ideas for how to do things. Those in government often pointed to other provinces. Some pointed to Australia and the issues with floods and droughts that Australia has dealt with, however no interviewees shared specific knowledge about how Australia integrates watershed and land use plans. Australia seemed to be a response to this question because interviewees were aware that Australia has been dealing with significant water and land management issues for some time.

Ontario was the most referenced jurisdiction that interviewees indicated they looked to for integrating watershed and land use plans. Interviewees cited the conservation authorities in Ontario - the resourcing, experience, policies, and regulation in place in Ontario.

> *"One area that has done a good job integrating land use planning policies and watershed planning conservation objectives with regulations and incentives is groups like Ontario, where they… again it comes down to they… are given the authority … given the jurisdictional responsibility and the capacity in terms of dollars to make changes. Conservation authorities, as I understand it, do conservation programming like conservation districts but they actually have regulatory authority as well… where you start to have crossover to the by-laws and development plans and the civic authority"* – Non-Government Participant.

> *"One thing that CAs have in Ontario that CDs don't have here, is they don't have any regulatory authority. There they have regulatory authority for flood plains. I don't know how that would work here. But it changes the game, they issue permits for building in flood prone areas and that gives them a much different stake in these kinds of things. So I don't know if there's a downside to that at all, but it's a big difference"* – Senior Provincial Staff.

Most land use planning related interviewees indicated greater openness and support for watershed regulatory authority for land uses in areas under conservation district mandates such as flood plains and drinking source water protection areas. However watershed planning and conservation district staff were usually less open to land use regulatory authority for Manitoba water planning authorities (thus far always conservation districts), stating that this would inhibit the support the conservation district program has been building. These divergent opinions are evidenced in interview responses:

> *"Certainly that's (regulatory authority for land uses) one route for evolution… Would we have more success if we could support some of these things with by-laws, yeah maybe...I think it's either that or we have to do a lot more work on having CD input recognized as legitimate almost partner/government input to the people who are currently making those regulatory decisions…I guess because I see the issues of capacity and finite resources (CDs), their small resources, carving off regulatory pieces and handing them to a program that's basically already under resourced for the kind of work that they should be doing, is kind of a losing game in many ways"* – Senior Provincial Staff.

"Ontario is extremely regulatory. You take a look at their planning and it's just amazing how regulatory they are versus Manitoba. I think it would be useful in promoting that collaboration though. If you had two regulatory processes and councils could see they could go together at the same time and they could save $50,000 if we combined these things and did them at the same time, if we had the same open house for both of them…kind of thing. I think you would get a warm reception that way. But pretty angry that it was mandatory or regulatory to do something" – Land Use Planning Consultant.

"May be best as voluntary system (incentive based with no regulatory authority for land uses) we have now, maintains better relations within the watershed with land owners as they can cool to being ordered to do certain things. If CDs had regulatory authority this may not help CD's relationships with land owners. (Our) CD Board is more interested right now in continuing to be a carrot organization. Incentive based" – Conservation District Staff.

6.8 Effectiveness of Integration

Interviewees stated that bringing people together was effective for promoting integration. Putting development plan recommendations on a separate page in a watershed plan was also noted to be effective.

"I think what works good is when you get the local planning team and the watershed team together you can identify what types of scientific background information that the planning district needs to be able to make a policy in their development plan. We can't just throw out random recommendations. We need some information to back that up some of the time" – Watershed Planner.

"We've recently started putting a page into our plans of obvious linkages between the two plans…First few plans we didn't" – Watershed Planner.

While interviewees acknowledged the benefit of having these recommendations laid out, it was also pointed out that these may not be accepted by councils as part of their development plans. Councils could be made more aware of these prior to a development plan process. The recommendations could be more specific as to what was a development plan recommendation, zoning by-law, or building code recommendation. Others felt land use planners could differentiate and work with the recommendations that are there as they are.

One land use planning consultant described an experience where the council of the municipality was highly resistant to a few of the watershed plan recommendations.

> *"It was nice how they had the land use implications nicely laid out in the plan so they are easy to find. Then what we did was a workshop with council. We threw those things in there, and for a lot of them there was a lot of discussion over the development plan (surrounding the recommendations from the watershed plan). (No-net loss of wetlands) That was the major onus. They (the council) wanted to be able to move the wetlands from the middle of the field to the edge of the field, they felt that would be okay and appropriate because they were keeping the amount of water storage that they had. There are issues with that obviously"* – Land Use Planning Consultant.

The above example represents a lack of knowledge by some council members about ecosystem integrity. The consultant stated this council wanted a policy in the development plan to counter balance the watershed plan recommendation. The council wanted a no-net gain of wetlands policy in the development plan to counter the no-net loss of wetlands in the watershed plan.

Some interviewees noted that having the development plans and watershed plans completed at the same time or at close to the same time contributed to integration.

> *"Some of the plans from the planning district were affected by the watershed plans, especially if they were just starting or in the middle of their planning process. Then for sure they made an effort to… a lot of the things we were saying in ours would be repeated or adapted into theirs, and vice versa. In our planning process, things we saw in the planning district plans made us think about how we are doing ours"* – Non-Government Participant.

Both land use and watershed planners acknowledged that both plans have source water protection areas or sensitive land areas. It was suggested by a few interviewees that steps need to be taken to ensure these areas align with one another. Some suggested this could be achieved through sharing of mapping resources.

> *"Sometimes our areas overlap in that area (source water protection) and we need to find a way to update the development plan vulnerable areas and/or replace them*

with these sensitive areas … or we need to find a way to mesh our practices because I think they both aimed at protecting ground water" – Watershed Planner.

A few interviewees were asked about the role and effect of land use planning consultants on the integration of watershed plans and land use plans, and how this influenced potential integration via collaboration. Watershed plans are produced by a collection of government and local stakeholders, with no development planning consultants directly involved in the plans. Land use plans are now often completed by consultants. As is shown by the quotes below, consultants can have different priorities than government staff and are driven by the interests of the client municipality.

"In terms of who prepares development plans, it's mostly consultants, and that has created at times disconnects with provincial goals, objectives and priorities. And again, it's not to say that it can't work, but it does pose unique challenges when you have a third party involved in a process and they're driven by, not conflicting goals, but different objectives. You're contracted to do a job, you establish the minimum requirements which become the maximum number of meetings, products, and you're out. So it's just inherent in consulting that you're driven by different priorities" – Senior Provincial Staff.

"At the end of the day a paid consultant is really going to do what the client wants. And the client is the municipality or planning district and if those councils aren't part of the watershed plan or aren't interested, collaboration is unlikely" – Land Use Planning Consultant.

Increased experience and education were noted to be important as well. Through increased experience and education people will become more aware of the interconnections between water and land, the importance of wetlands, etc. But at this point many interviewees agreed that the integration process is still in its early stages and through time may become more effective. The quote below shows that while the integration of watershed and land use planning still has issues to be resolved, knowledge of ecological concepts is increasing.

"I think people are still sorting it out. One of the contentious things was conservation agreements in Western Manitoba. They would see people signing these conservation agreements and flooding their land as wetlands and then thinking how

does that affect me in terms of salinity and farming if it's a wet year and that wetland starts creeping onto my land (remains an integration issue)…But certainly riparian areas and things like that, they're becoming common terms, people are understanding it more" – Land Use Planning Consultant.

6.9 Barriers

Shortage of time, financial, scientific data, knowledge, and technical resources were all noted as barriers.

"Time is the biggest barrier and that can translate into resources, money, information, data and tools. We want to work closer with planning districts but it's tough to find the time and if there is any incompatibility or conflict it's dropped" – Conservation District Staff.

"The normal reason why people aren't able to participate is because they have resource shortages" – Watershed Planner.

"Lack of good data, and modeling, and sort of the heavy duty stuff that would back stop a watershed plan that's really…. in short supply here… Regulatory authority and science-based understanding of how the watersheds are functioning would be the two big pieces I think that are missing" – Senior Provincial Staff.

Differences in regulatory authority for land uses (by-laws, issuing permits, etc.) between watershed and development plans was also recognized as a barrier - one process being voluntary, the other legally binding.

"Municipalities know through long practice and the connection with their by-laws that they have to abide by their development plan or there can be repercussions. They are not as quick to recognize their responsibility for anything in an IWMP because it is a product of another organization that has some input from them; they want to have input into those but they don't necessarily have to be responsible for the delivery of all those thing afterwards. So it's another reason why we have to work on moving towards collaboration." – Senior Provincial Staff.

Scheduling and delays in government approval processes also sometimes prevented recommendations from watershed plans entering into a development plan and vice versa.

"Problem is that everything has a timeline to it, our development plan process started about 5 years ago, we were done with it probably 3 years ago but it sat on the province's desk for probably another 3 years waiting for government approval, in

the meantime the conservation district plan that was being prepared didn't have the same political implications. Although ours started years before, theirs started later and was approved a lot earlier, things get out of sync." – Government Land Use Planner.

"I think it's limited at this point, it should be more involved, like we did our development plan some years ago and it should be updated every 5 years. Quite often that's the intent. Does it always happen? Not necessarily" – Local Elected Official.

Another barrier noted by interviewees was the presence of so many municipalities and planning districts being a part of one watershed.

"Difficult to go to all nine planning district sessions or for them to send nine planning district reps to a watershed" – Conservation District Staff.

Some interviewees stated that having land use planners and watershed planners in different departments is a barrier.

"The fact that we work in different departments, that's a barrier"- Watershed Planner.

Short term economics were cited as a barrier, where the interest in making money in the short term leads to reluctance to implement watershed actions that would result in long-term improvements to watershed health. Local politics were also acknowledged as a barrier, where local concerns would override more regional issues.

"I think short term economic needs are definitely a challenge for things like the IWMP. Meaning that municipal governments or individuals that are farmers or whatever, a lot of them are under pressure to come up with the all-mighty dollar in one way or another, and it's easy to bypass what may be best for the future" – Local Elected Official.

"Local politics, it's difficult to say no to a neighbour or a constituent who voted you in" – Non-Government Participant.

Changes in staff and councils were also noted as a barrier, as those involved in a plan may be gone a few years later.

> *"Changes in staff, change of a manager, and others involved in the process for two years, or you get a change in the planners, you get a change in council to those who weren't involved in the process, in terms of integration and outcomes those are challenges that need to be somehow dealt with"* – Non-Government Participant.

In some cases there was confusion over who was responsible for overseeing the integration of IWMPs with development plans. Some felt the political and municipal representatives were responsible for ensuring integration.

> *"The integration is more at the political and municipal level as opposed to the administration level"* – Government Land Use Planner.

Interviewees gave mixed statements as to whether or not the same representatives were on conservation district boards and planning boards. Some said they were usually the same, others said they were often different.

Different municipal and watershed boundaries were also recognized as a barrier. One interviewee suggested the municipal boundaries needed to be changed. Most other interviewees were of the opinion that this was a barrier, but also that effective integration and consistency between plans was still possible with differing municipal and watershed boundaries.

6.10 Implementation

With regards to implementing watershed and land use plans while retaining consistency between plans, many of the same barriers were recognized. Defining responsibility for implementation was stated as a potential challenge. A few interviewees suggested outlining who was specifically responsible for integration. Some believed there should be an overarching policy or overseeing body, others believed it would be better to work with the current system or make alterations to the current system to ensure effective integration.

> *"There has to be some kind of an overseer or some mechanism to ensure that implementation is consistent with what was planned"* – Non-Government Participant.

"(Overseeing body?) I struggle with that, I don't know that we need more layers of system to achieve it. I think there has to be mandates to do it; people have to be mandated to work together. (Pooling of CD and planning boards) would accomplish that for sure." – Senior Provincial Staff.

6.11 Policy and Legislation

Many stated that changes to the Planning Act and the Water Protection Act requiring development plans to consider outcomes of a watershed plan and vice versa was a positive step. More people are paying attention to the need for integration.

"I would say that is changing more recently, I think in large part due to the Water Protection Act and changes to the Planning Act, providing a necessity for the integration. I see more councillors and other people talking about it" – Non-Government Participant.

Other interviewees pointed out that policy only goes so far. The people involved still need to make the effort, and do the necessary work to integrate.

"Whether it's improved or not, I guess legislation doesn't do that. It's peoples' attitudes, staff members working together, politicians saying we want to make sure there is integration and cash from various sources, from senior levels of government to make it happen" – Government Land Use Planner.

6.12 Role of Land Use Planners

Interviewees all felt land use planners have a role to play in the integration of watershed and land use planning. Their first role is to be involved in water management and watershed planning. Others recognized the role of land use planners in both technical matters (mapping, writing by-laws, displaying information, etc.) and for soft skills - such as navigating the government system, collaborating different organizations, individuals, and stakeholders on land use and watershed planning, and in conflict resolution.

"I think the very first role that they should have in an integrated watershed management planning process is to be a part of it, whether it's on the project management team or the watershed team. So they have a role in approving the plan,

reviewing the plan before it goes through the final review process as well and then their final role is of course implementation" – Watershed Planner.

"The role of planners is the technical data, information, trends in development and growth and all of that, certainly constraint mapping, they have the skills to do constraint mapping. Another is navigating the system, how do we transfer something over here into something that is meaningful. So there's both parts, planners can play both parts and should. They're not just technocrats but they have some data and information that is relevant. But they're also collaborators and navigators through regulatory systems. They can take stuff that is relevant and put it in to a by-law or something that is actually enforceable. So there's really two roles there" – Senior Provincial Staff.

While most felt the knowledge and skills of land use planners were adequate for achieving effective integration, some interviewees suggested an increased knowledge of environmental science.

"I think a better understanding of resource management and natural sciences and so on would help" – Government Land Use Planner.

6.13 Lessons Learned

One of the most frequently cited areas for improvement was the need for more education. It was also noted that familiarity and knowledge are increasing and improving over time.

"We're still in the early stages of getting people to know what a conservation district is and what we do and what an IWMP is, so I think just education, what an IWMP is, and what their goals are and all that sort of stuff. That would probably be the two main ones" – Non-Government Participant.

"I think education is a really good word. Not only the councilors, but the people within conservation and water stewardship who are working on the watershed plan themselves, everyone needs to have a good understanding of what is in the development plan already and how this process (IWMP) is going to strengthen it"- Manitoba Agriculture Food and Rural Initiatives Land Use Specialist.

"I think we need to carry forward with kind of an educational type program. Just kind of an aside, the local CD was at our council not too long ago, and she pulled out the plan (IWMP) and said well you folks have a copy of this. There were a whole bunch of dumbstruck faces around (the room) and they did not have a clue what she was talking about. They did have hard copies and electronic copies but it's just not to their forefront, councils don't do a whole lot with drainage anymore. That's

> *pretty much taken over by the province and it's not something that ends up on your table at every meeting. They kind of lose sight of what's happening. There needs to be more education for those involved (ie. councils) as well as for the general public"* – Local Elected Official.

The last quote also indicates the need to educate people not directly involved in the plan and ensure stakeholders are aware of their watershed and development plans, particularly the councils who play a role in implementing the plans and ensuring consistency between the two plans.

A few interviewees, particularly Non-Government Participants, stated increased political will – to marshal resources for effective watershed and land use planning - is needed for effective integration.

> *"It's got to be political, for example, the province has said the watershed plans will be developed by the conservation districts. Statement of principle, no problem with that. Resourcing isn't there. The resourcing that needs to be there for that is sadly lacking"* – Non-Government Participant.

Several interviewees supported the idea of co-locating provincial watershed planners and land use planners to allow for more informal exchange of ideas and open up the potential for increased collaboration. One interviewee also suggested the idea of merging conservation district boards and planning boards in some way.

> *"One of the things I've been interested in is how we could bring together CD boards and Planning boards. One of them has a broad program, the CD boards have a broad programmatic mandate watershed based, planning boards have regulatory authority under the Planning Act. And at least half of the membership of both boards is the same. Planning boards only have elected officials and CD boards have appointed members but if you're thinking about longer-term, that's something I've been internally saying is maybe it's time to start looking at those two boards and fusing them. Then you get both, you get the broad mandate, watershed-based, and regulatory authority. And they'd have more resourcing"* – Senior Provincial Staff.

The importance of continual communication was also recognized as vital to the integration process - both thus far and going forward. It was also stated by one senior provincial

staff person that it will be important to communicate with and ensure that other senior level provincial staff are supportive and cognizant of the need for integration.

> *"To me now is a time to get a lot more understanding and engagement at the top decision making levels from deputy ministers, ministers of departments getting on board with this idea of taking a more holistic planning approach and making sure that planning approaches are seen to be supporting one another if not totally being amalgamated over time"* – Senior Provincial Staff.

6.14 Guide to Integration

Most interviewees supported the idea of a guide to integrating watershed plans with land use development plans. It was suggested this include the basics of land use planning (what is a development plan, zoning by-law, etc.) and watershed planning. The guide should be simple, outline the areas of possible crossover, and general suggestions for effective integration. It was also emphasized by several interviewees that any such guide needs to be developed cooperatively by both Local Government and Manitoba Conservation and Water Stewardship.

> *"A guide would be a good idea. A little handbook would be good. Nuts and bolts… lessons learned"* – Conservation District Staff.

> *"Here's the development planning process, here's the watershed planning process and then here are the areas and points at which integration could take place or contact could be made or joint efforts undertaken. It would be useful"* – Government Land Use Planner.

> *"Yes, I think it needs to be developed. I think you need to have local government behind it to write the guide. You have to have the staff try it out and see what makes sense. You have to have the basic stuff in the guide. We do need something for sure. But it's not the guides that bring them to life, it's the staff sitting at the table"* – Manitoba Agriculture Food and Rural Initiatives Land Use Specialist.

> *"That could possibly be a good project to look at to maybe co-develop (between) Local Government (and Conservation and Water Stewardship)…What's the difference with an IWMP, what is the background of the CD program coming into this, a lot of emphasis on how it can inform a development plan, a lot of emphasis on it providing another level or another set of tools for a municipality to use in safeguarding their economic and environmental health and future. And some concrete examples. For example, here's the type of goal that might be in a watershed*

plan, how do you relate that to by-laws in a development plan for a municipality…Or through that by-law you're making it impossible for us to achieve this particular (IWMP) goal" – Senior Provincial Staff.

While most interviewees supported a guide, others were concerned as to how effective a guide would be. Some reiterated that even with a guide - like policy - the people involved still need to make the effort and take the necessary steps to achieve integration.

6.15 Additional Comments

Interviewees were asked if they had anything else to add that may have been missed. One interviewee suggested the idea of a pilot project where the development plan and watershed plan are started at the same time, in an area with similar boundaries, and the involved players would work together very closely over the course of the creation of the plans.

"I think a pilot project would be a great idea. I think it would be great to try this out somewhere where we work very closely together at the start of a development plan and a watershed plan, and we either end up with two separate plans that are meshed very well or we end up with one sort of umbrella document that meets the needs of both groups" – Watershed Planner.

Another interviewee suggested that in the future it will be important for watershed and land use planners to play a role in conflict resolution, particularly if there is a shift towards a regulatory authority for watershed plans and conservation districts.

"If and when watershed plans, as they continue to, if the objective for them is to have more influence there's going to be more likelihood of conflict and so that's one thing we haven't talked about. Planner as facilitator, planner as problem solver, planner as consensus builder. It's not an issue now but it will be, as soon as this plan means I can't do something on my land that raises the stakes. That's something we should be anticipating" – Senior Provincial Staff.

6.16 Summary

A few common themes emerged from the interviews. Elected officials, watershed and land use planning staff, and the public were all cited as important for achieving effective integration. Many interviewees believed that collaboration as a form of integration is useful and something to be strived for, but also that there are advantages to currently emphasising cooperation and coordination. Some interviewees stated a belief that it is important to first achieve good cooperation and coordination and work from there towards collaboration.

Ontario was the most repeatedly identified jurisdiction as, although not perfect, an example of good integration. Interviewees had mixed feelings on regulatory authority (ie. by-laws) for conservation districts on land uses related to water management. Land use planning focused interviewees were more open to it; watershed planning focused interviewees were more reluctant. All interviewees acknowledged land use planners have a role to play, as facilitator, technical expert (writing recommendations into by-laws, mapping), and coordinator.

Frequently cited barriers integrating land use and watershed plans included limited scientific and technical knowledge, finances, and staff time. The different boundaries of municipalities and watersheds were also acknowledged, but this was something most believed could be worked around. Most interviewees acknowledged that recent policy changes to *The Planning Act* and *The Water Protection Act* had positive effects, but people still needed to do the groundwork to make integration happen. Most interviewees believed a guide to integrating watershed plans and development plans in Manitoba would be beneficial, and that this guide should be co-developed by Manitoba Local Government and Manitoba Conservation and Water Stewardship.

Ideas for improvement and lessons learned included the need for providing further education on watersheds, merging conservation district and planning boards, co-locating planners, future consideration of regulatory authority for water planning authorities (CDs), the future potential need for conflict resolution, and experimenting with pilot programs. Interviewees also stated that integrated watershed management planning is new in Manitoba, and that – over time - things have improved, and will continue to improve, achieving more effective integration between integrated watershed management plans and development plans.

7. Analysis and Synthesis

This chapter documents the analysis – and synthesis - of the results of the literature review, Manitoba sub-basin case studies, and interviews. The content is structured, below, in the order of the research questions.

7.1 Collaboration as a Form of Integration

What are some key indicators of effective integration-via-collaboration and how is it achieved? How has integration-via-collaboration, particularly with regards to watershed and land use planning, evolved over time and what is the potential going forward?

Various forms of collective efforts related to integrating land use and watershed planning were acknowledged in the literature and through interviews. Some touched on collaboration or the potential of collaboration. Margerum (2008, 2011), Innes and Booher (2010), and Healey (2006) all report that collaborative planning has been evolving to meet the need to better address complex, interconnected problems. Water and land are intertwined, meaning that solutions must be reached through holistic solutions that acknowledge these interconnections (Kidd and Shaw, 2007).

Several key indicators of collaboration as a form of integration emerged: participants must be informed and all views must be listened to regardless of levels of power; social networks need to be built; increased efficiency of transactions; building consensus; achieving results; and adaptation over time. It was acknowledged in interviews that collaboration takes more time, so it is important to determine when collaboration is necessary and when it is not. Some challenges were also noted both in the literature and in interviews, with regards to integration via collaboration for watershed and land use planning. Different municipal and watershed

boundaries were acknowledged as a barrier, but lack of human, financial, and time resources were the most frequently cited reasons for not collaborating.

Innes and Booher (2010) point out how important it is for participants in collaborative processes to be informed. "For the process to be collaboratively rational, all participants must also be fully informed and able to express their views and be listened to, whether they are powerful or not" (Innes and Booher, 2010, p.6). Through interviews this also emerged, with some - elected officials in particular - pointing out the importance of being knowledgeable about ecological functions and planning concepts during the planning processes, and the need for further education on how planning decisions affect watershed health in the early stages of watershed and land use development planning processes. This would help those involved understand how these processes fit together.

Several interviewees also acknowledged that in Manitoba, with the IWMP process in its infancy, many people are still gaining familiarity with watershed planning and its ties to land use planning. As the process continues, over time, people will likely become more able to fully participate and collaborate as a team. Plans that involve many different public stakeholders are more likely to be backed by the community, promoted and carried out (Carter et al., 2005). Public involvement and understanding of plans are also noted to have the potential to increase political and public support (Ivey et al., 2006). As Manitoba continues with IWMP and begins integrating with development plans, understanding is likely to grow through increased and continued exposure as well as through public involvement. With this increased understanding, the ability to truly collaborate with informed stakeholders becomes possible.

Another element of long-term collaboration is social networks, acknowledged by McGinnis et al. (1999) and Margerum (2011). Several interviewees acknowledged the

importance of building relationships and how this facilitates integration, as it allows for both formal as well as more informal means of communicating and working together to ensure integration takes place. These ongoing relationships, and involvement of multiple individuals and organizations, are noted to facilitate implementation - as people are more likely to implement something they've been involved with. The interview results showed that these relationships are being built. But changes could be made to facilitate stronger relationships between those involved in land use planning and watershed planning. Co-locating planners where logistically possible, and merging Conservation District and Planning District boards, may further increase the potential for informal collaboration to emerge.

Seltzer and Wight (1995) argue that collaboration involves multiple parties rolling several actions into one and getting more out of the same level of effort than less in-depth processes. As discussed in section 6.1.5, several interviewees indicated that participants in planning processes, particularly elected officials, would welcome increased efficiency. These responses indicate that, if possible, there may be an interest in pursuing collaboration if it can increase the efficiency of the processes, particularly with regards to integration.

Margerum (2011) notes that a key feature of many collaborative efforts involves reaching consensus in decisions, something that would be characteristic of collaboration as a form of integration as well. This differs from the majority vote approach. With collaboration, everyone comes to the same agreement through open, informed dialogue with other stakeholders. This was also emphasized in the interviews and Manitoba sub-basin case studies as important in the IWMP process in Manitoba.

Many longer-term collaborative efforts require adaptation over time, including learning through experimentation. Improving the integration of watershed and land use planning will

likely require experimentation to figure out over time what works best. Margerum (2011) points out that many longer-term collaborations require adaptive management in order to adjust over time. Lee (1993) argues that successful adaptation is achieved through experimentation, learning and adjustment from multiple levels. Thus, for longer-term collaborative efforts, evidence of adaptation becomes a key indicator of effective long-term integration via collaboration. One interviewee expressed an interest in conducting pilot projects, to openly experiment with how to integrate effectively, something supported by the adaptive management literature.

While there is potential for and interest in collaboration, there were drawbacks and challenges noted as well. Working together has its advantages, but there are also drawbacks. Acknowledging that not everything needs to be integrated, or collaborated on, in watershed and land use planning, is important. The key is to figure out what requires integration that would benefit from collaboration and what does not. Interviewees also noted that at times cooperation or coordination may have benefits of their own, and that integration can go 'a long ways' through good cooperation or coordination. Collaboration is needed to deal with complex problems that require holistic, co-created solutions and where there may be opportunities to roll multiple actions into one; less complex problems may be able to be dealt with more quickly via cooperation or coordination, where simply an exchange of information may suffice.

In the literature, several references focused on land use planning and watershed planning integration (Carter et al., 2005; Mitchell, 2005; Ivey et al. 2006; and Plummer et al., 2011), discussing the need for linkages between the plans. Mitchell (2005) and Plummer et al. (2011) suggest exploring coordination and collaboration, as possible modes of integration. They do not necessitate collaboration as the only mode of integration. However, both interviewees - in section 6.1.5, and the literature, acknowledged the benefits of collaboration, the key being

determining when it is useful as a mode of integration and when other modes, such as cooperation or coordination, may be more appropriate – and adequate.

One interviewee was of the opinion that, for collaboration to occur, it is necessary to re-align municipal boundaries with watershed boundaries. Others stated boundary realignment is unnecessary and unlikely to occur. Mitchell (2005) argues that boundary issues will always be present, and that it is better to focus on how to minimize these issues and collaborate with that reality, rather than pursue realigning political boundaries. Blomquist and Schlager (2005) argue that realignment is not necessarily the solution; there are many other boundaries besides watershed boundaries that influence community, and people don't necessarily identify with, or live communally within, watershed boundaries. While similar boundaries may help facilitate integration via collaboration, it is not necessary to realign boundaries to achieve effective integration. The case studies of the Pembina River watershed and the Netley-Grassmere watershed also indicate that there is already some integration occurring, as existing development plans contain policies for water management, and they are now required to consider the outcomes of watershed plans which are based on watershed boundaries.

Margerum (2011) in his research on collaboration concluded the three most common issues in convening a collaborative planning effort are reluctance and restrictions on participants' time and money, limitations imposed by policy or legislation, and staff turnover in collaborating agencies (p.77). These issues were also reflected by interviewees in section 6.1.9 who noted these issues as barriers to the integration of watershed planning and land use planning in Manitoba.

Adequate resources can definitely aid integration via collaboration, as was indicated in the literature and in interviews. Collaborative efforts need sufficient resources be successful. But

the efficiency achieved by rolling several actions into one and getting more out of the same level of effort, makes collaboration an attractive option. Over the long-term collaboration, when appropriate, can be a useful mode of achieving effective integration between watershed and land use planning.

7.2 Role of Land Use Planners

What is the role of land use planners in the (potentially) collaborative process of integrating watershed plans with land use development plans? What knowledge and skills are required?

Both the literature findings and interviewee's responses acknowledged the importance of land use planners in water management and in the process of integrating watershed plans with land use development plans. The Manitoba sub-basin case studies provide evidence that land use planners are already incorporating water management into development plans in Manitoba. Land use planners have several roles to play: facilitator, team member, plan reviewer, and implementers of plans. Patrick (2005) noted that planners can play a role by incorporating watershed initiatives - such as protecting ground water recharge areas - into official community plans, and implementing by-laws to protect these areas. Ivey et al. (2006) discuss several land use planning tools that can be used to integrate watershed and land use planning. These include: writing water resource initiatives into municipal plans, using the watershed scale for planning, using zoning to buffer wellheads and reservoirs, designating brownfields for redevelopment (involving the removal of harmful substances from the area), and using land use plans to provide protection for wetlands and shorelines (Ivey et al., 2006). The interviewees also noted in section 6.1.12 that land use planners have a role to play in ensuring watershed recommendations are written into land use policies and by-laws.

Several interviewees acknowledged, as reported in section 6.1.12, the importance of land use planners being part of the watershed planning process. One government land use planner also expressed the view that those involved in watershed planning processes could be more involved in development plan creations and updates.

Patrick (2005) also noted the importance of land use planners as facilitators, and that they can play a significant role in bringing people in the watershed together towards a common goal. Patrick (2005) especially emphasizes the usefulness of the planners' collaborative skills-set in watershed planning, particularly source water protection. Planners are often good communicators, strong organizers, and skilled facilitators - all important skills for integrating watershed plans with land use plans. These skills were echoed in the interviews, while some interviewees also identified the importance of planners in conflict resolution, particularly if watershed plans gain more regulatory weight in the future. In Manitoba these skills could apply to both watershed and land use planners.

In terms of knowledge and skills, Patrick (2005) points out that planners often have technical skills such as an understanding of community planning processes and by-laws. One local elected official emphasized their importance in ensuring proper procedure is followed for land use changes.

In Manitoba, some interviewees felt that the skills land use planners already have are enough for effective integration. Others felt they may benefit from more scientific or resource management knowledge. Case studies of the Pembina River watershed and Netley-Grassmere watershed, as outlined in section 5.3 and 5.4, indicate that land use planners already have some capacity for writing watershed management principles into land use development plans.

7.3 Integration in Other Jurisdictions

What level of integration has been achieved between Integrated Watershed Management Plans [IWMP] and Municipal/Inter-municipal Development plans in jurisdictions outside Manitoba?

In terms of other jurisdictions that are looked to for effectively integrating watershed and land use plans, Ontario was frequently pointed to both in the literature and by interviewees. Within Ontario, regions in Southern Ontario, particularly the Grand River Valley, came up most frequently in the literature and in interviews. Noteworthy influences on effective integration between watershed and land use planning in Ontario include: experience with integrating plans, sufficient resources, public and political support, guidelines for integration, a lead agency ensuring integration, regulatory authority for conservation authorities, and legislation requiring integration.

Certain Conservation Authorities in southern Ontario, such as the Grand River Conservation Authority and the Credit Valley Conservation Authority, discussed in sections 4.3 and 4.4, have been engaged in watershed planning for several decades already, and thus have had more time than many other jurisdictions to find ways to integrate with land use planning. This lengthy experience has potentially allowed for time to make adjustments to processes, policies, and regulations. Involvement of the public in watershed and community land use planning has also allowed the public to become familiar with watershed planning and why it is important, lending public and political support to the plans.

In Ontario, certain conservation authorities noted for their effectiveness in integrating watershed and land use planning, such as the Grand River conservation authority, have relatively extensive resources compared to other settings. Ivey et al. (2006) note that the Grand River

Conservation Authority's monetary, human, technical, and information resources contribute to this region's ability to effectively integrate land use and water management.

Ivey et al. (2006) note that the level of integration achieved in the Grand River Valley area is also a result of strong political commitment to integration in this area. Political support in the Grand River Valley results in resourcing that has greatly aided integration. Political support is often facilitated by community support, which is high in the Grand River Valley area. Ivey et al. (2006) note that members of the public are involved in developing incentives programs, source water protection planning, and in the development of community plans - contributing to strong support for watershed initiatives and increased understanding of the purpose of planning.

As identified in the literature review, a provincial guide was developed for integrating watershed and sub-watershed plans into municipal plans (OMEE, 1993). This guide was designed to facilitate the integration of watershed and land use planning. Carter et al. (2005) acknowledged this guide contains valuable insight, but could have been better utilized by watershed and municipal planning authorities in Ontario. Plummer et al. (2011) noted a lack of guidelines for the new governance structure involving *The Clean Water Act*.

Carter et al. (2005), found in their research on the linkages between community land use plans and watershed plans, conducted in three case study locations on the towns of Wasaga Beach, Innisfil, and Newmarket in Southern Ontario, that the presence of a lead agency that oversees and ensures integration between watershed and land use planning has a significant impact on the success of the integration: "Integrated management criteria were met to a much lesser degree in the towns of Wasaga Beach and Innisfil than in the town of Newmarket, which had a lead agency facilitating integrated management" (Carter et al., 2005, p.122). A lead agency could be a traditional agency or a collection of stakeholders (Carter et al., 2005, p.119).

Interviewees indicated that sometimes conservation district and planning district boards have the same members, but sometimes not. One interviewee suggested in section 6.1.13 a merger of conservation district and planning boards, something that could be considered similar to the stakeholder committee option discussed by Carter et al. (2005) as a lead agency for overseeing integration.

Jurisdictions such as the Grand River Conservation Authority have some regulatory authority (GRCA, 2012), such as by-laws and permitting, that fall under watershed management mandate, such as regulating development in flood plains. This regulatory authority provides a level of enforcement and an increased level of importance in relation to land use plans.

Requiring integration through legislation such as in *The Clean Water Act* in Ontario was also noted to have a significant impact on spurring integration between watershed and land use planning (Plummer et al., 2011): "Under *The Clean Water Act*, the potential for actual integration between land use planning and watershed management has increased substantially because official plans must be consistent with approved source protection plans" (Plummer et al., 2011, p.4). Plummer et al. (2011) note that this policy change provides a vital link to the successful integration of watershed and land use planning:

> "The findings provide empirical evidence that the source water protection system currently being implemented through *The Clean Water Act* is addressing the historical gap between land use planning and water management in Ontario" (Plummer et al., 2011, p.11).

7.4 Integration in Manitoba

What level of integration is being achieved between Integrated Watershed Management Plans [IWMP] and Municipal/Inter-municipal Development plans in Manitoba? How could the processes be improved and formalized?

Based on responses from interviewees, the level of integration being achieved between IWMPs and Development Plans in Manitoba most closely aligns with cooperation and coordination. There are some signs that aspects of collaboration are taking place and interviewees acknowledged in their responses that there is potential for further collaboration. People – watershed and land use planners, other government departmental staff beyond Manitoba Conservation and Water Stewardship and Manitoba Local Government, senior level government staff, consultants, elected officials, and non-governmental participants - all play a role in integration. Policies influence integration. The process could be improved through increased resources (time, money, human, technical), a more defined process for how to go about the integration, and ensuring that overarching themes and connections are acknowledged.

7.4.1 Process of Integration

Much of the integration between watershed and land use plans in Manitoba at the moment occurs as a result of including multiple parties in the plan-making efforts. IWMPs involve elected officials, who are often involved with the project management team, who meet approximately every other month for two years, to help guide the plan. Non-governmental participants have varying roles from being a project management team member, to watershed team member (consisting of technical and other representatives who usually meet twice as a group), to a member of the public attending a consultation meeting. The usual role of land use planners is as a member of the watershed team. In some instances, land use planners have also been on the project management team, although this has been less common.

There was also an interest expressed by government land use planners that watershed planning staff, or conservation district staff, provide more input during the creation of a

development plan. Having watershed planners review development plans and ensuring conservation districts review them as well, would be one way of achieving this. At this point, little cross-over between plans has occurred. To the knowledge of most interviewees, no development plans had been updated – nor new development plans completed - by directly incorporating new IWMP suggestions. It is possible limited informal adjustments may have been made been through awareness of in-process IWMPs and development plans in the same region. However, many interviewees stated that existing development plans often contain various environmental protection policies that are tied to water management, as was evidenced in the Manitoba sub-basin case studies.

Every IWMP that has been produced in the last few years features a page or two of direct actions or initiatives to be included in the applicable development plan/s. This did not occur in early IWMPs, but has been occurring more recently.

Prior to developing particular suggestions, or embarking on an IWMP, watershed planners review the contents of existing development plans. Efforts are also made, when talking to land use planners, to identify what kind of information is needed to create a compatible or complementary policy in a development plan, or what could potentially be formulated as a by-law. Others believed this to be unnecessary - as something that land use planners could determine more effectively. Some interviewees commented that the development plan recommendations in watershed plans could be more clearly outlined, as potential or desirable development plan policies or by-laws. One interviewee pointed out that some recommendations did not apply to municipal development plans, such as crown land recommendations, or recommendations that were more focused on building code standards.

One area of overlap that was noted was ‘source water protection areas’ that need to be incorporated in both plans. A non-governmental interviewee, who was part of a project management team, was of the opinion that the IWMP outcomes did affect development plans in their area, and that the IWMP was influenced by what was in the development plan.

7.4.2 Challenges and Potential Solutions

Different timing regarding when development plans and IWMPs are being initiated/updated and approved was noted as an issue by several participants. An elected official stated that the extent of integration of IWMPs with development plans remains limited and there should be further integration, although timing and the length of planning processes - and times between planning updates – make this a challenge.

Another interviewee indicated that the length of the provincial approval process for a development plan was an impediment, as the process can take several years - after a plan is completed - to become approved. Meanwhile IWMPs may have been developed that should have been, or should in the future be, integrated into the development plan.

Typically there are multiple planning districts within a watershed planning boundary. The Pembina River IWMP area has eight planning districts with development plans that are part of the watershed. The Netley-Grassmere IWMP has four planning districts with development plans that are part of the watershed. Multiple planning districts within a watershed creates a challenge because it is difficult for planning district representatives and watershed planning teams to find time to meet with all of the different planning district staff, or schedule a suitable time for everyone to come. In the Pembina River IWMP, the challenge of working with many different planning districts was noted by interviewees. One interviewee suggested that a solution would be

to have better coordinated, or more collaborative, regional land use planning, and greater consideration of municipalities' actions, especially as regards the effects of their land use decisions on their neighbors.

Another barrier is that watershed planners and land use planners work in different departments. However it was also noted that, despite this, both groups are very open to working together and interested in finding ways to overcome the barriers and challenges in the integration process. One interviewee identified co-locating land use and watershed planners regionally, where logistically possible, as one possible response. In some cases this may not be possible as watershed planners are centrally located in Winnipeg and Brandon. The watershed planners cover regional areas that may include multiple Manitoba Local Government Community and Regional Planning offices, within one watershed planner's designated area. It may be possible to co-locate some land use and watershed planners, but it would be challenging to do this throughout the province.

Local politics and short-term economic needs were also noted as barriers. Interviewees noted that it is difficult to say no to someone who voted for you. To ensure integration and implementation of both plans - to make the integration real on the ground - takes political will, that acknowledges the balance needed between short term and long-term needs.

Changes in staff and council were a noted barrier as well. One method of working around this - that is already being done - is the inclusion of the public. Precedent studies from Ontario reinforce the importance of public participation and support. As noted earlier, public involvement lends increased credibility and increases the chances of implementation; if staff or council change, new staff and councillors can still recognize the weight of a plan that comes

from public involvement. Another method to overcome this challenge is to become familiar with, and continue to implement, the plan created by potentially different staff and council.

Some interviewees perceived, from their perspective, that the watershed planning processes was more inclusive than the development planning processes. Perhaps this is true; perhaps it is a matter of individual perspective and interest - in involvement in a particular plan.

In some cases there appeared to be confusion from interviewees, both elected officials and government staff, over who was responsible for overseeing the integration of IWMPs with development plans. Some government staff felt the political and municipal representatives were responsible for ensuring integration. Interviewees indicated that sometimes the elected officials who are on planning boards are also part of conservation district boards, but not always.

The climate and hydrologic cycle in Manitoba are not stationary. What has historically occurred in terms of weather can no longer be relied on. Efforts at integrating land use planning and watershed planning in Manitoba must acknowledge this fact and prepare for more extreme events, building resiliency for both floods and potential droughts. Part of this may involve landscape alterations that build capacity to address water shortage and surplus situations. Adaptation through experimentation in integrating land use plans with watershed plans can speed learning. Building resiliency for extreme events, such as floods and droughts, in both land use planning and watershed planning in Manitoba will be important, to prepare communities and individuals for unpredictable current and future weather. The Government of Manitoba recognizes the need for this and has taken steps towards this through the preparation of a guide to climate change adaptation for community land use planning, acknowledging the need to integrate

with watershed plans (MLG, N.D.). Implementation of this direction is important to adequately prepare for climate change impacts.

7.4.3 Policy and Legislation

Interviewees noted, as reported in section 6.1.11, that the changes to *The Planning Act* and *The Water Protection Act* have had a positive effect on integration. Several interviewees stated that little integration occurred early on in the creation of IWMPs; however, these interviewees observed that seems to be changing, partly as a result of the changes to the legislation. Precedent studies of jurisdictions from conservation authorities and municipalities from southern Ontario reported in section 4.3 reinforce the importance of legislation on achieving integration. Other interviewees observed that, while legislation may set the stage for integration, it is still ultimately in the hands of the politicians, planners, and people - to ensure the integration is realised.

In relation to policy and legislation, several interviewees indicated the need for legislation and policy integration, and potentially over-arching policy to guide both processes.

7.4.4 Regulatory Authority for Land Use Changes

Most integrated watershed management planning across Canada is voluntary and non-regulatory. However parts of southern Ontario have watershed-based conservation authorities with regulatory authority for land use changes such as establishing by-laws and issuing development permits for areas that fall under their mandate. This region has achieved notable success in terms of integrating watershed plans with community land use plans. For this reason Manitoba should give consideration to giving conservation districts regulatory authority over

land uses under their mandate in the future. Prior to doing this, it will be important to weigh the pros and cons of giving regulatory authority for land uses to conservation districts.

Pros: Regulatory authority for conservation districts in the form of by-laws and permits for watershed-related land uses would improve the balance between integrated watershed management plans and development plans, helping ensure consistency between the plans. Mitchell (2005, p.1344) argues that IWMPs can fail to be implemented or be a lower priority because they have no clear legislative basis. This is one reason why it is important to integrate with land use plans. IWMPs with regulatory weight would help ensure that suggested development plan policies and by-laws are implemented. Some regions such as the Grand River Conservation Authority and Credit River Conservation Authority discussed in sections 4.3 and 4.4 have land use regulatory authority for areas under their mandate and are noted leaders in watershed planning, and integrating watershed plans with land use plans. Having land-water regulatory authority decision making placed in the hands of those who best know and understand local watershed issues and the implications of land use changes on the health of the watershed can help ensure the best courses of action are taken.

Cons: The current incentive-based programming that conservation districts offer was stated as the preferred role of conservation districts in the document 'Conservation Districts Program Framework for the Future' (Conservation Districts Framework Committee, 2009). It was stated by interviewees in section 6.1.7 that the incentive-based programming is building good relationships with land owners. Regulatory authority in terms of by-laws and permitting may change the relationship between conservation districts and land owners. Integrated watershed management plans are voluntarily implemented and rely on building consensus with stakeholders to implement the plan. While implementation is voluntary, there are benefits to

building consensus amongst stakeholders and finding ways to address issues through collective agreement. Consensus-based solutions can facilitate conflict resolution and build stronger relationships between regional neighbours. As noted in section 1.2.3, some Manitobans have an existing distrust towards the Province of Manitoba due to perceptions of failed environmental management in the past. Increasing regulatory authority may further enhance this distrust. It was documented in section 6.1.7 that interviewees were of the opinion that local councils and land owners would not be receptive to the Province of Manitoba imposing increased regulation regarding land uses in the watershed, despite the inclusion of local governance and decision making through conservation district boards.

As evidenced by interviewees in section 6.1.7, conservation districts are not interested in, nor do they have the capacity to take on, regulatory authority for land use by-laws and permitting. While some conservation authorities in Ontario have achieved success with regulatory powers, it was noted in section 4.1.4 that what works in one setting may not be effective in another. Over half of Manitoba's population lives in the capital city of Winnipeg; the rest of Southern Manitoba is rural and relatively sparsely populated. This is in contrast to the higher populations living throughout Southern Ontario and in areas such as the Grand River Valley. Conservation Authorities in Ontario have extensive staff [the Grand River Conservation Authority has, judging by their website as of January, 2013, well over one hundred staff (GRCA, 2012)]; including planners involved in land use regulatory issues. This may be compared to Manitoba, where conservation districts typically have one to four staff. Conservation authorities in Ontario raise most of their funds through municipal levies and programs they offer such as campgrounds (GRCA, 2012). Conservation districts in Manitoba receive the majority of their funding from the Province of Manitoba and are assisted in developing their IWMPs and

programming by provincial watershed planners, who each work with three to four different conservation districts. These differences between Southern Ontario and Southern Manitoba create challenges to transplanting successful initiatives, targeted at improving watershed planning and land use planning integration, from jurisdictions in Southern Ontario to Manitoba.

Focusing on incentive-based programming may be better for now; the CD Program has been marketed this way. Incentive-based programming by the conservation districts was also noted by some interviewees in section 6.1.7 to be contributing to building trust with land owners, through the combination of an incentives approach and local representation on conservation district boards. Land use regulatory authority for conservation districts could be considered in the future, based on future need and on consultations with the affected stakeholders.

7.4.5 Suggestions for Improvements

Several interviewees in section 6.1.14 suggested the usefulness of a guide - or designated process - for how to integrate IWMPs with Development Plans. Carter et al. (2005) also noted the benefits of having a guiding framework document.

More education was cited, especially for elected officials and non-governmental participants, as being key to facilitating integration of these plans. A large part of this involves making people familiar with what an IWMP is, and what conservation districts are. Some interviewees stated this could be included in any guide to integration.

Increased resourcing may be needed. One interviewee noted in section 6.1.13 that there needs to be political will to provide this resourcing. Others also stated that resourcing was an issue, and also acknowledged that there is never enough time or money. For the moment, particularly in tight budget times in Manitoba, it may be better to focus on how to maintain or

slightly increase existing resources - while at the same time working with what individuals and organizations have readily on tap. A few interviewees suggested it is better to focus on making the most of existing resources, rather than focus on petitioning for increases.

Realigning municipal boundaries with watershed boundaries was suggested by one interviewee as key to integrating IWMPs with development plans in a collaborative fashion. Others indicated that - in the past - this has been discussed, but presently there is no interest from government in such moves. Mitchell (2005) argues that boundary issues will always be present, regardless of how they are aligned; it is therefore better to focus efforts on how to best work within the current boundaries, rather than focus on realignment. As stated earlier, improved integration mechanisms - and more regional planning between different planning districts - may prove the most effective method for addressing this at the present time.

In the future, some interviewees indicated that more in-depth efforts at integration, such as watershed and land use planners working together to create sustainability plans, would be a good idea. It was also stated by one interviewee in section 6.1.15 that experimentation, particularly with integrating watershed and land use planning, would be useful for learning. This kind of learning through experimentation aligns with the principles of adaptive management, which Margerum (2011) notes are often a feature of longer-term collaborative efforts. As Manitoba continues to explore how effective integration can occur over the long-term, this kind of local experimental learning will be important in discovering how integration can best work in Manitoba, and potentially how it may vary even in different areas of the province.

7.5 Summary

While it may take some time to realize the full potential of integration between watershed and land use development planning in Manitoba, many interviewees acknowledged the potential. In some cases interviewees hinted at a more collaborative approach. This may occur in the future, but what is more likely in the near future would seem to be ensuring strong cooperative and coordinated integration that begins to explore and experiment with collaboration.

Land use planners have a key role to play – as watershed team members, reviewers of watershed plans, facilitators, conflict resolvers, and consensus builders. They also have a role through their technical expertise – mapping, background studies, displaying information, and through writing watershed management suggestions into land use policies and by-laws. The knowledge of others involved in integration, such as elected officials and the public, also was recognized as important.

Lessons can be learned from other jurisdictions. Based on Ontario experience, resourcing, public involvement, political support, land use regulatory authority for watershed management authorities - and in some cases a lead agency overseeing integration - all contribute to effective integration.

The Manitoba sub-basin case studies and interviews provide evidence that integration is already occurring in Manitoba but also that the integration of development plans and integrated watershed management plans could be improved. Having land use planners on watershed teams, land use planners reviewing watershed plans, writing development plan recommendations explicitly on a dedicated page, public involvement, cross-over of representatives on conservation district and planning boards, existing water-related policies in the provincial planning regulation, and legislation requiring consideration of outcomes of both watershed plans and development

plans - has been going well. Improvements could be made through increased resources, considering regulatory authority for water planning authorities in the future, having watershed planners and conservation districts review development plans, merging planning boards and conservation district boards to create an overseeing body, co-locating planners regionally, and through continued experience.

8. Conclusion

Land and water are interconnected. Activities on the land affect water and vice versa. Because of this, land use plans and watershed plans must be integrated for both plans to be effective. Land use and watershed planning have historically not been integrated as effectively as they should be (Mitchell, 2005; Bates, 2011). A search for ways of improving integration via coordination or collaboration has been suggested by some authors (Mitchell, 2005; Plummer et al., 2011). Through the use of a literature review, precedent studies, Manitoba sub-basin case studies, and semi-structured interviews this research has determined that collaboration as a form of integration has benefits of increased efficiency, and more consistency between plans, due to co-creation. The research concluded that collaboration is more challenging to implement and that it is important to build upon a foundation of strong cooperation and coordination. This study also sought to more clearly define the role of land use planners in water management - but the roles, skills, and knowledge necessary of other players involved in the integration, also became clear. An effort was made in Chapter 3 section 3, and Chapter 4, to also explore how land use and watershed plans are integrated in other Canadian provinces - with a particular focus on Southern Ontario, where several jurisdictions, including the Grand River Valley and Credit River Valley, are noted to be leaders in the effective integration of these plans.

Finally, the study sought to explore how well 'integrated watershed management plans' and 'development plans' have been integrated in Manitoba. To facilitate this assessment, a conceptual framework for integrating watershed plans with land use plans was developed. Recommendations are given for how the integration process in Manitoba could be improved.

8.1 Discussion

The following sections make use of a summary table and conceptual framework to summarize the key findings of the research.

8.1.1 Cooperation, Coordination and Collaboration as Modes of Integration

While exploring the potential of collaboration as a form of integration, it became clear that cooperation and coordination were frequently utilized as modes of integration. Cooperation and coordination can be part of – or a base for - collaborative integration, or they can be less complex forms of integration, different from collaboration. Based on the findings of the literature review, Manitoba sub-basin case studies, and interviews a summary table (Figure 9) was developed.

8.1.1.1 Cooperation – Moving separately towards common goals. This mode of integration was recognized by interviewees in section 6.1.3 as the most tangible mode of integration. It is easy for individuals and organizations to establish common goals and then work separately towards these goals. People readily agree to exchange information and work towards common goals cooperatively. Utilizing cooperation was also noted by interviewees in section 6.1.5 to be able to promote important goals and issues that may be subsumed in a more collaborative process. Finally, cooperation is often an important part of collaboration and it is wise to build upon strong cooperation before moving towards more in-depth integration via collaboration. There are also drawbacks to integration via cooperation. There are no synchronized actions, and opportunities for rolling multiple actions into one may be missed.

Figure 9: Pros and Cons of Different Modes of Integration

	Definition	Examples	Pros	Cons
Cooperation	Moving separately towards common goals.	Establishing common goals. Watershed plans and land use plans are developed with consideration for the other.	Easier to initiate. Individual issues of importance not suppressed by the whole.	More potential duplication of efforts. Lack of synchronized actions.
Coordination	Moving jointly towards common goals.	Ensuring policies and regulations of both processes are fully consistent. Updating land use plans when watershed plans are completed and requiring consistency between plans.	Timing is coordinated, recommendations immediately adopted. Increased awareness of activities of other parties involved.	Less individual autonomy over activities. Inability to solve complex problems requiring complex, co-created solutions.
Collaboration	Co-creating, rolling multiple actions into one to achieve common goals.	Bringing together multiple types of expertise to solve problems related to both land use planning and watershed planning. Joint oversight of both planning processes.	Increased efficiency. Co-creation can lead to greater consistency between plans. Can solve problems that require complex, holistic, co-created solutions.	More difficult to initiate. Potentially time consuming. Work location constraints.

8.1.1.2 Coordination – Moving jointly towards a common goal. This mode of integration brings the added benefit of synchronized actions. Actions are planned for jointly. Upon completion of a plan or when recommendations become available, the other plan can be updated. There is

greater awareness when integration via coordination and thus an increased likelihood of consistency between plans. With this increased awareness there may also be a greater understanding of how and on what tasks to work together collaboratively. The drawback of coordination as a form of integration is that multiple actions are not rolled into one and co-created; collaborative problem solving is limited.

8.1.1.3 Collaboration - Co-creating, rolling multiple actions into one to achieve common goals. This mode of integration has the potential to solve complex problems requiring holistic, co-created solutions. Collaboration can also lead to increased efficiency through rolling multiple actions into one. Working more closely together and co-creating/developing plans has the added benefit of potentially increasing consistency between plans. Some of the drawbacks of collaboration as a form of integration are that it can initially be more time-consuming and challenging to begin.

8.1.1.4 Summary

While collaboration has potential as a form of integration, it is important to recognize the benefits of cooperation and coordination. Effective integration can be achieved via strong cooperation. Coordination and collaboration may be needed to address certain integration problems. It remains important to recognize when it is valuable to utilize more in-depth modes of integration. Collaboration is needed to address complex problems that require co-created, holistic solutions that, with some initial time investment, can result in long-term resource savings. For less complex problems, coordination or cooperation may be more effective. Little

to no upfront time commitment is needed and simpler problems can be addressed through synchronized efforts or separately by each organization moving towards common goals.

Most of the integration between watershed planning and land use planning in Manitoba, taking place as of January, 2013, appears to most closely align with cooperation. Common goals are established and steps are being taken separately towards achieving these goals. Information is being shared. There are also examples of instances of coordination or collaboration. The same representatives are sometimes on both conservation district and planning boards, providing the opportunity for synchronized actions and oversight of integration. At the watershed team meetings, where many different experts are brought together to brainstorm ways to address watershed issues, there is the potential for co-created, collaboratively produced solutions.

For now it would appear to be best to focus on developing strong integration via cooperation while taking advantage of opportunities to gain experience integrating via collaboration. In this way building blocks are being developed for integrating watershed and land use planning, stakeholders begin to have a stronger understanding of when it is beneficial to coordinate or collaborate, and integration can potentially move towards becoming more collaborative over time.

8.1.2 Conceptual Framework: Factors Contributing to Effective Integration

A conceptual framework (Figure 10) was developed focusing on factors facilitating the integration of watershed plans with land use development plans. This framework was developed using the analysis and synthesis of the literature review, Manitoba sub-basin case studies, and semi-structured interviews to provide an outline of the factors contributing to effective integration between watershed plans and land use development plans. This framework was used

Figure 10: Conceptual Framework - Factors Contributing to Effective Integration

Factor	Level of Integration		
	Low	**Medium**	**High**
Knowledge/Education	Limited understanding of land – water ecological functioning.	Some understanding of ecological processes – limited recognition of ties to land use planning.	Strong understanding of ecological functioning and ties to land use planning. Strong public and political support.
Resources – human, financial, technical, scientific	Limited available staff time and technical expertise, scientific knowledge, and financial resources.	Adequate financial support, technical expertise, scientific information to build linkages between plans.	Strong financial support, wide range of available scientific information, sufficient staff time.
Watershed and land use planners / organizations involvement in both plans – development, review, and implementation	Little to no involvement in the plans of the other.	One party is involved in the planning process of the other or both somewhat involved in both processes.	Both parties closely involved in development, review, and implementation of both plans.
Legislation/Policy/Regulation	No legislative or policy basis for watershed and land use plan integration.	Legislative basis for watershed and land use planning, policy direction for managing land and water resources.	Legislation / policy mutually supportive and requires consideration between plans, strong authority.
Clear responsibility for ensuring integration	No designated responsibility for ensuring integration.	Informal crossover of overseers ensuring integration.	Merged boards or overseers aware of both plans who ensure integration.
Experience with watershed and land use planning processes	0 years	1-10 years	10+ years
Framework for Integration	No policy or guiding framework.	Some guiding policy and framework.	Strong policy and guiding framework for integration.
Adaptable	Little or no ability to adapt to change.	Able to incorporate new information informally in plan implementation.	Plans are updated with new information. Experiment.

to assess the level of integration between watershed plans and land use development plans in Manitoba. Recommendations for improving integration are listed for each factor. These eight factors are: knowledge/education; resources – human, financial, technical, scientific; watershed and land use planners/organizations involvement in both plans – development, review and implementation; legislation, policy, and regulation; clear responsibility for ensuring integration; experience with watershed and land use planning processes; framework for integration; and adaptable.

8.1.2.1 Knowledge/Education

Knowledge of ecosystem functions and how land use decisions affect aquatic ecosystem health are very important to achieve effective integration. Part of the research explored the skills and knowledge land use planners need to have in order to integrate watershed plans with land use plans. But what also emerged was the importance of the knowledge of others involved in the integration process. Integration is more effective when the public, land owners, elected officials, and others involved have an understanding of land-water ecosystem functions, and how land use decisions affect aquatic ecosystem health.

In Manitoba the knowledge/education could be assessed as medium, as apparent knowledge levels range from limited to extensive. In section 6.1.8 there was the example of a council who wanted to institute a 'no-net gain of wetlands' policy and move wetlands in their municipality to other locations. This exhibits a low level of knowledge regarding land and water ecosystem functions. Others exhibit some understanding of ecosystem health, supporting watershed health initiatives but not fully recognizing the effects of some land use activities on an aquatic ecosystem. Some in Manitoba are very knowledgeable, but improvements could be made to understanding how to translate suggestions from watershed plans into policies and by-laws in a development plan.

Recommendations:

Continue to effectively engage Manitobans in watershed and land use development planning processes. Through completing and implementing plans, more and more Manitobans are coming to better understand the natural processes of their watersheds, and how to care for them.

Make environmental planning a required course in university planning programs. This would provide soon-to-be-practicing land use planners with a basic understanding of environmental principles and processes as they relate to planning. With this knowledge planners could better understand, and integrate with, other environmental professionals - and collaborate more effectively to address water and land issues.

Provide informational sessions for land use planners in Manitoba on integrated watershed management planning, and how IWMPs tie into municipal development planning. This would build the knowledge of public, private, and non-profit sector planners, enhancing their ability to integrate elements of an IWMP into a municipal/inter-municipal development plan.

Provide workshops or informational sessions for elected officials on their role in overseeing the integration of IWMPs and development plans. This could take place at future Manitoba planning conferences, Manitoba Conservation Districts Association conferences, or other appropriate settings. These sessions would include brief overviews of each process, how the plans can overlap, and things to pay attention to in order to ensure the processes are mutually supportive of one another.

Have government land use planners provide an informational session for watershed planners on how to write development plan policies and by-laws. This would

increase the capacity of watershed planners to understand how development plan policies and by-laws could contribute to watershed plan implementation and/or support watershed plan goals. Watershed plan recommendations could then also potentially be directly transferred - by those writing the development plans, consultants or government staff - into the development plan.

Create more opportunities for informal knowledge exchange between watershed planners and land use planners. This could be achieved through regionally co-locating planners where possible, periodic joint meetings to discuss work progress, or through other means.

8.1.2.2 Resources – human, financial, technical, and scientific

Having available staff, adequate finances, technical expertise, and solid scientific information to support policies and regulations is important, to achieving effective integration between watershed plans and land use development plans.

In Manitoba, this factor could be rated as low to medium. Compared to some provinces, Manitoba has extensive watershed planning. There are capable land use planners and watershed planners, as well as various technical experts – engineers, groundwater specialists, drinking water officers, etc. – contributing to watershed and land use plans. The presence of such staff is a strength.

Finances are limited; the Province of Manitoba is dealing with a difficult budget situation as of January, 2013. This contributes to fewer staff than would be ideal, and also can be linked to limited scientific knowledge. For example, some development plan recommendations would be greatly strengthened by certain types of scientific information – having a limit on cottage

development around a lake in a development plan would be stronger, with the backing of scientific information supporting a certain number or limit.

Recommendation:

Seek opportunities to pool existing resources and roll multiple actions into one. Collaboration can lead to increased efficiency and make more resources available. These existing or newly available resources could be used to further support efforts to integrate watershed and land use development plans in Manitoba.

8.1.2.3 Watershed and Land Use Planners/Organizations Involvement

To achieve effective integration, it is important for watershed and land use planners/organizations to be involved throughout the planning processes in plan development, review, and implementation.

In Manitoba, this factor could be assessed as medium. Land use planners are involved in the creation, review and potentially the implementation of watershed plans. Government land use planners come to watershed team meetings, review the integrated watershed management plan before it is finalized, and can use the recommendations from a watershed plan to assist with land use decision making and in development plan creation/updates. Watershed planners have no work-related input into land use development plans. There is however a departmental review by Manitoba Conservation and Water Stewardship that includes reviewing the consistency of a development plan with relevant IWMPs. Land use/subdivision changes are sometimes circulated to the local conservation district for comment. Writing IWMP development plan recommendations directly into policies or by-laws - and indicating whether these belong in

development plan, secondary plan, or under another area of land use planning such as crown lands - would help to increase the likelihood of IWMP recommendations being adopted.

Recommendations:

Increase the involvement of watershed planners in development plan creation and review. This would help ensure that recommendations from a watershed plan are included or at least properly considered during the creation of a development plan.

Continue or initiate the circulation of proposed land use changes to conservation districts, but increase the clarity of the purpose and capacity of the conservation districts to comment. Conservation districts need to be reviewing land use change applications for consistency with their IWMPs and must always keep the goals of their IWMPs in mind.

Clearly outline development plan, zoning by-law, secondary plan and other recommendations for development planning in IWMPs. Having a page in IWMPs dedicated to land use planning connections and recommendations was recognized as a positive step in facilitating integration between IWMPs and development plans in Manitoba. This could be further enhanced by writing these recommendations in such a way as they could be directly transplanted into a development plan, zoning-bylaw, secondary plan, or other document.

Share mapping files. Sharing GIS files that are used in the creation of IWMPs and development plans for areas, such as source water protection zones, would help increase the consistency between plans as they are developed or updated

8.1.2.4 Legislation/Policy/Regulation

Legislation and policy that encourages or requires the integration of watershed plans and land use plans is important for achieving integration.

For this factor, Manitoba could be rated as high. There is a strong legislative basis for integrated watershed management planning through *The Water Protection Act* and for development planning through *The Planning Act.* Both these acts also require that - in creating or updating a plan - consideration must be given to the local IWMPs or development plans. Plummer et al. (2011) conclude that, in Ontario, having *The Clean Water Act* require consistency between source water protection plans and official community plans, has led to greater levels of integration. Providing land use regulatory authority for watershed-based organizations such as conservation districts, much like conservation authorities in Ontario, could be part of strong regulatory support that increases the balance between watershed plans and land use development plans.

Recommendation:

Consider land use regulatory authority for conservation districts in the future. Prior to giving land use regulatory authority to conservation districts in Manitoba, it will be important to weigh the pros and cons as outlined in section 7.4.4. As of January, 2013, it is recommended to continue with incentive-based watershed programming, while working towards having IWMP land use planning recommendations effectively worked into development plan policies and by-laws.

8.1.2.5 Responsibility for Ensuring Integration

Knowing who is responsible, for ensuring that integration between watershed plans and land use plans takes place, increases the likelihood of integration occurring.

Manitoba could be assessed as medium for this factor. Conservation district board members sometimes sit on planning boards as well. Sometimes they do not. Information is relayed from board members to councils but it helps to have the same people involved. One example from a study in Ontario, focused on linking watershed planning and land use planning by Carter et al (2005), indicated that the presence of a board overseeing the integration of watershed plans with land use plans improved integration. In section 6.1.13, one interviewee suggested the idea of merging conservation district and planning boards.

Recommendation:

Strengthen the connection between conservation district boards and planning boards. This could be by formally requiring a certain number of the same people on each board, having periodic joint meetings between both/multiple boards, or finding some way of fusing the boards together. Conservation district boards and planning boards, or a future merged board, need to be constantly aware of the need to integrate watershed planning and land use planning.

8.1.2.6 Experience

Simple experience with watershed and land use planning processes, as well as with integration, is apt to increase the support and capacity for planning and integration.

Manitoba would be around medium for this factor. Integrated watershed management planning really only began in 2006. Since that time, the program has grown substantially and

support for watershed planning has grown. The capacity for integrating with land use development planning has also increased, with adjustments such as including a page or two in an IWMP on recommendations for development planning. Experience from Ontario indicates that support for linked watershed and land use planning increases over time, assuming that the public is effectively engaged and awareness is raised.

Recommendation:

Continue to learn by doing. Integration has been improving simply through experience over time. It will be important to continue to look for ways to improve linkages between IWMPs and development plans.

8.1.2.7 Framework for Integration

Having a framework or set of guidelines - on how to integrate watershed plans with land use plans - can help facilitate the process.

For this factor Manitoba could be assessed as low to medium. Integration is encouraged and consideration is required through *The Water Protection Act* and *The Planning Act.* However, no guide exists. Both the literature in section 3.3.2 and interviewees in section 6.1.14 pointed to the benefits of having a framework or guide to direct integration. Other interviewees in section 6.1.14 were not sure if a guide would be much use.

Recommendation:

Develop a basic guide to integrating watershed plans and land use plans in Manitoba. This document would outline what IWMPs are, what development plans are, areas where they can overlap, and guidance for how to integrate effectively. The guide should be co-developed by Manitoba Local Government and Manitoba Conservation and

Water Stewardship. It should be written with a wide range of individuals in mind including watershed and land use planners, conservation district staff, elected officials, the public, and others.

8.1.2.8 Adaptability

Being able to adapt to change is important for integration to take place. This could be updating plans upon receiving recommendations, updating plans when new information becomes available, or adapting to future climate change.

For this factor Manitoba could be assessed as low to medium. To the knowledge of interviewees and the researcher, no development plans have so far been updated, after IWMP recommendations for a development plan become available. No IWMPs have been updated as new information becomes available. In terms of climate change adaptation, there are guides from Manitoba Local Government (N.D.) available to help communities prepare for climate change, that direct people to look at their local IWMP for direction in helping their community adapt to climate change.

Recommendations:

Update development plans with IWMP recommendations when available. This would help overcome the issue of sometimes waiting for years to update a development plan with watershed plan recommendations.

Make watershed plans more adaptable to new information. IWMPs are currently difficult to alter after ministerial approval. Having more flexible plans that could be altered with new available information would help keep plans relevant.

Climate change adaptation should be considered during the integration process. Many climate change impacts involve alterations to the hydrologic cycle, which has the potential to impact communities through floods, droughts, availability of drinking water, and other ways.

Experiment. This could be co-initiating an IWMP and development plan, and attempting to continue to work very closely together throughout both processes. Another experiment could be to work in an area where the watershed and municipal boundaries are similar and observe how this contributes to integration. Exploring the potential of joint planning district and conservation district boards is another potential experiment.

8.1.2.9 Summary

Many of the recommendations listed above are focused on increasing the balance between watershed planning and land use development planning. With IWMPs being voluntarily implemented, and land use plans being regulatory, there is a difference in the weight of importance. The conceptual framework can be used to assess how integrated watershed management planning and land use development planning can be better integrated both in Manitoba and elsewhere. Achieving successful integration of IWMPs with development plans in Manitoba will go a long ways towards strengthening the outcomes of both plans.

8.2 Limitations:

One limitation of the research is that most of the interviewees participated in integrated watershed management planning processes, while fewer participated in development planning processes - or participated in these less extensively. This was partly the result of using a

snowball approach to gain/identify additional interview contacts. These contacts were provided by watershed and conservation district staff who knew of people who were land use planners, local elected officials, or non-governmental participants - who would be suitable interviewees. This appears to have led to a bias in the interviews, in that many interviewees were more familiar with the IWMP process than the development planning process. In an attempt to achieve more balance the researcher deliberately interviewed some people, outside of the Manitoba sub-basin case study locations - but with experience with IWMPs in Manitoba - who had a land use planning focus. However, all interview participants had some knowledge of both processes, and four government and consultant land use planners were also interviewed who were far more familiar with development planning processes.

Another possible limitation is that IWMPs are new in Manitoba. As IWMPs have been around from 2006, the processes - and the integration with land use planning - are in their infancy. Because of this, it is challenging to assess how effective integration has been in Manitoba between watershed and land use planning, as the plans have not been fully implemented. To overcome the fact that integrated watershed management planning is a recent initiative in Manitoba, the integration between IWMPs and development plans – for the purposes of this study - was viewed more as a work in progress. The focus was on how the integration effort was going thus far, and what factors contributing to effective integration are in place. None the less, the inability to look back at completed processes was somewhat of an inhibition - as this would have allowed for a more thorough analysis and concrete assessment, based on a cross-comparison of plans, as well as an examination of the implementation outcomes of recommended integration actions.

During the research, it became evident that it would have be beneficial to convene of focus group consisting of watershed and land use planners to reflect on some of the conclusions and recommendations of this study. This could potentially occur in the future in a work setting as a means of moving the research forward after the completion of this practicum.

8.3 Recommendations for Future Research

One area of future research would be to complete a study similar to this one in five years time or further out, to assess how the integration between IWMPs and development plans has progressed. In five years, the first round of IWMPs will have reached, or be nearing, their review dates - and development plans should have had sufficient time to update during their review processes. This would then allow for a cross-analysis of plans, similar to that conducted by Plummer et al. (2011).

On a broader level, future research could also explore how collaboration is continuing to evolve. It would be useful to monitor and map the potential efficiency gains resulting from using collaboration as a form of integration. Future forms of collective planning and environmental management efforts, in Manitoba and elsewhere, may begin to more closely resemble collaboration over time. At this point, many processes that strive to be collaborative more often resemble (low-level) communication, cooperation or coordination. It may be useful to examine how this progresses, with watershed and land use plan integration, or with another area of research, to study how collective planning efforts are evolving. It would also be useful to explore what the necessary conditions are for co-creative, collaborative planning to occur.

The conceptual framework on factors related to achieving successful integration between watershed planning and land use planning could also be built upon. One area of research to

pursue is how to assess whether or not integration is successful. Watershed report cards are sometimes used for assessing watershed management, and development plans are sometimes given awards for examples of good community planning. Exploring how to determine successful integration, perhaps through cross analysis and other methods, would be a useful area for future research.

8.4 Conclusion

Several conclusions can be drawn from this study. The first is that there is potential for collaboration as a form of integration with regards to integrating watershed and land use plans, but discretion must be used to determine when collaboration is appropriate and when it is not. Collaboration is necessary for complex problems requiring co-created solutions and useful for when multiple actions can be rolled into one. For problems requiring simpler solutions, such as the exchange of information, cooperation or coordination may be more appropriate. The second conclusion is that land use planners clearly have a role to play in water management, but that the skills and knowledge of watershed planners, technical experts, elected officials, and others is also very important. The final conclusion is that integration between watershed and land use planning in Manitoba is beginning to occur, and Manitoba would benefit by considering what has led to successful integration in other jurisdictions.

Through both the literature review and interviews, it was acknowledged that there is potential for collaboration as a form of integration between watershed and land use planning. Collaboration becomes especially useful when problems are complex and when there is an opportunity to combine several actions into one, gaining more out of the same level of effort. But collaboration and working more closely together can take more time and may not be suitable

in all areas of cross-over between watershed and land use planning. Discretion needs to be used to assess when collaboration is most suitable and when less in-depth forms of integration, such as cooperation or coordination, are more appropriate and/or more achievable in the current institutional context.

Land use planners have a role to play in water management. With regards to integrating watershed and land use plans, land use planners can serve as organizers, facilitators, team members, and implementers. They can use their knowledge of land use planning tools to implement watershed initiatives, such as creating buffer zones around source water protection sites or by preventing development from occurring in high flood risk areas. Communities depend on water for their daily well-being; thus, linking watershed management to community land use planning is very important for the long-term sustainability of settlements. However, having knowledgeable watershed planners, elected officials, and public participants is also vital to successful integration.

As integrated watershed management planning is in its infancy in Manitoba, the integration with development planning remains a new undertaking as well. Integration is beginning to occur – legislation requires that development plans consider IWMPs, and vice versa. Land use planners attend meetings and comment on IWMPs as they are in progress, and both land use and watershed planners formally and informally communicate, to determine ways to better integrate the two processes. Manitoba would benefit by exploring the suitability of watershed-land use planning integration initiatives that have been successful in other jurisdictions, such as Southern Ontario. Such initiatives might include: creating a guide to integration; increasing resourcing for facilitating integration; continuing inclusive public participation; continued social learning; identifying a responsible authority – or over-sight body -

for ensuring effective integration; and - as the programs evolve – consideration of providing regulatory authority to watershed/conservation districts.

An adaptive management approach should be taken towards integrating watershed and land use plans in Manitoba, important to successfully meet the changes of the adaptation era outlined earlier by Venema et al. (2010). Such an approach is needed to effectively deal with the land and water impacts resulting from the loss of hydrological stability due to human large scale landscape alterations and climate change (Sanford, 2012). Experimentation should occur to learn what does and does not work, potentially utilizing successful initiatives from other jurisdictions as ideas for experimentation. In the future, it would be beneficial - in five years, or later - to conduct another study of this nature, to assess how integration between watershed and land use planning has improved over time in Manitoba. Part of this future study could also explore how collaboration is, or is not, emerging as a form of integration over time. The potential for collaboration is there. While not always necessary or easy to achieve, collaboration can increase efficiency, solve complicated problems, and accomplish things that would not be possible through less complex forms of integration.

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Appendix A: Recommendations for Improving the Integration of Integrated Watershed Management Plans and Development Plans in Manitoba

Below are a set of recommendations for how to improve integration between IWMPs and development plans in Manitoba, based on the assessment conducted in section 8.1.2. The recommendations are listed in no particular order.

1. **Continue to effectively engage Manitobans in watershed and land use development planning processes**. Through completing and implementing plans, more and more Manitobans are coming to better understand the natural processes of their watersheds, and how to care for them.

2. **Provide informational sessions for land use planners in Manitoba on integrated watershed management planning, and how IWMPs tie into municipal development planning.** This would build the knowledge of public, private, and non-profit sector planners, enhancing their ability to integrate elements of an IWMP into a municipal/inter-municipal development plan.

3. **Provide workshops or informational sessions for elected officials on their role in overseeing the integration of IWMPs and development plans.** This could take place at future Manitoba planning conferences, Manitoba Conservation Districts Association conferences, or other appropriate settings. These sessions would include brief overviews

of each process, how the plans can overlap, and things to pay attention to in order to ensure the processes are mutually supportive of one another.

4. **Have government land use planners provide an informational session for watershed planners on how to write development plan policies and by-laws.** This would increase the capacity of watershed planners to understand how development plan policies and by-laws could contribute to watershed plan implementation and/or support watershed plan goals. Watershed plan recommendations could then also potentially be directly transferred - by those writing the development plans, consultants or government staff - into the development plan.

5. **Clearly outline development plan, zoning by-law, secondary plan and other recommendations for development planning in IWMPs.** Having a page in IWMPs dedicated to land use planning connections and recommendations was recognized as a positive step in facilitating integration between IWMPs and development plans in Manitoba. This could be further enhanced by writing these recommendations in such a way as they could be directly transplanted into a development plan, zoning-bylaw, secondary plan, or other document.

6. **Create more opportunities for informal knowledge exchange between watershed planners and land use planners.** This could be achieved through regionally co-locating planners where possible, periodic joint meetings to discuss work progress, or through other means.

7. **Seek opportunities to pool existing resources and roll multiple actions into one.** Collaboration can lead to increased efficiency and make more resources available. These existing or newly available resources could be used to further support efforts to integrate watershed and land use development plans in Manitoba.

8. **Increase the involvement of watershed planners in development plan creation and review.** This would help ensure that recommendations from a watershed plan are included or at least properly considered during the creation of a development plan.

9. **Continue or initiate the circulation of proposed land use changes to conservation districts, but increase the clarity of the purpose and capacity of the conservation districts to comment.** Conservation districts need to be reviewing land use change applications for consistency with their IWMPs and must always keep the goals of their IWMPs in mind.

10. **Share mapping files.** Sharing GIS files that are used in the creation of IWMPs and development plans for areas, such as source water protection zones, would help increase the consistency between plans as they are developed or updated.

11. **Update development plans with IWMP recommendations when available.** This would help overcome the issue of sometimes waiting for years to update a development plan with watershed plan recommendations.

12. **Make watershed plans more adaptable to new information.** IWMPs are currently difficult to alter after ministerial approval. Having more flexible plans that could be altered with new available information would help keep plans relevant.

13. **Strengthen the connection between conservation district boards and planning boards.** This could be by formally requiring a certain number of the same people on each board, having periodic joint meetings between both/multiple boards, or finding some way of fusing the boards together. Conservation district boards and planning boards, or a future merged board, need to be constantly aware of the need to integrate watershed planning and land use planning.

14. **Develop a basic guide to integrating watershed plans and land use plans in Manitoba.** This document would outline what IWMPs are, what development plans are, areas where they can overlap, and guidance for how to integrate effectively. The guide should be co-developed by Manitoba Local Government and Manitoba Conservation and Water Stewardship. It should be written with a wide range of individuals in mind including watershed and land use planners, conservation district staff, elected officials, the public, and others.

15. **Consider land use regulatory authority for conservation districts in the future.** Prior to giving land use regulatory authority to conservation districts in Manitoba, it will be important to weigh the pros and cons as outlined in section 7.4.4. As of January, 2013, it is recommended to continue with incentive-based watershed programming, while

working towards having IWMP land use planning recommendations effectively worked into development plan policies and by-laws.

16. **Climate change adaptation should be considered during the integration process.** Many climate change impacts involve alterations to the hydrologic cycle, which has the potential to impact communities through floods, droughts, availability of drinking water, and other ways.

17. **Experiment.** This could be co-initiating an IWMP and development plan, and attempting to continue to work very closely together throughout both processes. Another experiment could be to work in an area where the watershed and municipal boundaries are similar and observe how this contributes to integration. Exploring the potential of joint planning district and conservation district boards is another potential experiment.

18. **Continue to learn by doing.** Integration has been improving simply through experience over time. It will be important to continue to look for ways to improve linkages between IWMPs and development plans.

Appendix B - Interview Questionnaire

Interview Questions for Land Use Planners, Watershed Planners, Elected Officials, and Non-Government Participants

The following questions will guide the interview with each participant. Questions will depend slightly on the participants themselves, as well as their particular roles and organizations.

Collaboration/Integration:
1. Who do you think needs to be involved to effectively integrate watershed plans with municipal/inter-municipal plans? (e.g. organizations, individuals)

    a. Who has been involved?

2. How much attention is paid to potential partners in the integration process? Is there a belief that more can be accomplished by organizations and individuals working together collectively rather than on their own?

3. Is there a willingness to let other organizations/individuals know what is being planned? Is there an awareness of what others are taking action on or who is addressing issues of common interest?

4. Are efforts being made to synchronize actions and share results, when possible, with organizations/individuals with mutual interests?

5. Is there a belief that when organizations/individuals take action together, making several actions into one, individual organizational goals can be achieved more efficiently, gaining more out of the same level of effort, than would be achieved through less in depth collective efforts? Is an effort being made to function in this way?

6. Has there been a merger of interests and the development of common goals? Does responsibility for outcomes, good or bad, fall upon the partnership of organizations rather than the individual organizations involved?

Watershed and Municipal/Inter-municipal plan integration:
7. Are there other jurisdictions that you look to for how to integrate watershed plans with municipal/inter-municipal plans effectively?

    a. If yes, which jurisdictions?

    b. What have you learned from this (these) jurisdiction(s)?

8. In your work/participatory context, what was and was not effective in the integration of watershed plans with municipal/inter-municipal plans?

9. What barriers did you find in integrating watershed plans with development plans? (e.g. Resources? Money? Information? Data? Tools?)

10. What aspects of the plans have been implemented? How did you implement? Are the barriers to integrating IWMPs with municipal/inter-municipal plans also encountered during implementation?

a. Are there other barriers? Different barriers?

11. What policy(ies) has/have been most effective in achieving the integration of IWMPs with municipal/inter-municipal plans?

a. What effect does section 62.1 of *The Planning Act* and sections 15 and 16.2 of *The Water Protection Act* have on the integration process?

b. Do other policies need to be in place as well? If yes, what policies?

12. Do you think land use planners should play a role in the integration process and in water management?

a. If yes, what should this role be?

b. What skills and knowledge do land use planners need to have to effectively serve in this role?

13. Looking back, what do you think could have been done better?

a. Anything you would do differently?

b. Lessons learned?

14. What should be included in a framework/guide for other sub-basins/planning districts to integrate IWMPs with municipal/inter-municipal plans effectively?

APPENDIX C - Statement of Informed Consent

Research Project Title: *Integrating Watershed and Land Use Planning – Via Collaboration – in the Red River Basin of Manitoba*

Researcher(s): **Robin Beukens**

Research Supervisor: **Dr. Ian Wight**

Please contact me if you have any questions:
Robin Beukens
Email:
Phone:
Mail:

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

1. Purpose of the Research:
The purpose of this research is to satisfy the major degree project requirement of the Master of City Planning Degree at the University of Manitoba. The project is titled *Integrating Watershed and Land Use Planning – Via Collaboration – in the Red River Basin of Manitoba.* The purpose of the research is to explore how to best integrate watershed plans with land use development plans in Manitoba, with a particular emphasis on exploring collaboration as a form of integration.

2. Risks and Benefits:
There are no particular risks or benefits to you in participating in this study. There are no risks associated with this project beyond normal everyday risk. The study does not address personal or confidential issues.
The study asks only for your professional knowledge about integrating watershed plans with land use development plans. However, you should be aware that the general role you played in the planning process will be identified. As such, it may be possible for those with knowledge of the jurisdiction and planning process to infer your identify. As well, given the small pool of relevant participants, a participant might be identifiable by their choice of words as used in the practicum. Participants will benefit professionally by learning more about successful approaches to integrating watershed and land use planning as an outcome of this research and by helping to ensure the effective integration of these plans in Manitoba.

3. Procedures:
You are being asked to participate in an interview asking questions on integrating watershed plans with land use development plans. Interviews are intended to clarify and supplement published public materials on integrating watershed plans with land use development plans. The interviews are expected to take one hour in length. The interviews will be recorded and notes taken. The project will include up to nine key informant interviews from three different jurisdictions. Only the researcher will have access to the research data. Digital data will be password protected. Physically notes will be stored securely in the researcher's briefcase in the field and locked in my home office upon return to Winnipeg. All raw information gathered (recordings and notes) will be destroyed at the conclusion of the practicum project, estimated August 2012.

4. Recording Devices:
This interview will take approximately one hour of your time. With your permission, the interview will be recorded with a digital recorder and notes of the interview taken. You will not be identified in the thesis

document. All audio files and interview notes collected during the research process will be stored in a secure location. After the project is complete, interview recordings and notes will be destroyed. If you do not wish for the conversation to be recorded, I will take hand-written notes only. However, recording will ensure a more accurate record of your responses in the final document. You should also be aware that the general role you played in the planning process will be identified. As such, it may be possible for those with knowledge of the jurisdiction and planning process to infer your identify. As well, given the small pool of relevant participants, a participant might be identifiable by their choice of words as used in the practicum.

5.Confidentiality: Your privacy is important. Your will not be identified in the practicum document. Information you give during the interview will be coded for use in the practicum. Recordings of interviews, and notes taken, will be secured during the project and destroyed at project completion, expected in October, 2012. You should be aware that the jurisdiction/organization you are from will be identified, as well as the general role you played in the organization and the planning process. It may be possible for those with knowledge of the organization and planning process to infer your identity. A participant might be identifiable by their turn of phrase as used in the practicum. However, no personal information will be gathered and I will be asking questions only relating to your professional expertise on the subject. If at any time you wish to withdraw from the interview or the project, your responses will not be used in the final document.

6.Feedback: A summary of research results will be made available to all participants. For those who are interested, the final completed practicum will also be made available. Feedback will be provided by email in PDF format.

7. Credit or Remuneration: There is no credit, remuneration, or compensation for participant involvement in this study.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. **You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence.** Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba Research Ethics Board(s) and a representative(s) of the University of Manitoba Research Quality Management / Assurance office may also require access to your research records for safety and quality assurance purposes.

This research has been approved by the Joint Faculty Research Ethics Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Coordinator (HEC) at_____. A copy of this consent form has been given to you to keep for your records and reference.

Participant's Signature _____ Date _____

Researcher Signature _____ Date _____