

Municipal Wetland Conservation and Restoration:
An evaluation of context-based policy in Calgary, Alberta

by

Lucy Ramirez

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Department of City Planning

University of Manitoba

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Abstract

The Calgary Wetland Conservation Plan (WCP) (2004) is analysed to determine if the plan conserved and restored wetlands in the landscape, by considering the plan context and outcomes and developments in provincial policy, as informed by grey literature; key informants and a focused review of relevant plans. The findings conclude The City of Calgary did not and will not meet its goal of no net loss of wetlands, because it adopted a no net loss approach to wetland management and a mitigation sequence, which prioritizes development. Reasons for constrained wetland conservation and restoration include requiring the need for water supply at a natural rate and a water licence to release treated stormwater to a conserved or restored wetland, unavailable since 2006. Also limiting were the spatial context of municipal boundaries and the lack of mechanisms to facilitate a larger regional wetland management plan. Most wetlands were removed from the landscape, with a select few preserved and integrated into Calgary's neighbourhoods. The research considers the gap between the intentions and outcomes of the WCP and recommends three areas for future research.

Keywords: context-based approach, municipal wetland policy, wetland loss, urban wetlands, no net loss, mitigation sequence, implementation gap

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Acronyms

Alberta Land Institute (ALI)	Land use, outline plan and road closures (LOC)
Alberta Land Stewardship Act (ALSA)	Light Rail Train (LRT)
Alberta North American Waterfowl Management Plan Partnership (Alberta NAWMP Partnership)	Local Action for Biodiversity program (LAB program)
Alberta Urban Municipalities Association (AUMA)	Local Area Plan (LAP)
Area Redevelopment Plan (ARP)	Locally Significant Wetland (LSW)
Area Structure Plan (ASP)	Modernized Municipal Government Act (MMGA)
Biophysical Impact Assessment (BIA)	Municipal Development Plan (MCP)
Calgary Economic Development (CED)	Municipal Government Act (MGA)
Calgary Metropolitan Plan (CMP)	New Approach to Business Plans and Budgeting (NABB)
Calgary Regional Partnership (CRP)	New Community Planning Guidebook (NCPG)
Calgary Transportation Plan (CTP)	North East (NE)
Calgary Wetland Conservation Plan (Calgary WCP)	Outline Plan (OP)
Canada Mortgage and Housing Corporation (CMHC)	Prairie Pothole Region (PPR)
Ducks Unlimited Canada (DUC)	Provincial Policy Statement (PPS)
Environmental Law Centre (ELC)	Provincially Significant Wetlands (PSW)
Environmental Open Space (EOS)	South Saskatchewan River Basin (SSRB)
Environmental Reserve (ER)	South Saskatchewan Regional Plan (SSRP)
Ecosystem Services (ES)	Standing Policy Committee (SPC)
Environmentally Significant Areas (ESAs)	Sustainable Suburbs Study (SSS)
Land Use Bylaw (LUB)	

Chapter 1. Introduction and Summary

1.1 Problem Statement

The problem addressed in this research is continued wetland loss in the western Canadian landscape, specifically in the Prairie Pothole Region. More precisely, in Alberta and in the settled portion of the province, also known as the White Area. This is where Alberta's population is concentrated and most of the land, 74 percent, is privately owned and regulated by municipalities (Barss, 2003, p. vii).

Rubec (1994) estimated that approximately 14% of wetlands in Canada had been lost. Within southern Alberta, historical losses have been estimated at 70 percent (Tyler et al., 2008, pp. 29-30). It's estimated that 90 percent of pre-settlement wetlands in Calgary have been eliminated (City of Calgary, 2004, p. 6). Urban expansion threatens both the existence and functioning of wetlands, "[u]rbanization impacts wetlands through the direct loss of wetland and adjacent areas, and through indirect impacts to hydrological and ecological pathways" (Snodgrass et al., 1996 in Schulte-Hostedde, Walters, Powell, & Shrubsole, 2007, pp. 89 - 90). Lynch-Stewart, Kessel-Taylor, and Rubec (1999) stressed land use planning could protect wetlands in urbanized areas. This is particularly important because contemporary wetland loss in Alberta is due to urban land development (Clare 2013 and 2015).

Because contemporary wetland loss in Alberta is due to landscape change resulting from urbanization, it is important to study existing municipal wetland policies to understand their effectiveness. The broad phenomenon that this research investigates is, how are urban municipalities using context-based policy to conserve and restore wetlands in the Prairie Pothole Region? To investigate this phenomenon a case study on the City of Calgary is done. To my knowledge, Calgary was the first municipality in Alberta and Canada to develop and adopt a stand-alone plan dedicated to wetland management.

Within the Prairie Pothole Region, many jurisdictions have adopted a 'no net loss' approach to wetland management (Rubec & Hanson, 2009). In the section entitled, *Context: Legal and Policy Frameworks*, a summary of 'no net loss' and 'no loss' wetland management approaches are provided. Many authors have referred to wetland management; however, few have defined what this means (Clare, Krogman, Foote & Lemphers, 2011; Lynch-Stewart,

Kessel-Taylor, & Rubec, 1999; Lynch-Stewart et al., 1993; Rubec & Hanson, 2009). Ultimately, it is about finding a balance between preserving wetlands and allowing development. This researcher believes that a ‘no net loss’ approach prioritizes development, whereas a ‘no loss’ prioritizes the environment.

To study the broad phenomenon of municipal wetland policies, this research conducts an inquiry into the *Calgary Wetland Conservation Plan* (City of Calgary, 2004), hereafter called the *Calgary WCP*. While the *Calgary WCP* has been described and/or referred to in the literature (Kevinsen, Patrick, & Bharadwaj, 2013; MacIntyre, 2011; Ryan, 2015; Stewart, 2008), the plan outcomes have not been examined. The current research seeks to understand the outcomes of the *Calgary WCP*. An understanding of the context is needed before a post hoc evaluation of plan outcomes can be done (Baer, 1997). Before seeking to understand the outcomes, I seek to understand the context of the *Calgary WCP*. Lastly, because municipalities are ‘creatures of the province’ and provincial wetland policy informs municipal wetland policies, recent developments in provincial policy are reviewed to determine if they enable municipalities to conserve wetlands.

1.2 Key Research Question and Research Methods

The central question guiding this research is: What are the outcomes of the *Calgary WCP* (City of Calgary, 2004)? I have adopted an interpretive/social constructivist philosophical approach. I have used a qualitative research strategy, specifically a case study. My data collection methods are:

- A review of the grey literature to understand the context of the plan, including the environment, economic, social and political components. As well as a review of the legal and policy frameworks of planning and water management as it relates to wetlands.
- Semi-structured interviews with key informant whom have insight into the *Calgary WCP* or Alberta Wetland Policy.
- A post hoc evaluation of plan outcomes using a pragmatic approach (Hoch, 2002).

My data analysis method is content analysis (Gaber & Gaber, 2007b).

1.2.1 Paradigm

Creswell (2009) urged researchers to clearly state the philosophical ideas that underpin their research. I am guided by a social constructivist paradigm. Creswell provided a short history

of social constructivism and the reason why it focused on individuals' perceptions, it is because "[i]ndividuals develop subjective meanings of their experiences – meanings directed toward certain objects or things. These meanings are varied and multiple, leading the research to look for the complexity of views rather than narrowing meaning into a few categories or ideas" (p. 8). This study adopts a qualitative research strategy because "Planners make plans that combine a multiplicity of viewpoints and voices" (Hoch, 2002, p. 57). In my opinion, it is best to use a qualitative research strategy in these circumstances, to capture the multiplicity of voices. Hoch (2002) wrote planners "... should try to comprehend and organize the different viewpoints and the ambiguity among them by adopting a pragmatic outlook" (p. 71). A pragmatic outlook has been called common sense judgement, it "embraces context and seeks continuity among diverse viewpoints" (Hoch, 2002, p. 53). The viewpoints in this research are from staff at the City of Calgary, the Province, a municipal practitioner who was on the team that developed the mitigation piece of the Alberta Wetland Policy (Alberta, 2013), and policy staff from an urban advocacy association. Developers viewpoints are not captured in this research. Further studies should incorporate their viewpoints, particularly since Calgary's first wetland community, Bridlewood, predates the *Calgary WCP*.

1.2.2 Case Study Research

Case studies are a qualitative research strategy and using this inquiry approach allows me to consider six traits that make qualitative data useful to planners, "natural settings, context, process, description, unanticipated discoveries and community involvement" (Gaber & Gaber, 2007a, pp. 8-10). Flyvberg (2006) observed, critics of case studies often misunderstand the strategy. He corrected five common research misunderstandings. He argued:

- case studies provide valuable context-dependent knowledge
- it's possible to generalize from a single case
- there is no greater bias towards verification
- case studies are thick narratives (pp. 224-237)

The broad phenomenon I am investigating in is: How are urban municipalities using context-based policy to conserve and restore wetlands in the Prairie Pothole region? In this region many jurisdictions have adopted a 'no net loss' approach to wetland management. Even though it is questionable, "whether the mitigation sequence of avoid, minimize, and compensate

is an effective approach for managing wetland habitats within a no net loss framework” (Clare et al., 2011, p. 168).

Calgary’s context-based policy, the *Calgary WCP*, is my unit of analysis. This case is what Flyvberg (2006) called an extreme/deviant case (p. 230). It is claimed, quite often, the *Calgary WCP* was the first municipal plan in Canada dedicated to wetland management (City of Calgary, 2011a). The Plan, used planning measures to protect high priority [ER] wetlands, allowed the City to set up a parallel process for wetland approvals and a wetland mitigation bank (Manderson, 2016). Mitigation banking is still unusual in the Canadian context (Rubec & Hanson, 2009). However, it is more widely used in the United States (US).

Clare et al., (2011) highlighted that when compared to the US, Canada has less experience with wetland legislation and policy. The mitigation concept first emerged in the US because of legislative changes to the *Clean Water Act* in the late 1970s (Clare et al., 2011). Wetland mitigation banking emerged in the US during the 1990s when “there was mounting pressure from industry to move away from on-site and in-kind wetland mitigation, and towards the use of wetland mitigation banking as a market mechanism that would allow for the increasing use of off-site compensation” (Ruhl et al., 2009; and Salzman & Ruhl 2005 as cited in Clare et al., 2011, p. 167).

One of the criticisms of mitigation banking is it provides developers with a subsidy, paid for by the public. Clare et al., (2011) described it well:

“in areas where land value prices are considerably lower than at the site of impact... a large subsidy for industry and land developers [is created] who[m] are able to buy credits in a wetland bank for far less money than they receive when their product is sold in the marketplace. While private interests gain considerably in this arrangement, the public largely pays this subsidy in the form of lost ecosystem goods and services (de Groot et al., 2010; Mitsch & Gosselink, 2000 as cited in Clare et al., 2011, p. 173).

Rubec and Hanson (2009) reviewed wetland policies in Canada, both federal and provincial, they “...noted that wetland mitigation banking [was] not commonly practiced by any jurisdiction in Canada” (p. 12). They went on to say they believed “...that there [was] support in Canada for consolidated wetland compensation projects” (p. 12). The authors’ statement has merit, as evidenced by the reverse auction wetland project in the Nose Creek watershed, north of Calgary (Pratt, 2015). The project is being conducted by the Alberta Land Institute at the

University of Alberta. The project sponsors include: University of Alberta, University of Western Ontario, Alberta Innovates Bio Solutions, Rocky View County, the City of Calgary, and Ducks Unlimited (Pratt, 2015). The Provinces supplied the money for wetland restoration, it came from the provincial wetland compensation fund (Melchior, 2015, p. 29). It is too early to evaluate this project; however, the *Calgary WCP* has been in place since 2004 and it's timely to investigate the plan's outcomes. In planning, as in the ecological restoration field, "lag times for testing and refining ideas and practices are protracted because few projects are evaluated and reported" (Galatowitsch, 2012, p. xv).

1.2.3 Post hoc evaluation and pragmatic reasoning

My research is guided by Baer (1997) and Hoch (2002), in my assessment of the *Calgary WCP* I seek to answer the following questions:

1. What was the intention of the *Calgary WCP*?
2. Was the plan implemented? Who used the plan? What were the expected outcomes? What were the unanticipated outcomes?
3. What are the similarities between the plan and reality. What difference did having a plan make?

I incorporated these questions into my semi-structured interview schedule, see Appendix A – Interview Questionnaire. I will now elaborate on why I included these questions.

Planners need to consider context when evaluating plans. Hoch pointed out, "[i]f we imagine planning as a kind of forethought, then the regular act of monitoring achievement means **remembering the earlier intention as a framework for assessment** [emphasis added]" (Hoch, 2002, p. 56). Therefore, before looking at the outcomes of the *Calgary WCP* I seek to answer the question: What was the intention of the *Calgary WCP*? To address this question, this study spends a considerable amount of time reviewing the context of the plan. Afterwards, I move on to discuss the outcomes of the *Calgary WCP*.

This study conducts what Baer termed a 'post hoc evaluation of the plan outcomes'. Baer explained, "[t]he purpose [of post hoc evaluation is] usually to discover if the plan was implemented, and if so how it performed...or what its effectiveness was..." (Baer, 1997, p. 332). Baer stressed there are many "permutations of *post hoc* evaluation" (p. 333). These permutations are a result of addressing the question what should the plan outcomes be compared to? Baer

proposed different answers to this question, the one that resonated with me is “Reality can be compared against the plan, but rather than focusing on the difference between the two, the focus can be Litchfieldian, on what *difference* any unanticipated consequences from the plan actually made” (p. 333). In my interview schedule I included questions related to whether the plan was implemented, what were the expected outcomes, what were the unanticipated outcomes.

Hoch (2002) raised the question, “...if we know after the fact that the plan was not followed, what does it mean to evaluate the plan?” (p. 59). This is an important question to address because one of my interviewees highlighted how wetlands were to be integrated into urban development was not thoroughly considered and after the plan was adopted the City had to engage the Province in many conversations regarding policy implementation (City of Calgary – Manager, Community Planning, personal interview). Brody and Highfield (2005) highlighted plan implementation is not given the same amount of consideration as the formulation of plans, the authors “concluded that far more effort is put into planning than is accorded to the details of implementation... Following through with effective implementation of land use planning and wetland prioritization is as important as the process of planning itself and requires sufficient allocation of resources” (as cited in Clare et al., 2011, p. 172).

To address implementation gaps when evaluating plans, Hoch (2002) encouraged planners to adopt a pragmatic approach instead of a ‘Rational’ approach. A ‘Rational’ approach focuses on plan implementation, whereas a pragmatic approach focuses on “similarity not correspondence” (p. 66). Instead of asking “how well do after plan outcomes meet plan objectives?” (pp. 57-58), he argues that the question becomes “do relevant stakeholders use the plan, resist the plan, grudgingly submit or perhaps ignore it altogether? Do people take the plan to heart and rema[ke] their lives in terms of its purpose?” (p. 66). Because of this line of questioning, in my interview schedule I included the following question, who used the *Calgary WCP*?

After the *Calgary WCP* was adopted, a planner started to use the plan and incorporated it into the land use planning process, specifically into long range regional planning in the NE and then more detailed master planning, Area Structure Plans (ASPs). In this research, wetland communities are the “the similarity binding plan and product” (Hoch, 2002, p. 70). Bridlewood was Calgary’s first wetland community and Cornerstone is a more recent example. To narrow

the scope of this study, I focus on the Area Structure Plans and then the Outline Plans flowing out from the *Northeast Regional Policy Plan* (2006). The reason I focus on this regional area is because it contained “the greatest concentration of natural wetlands within the City of Calgary” (City of Calgary, 2006, p. 11).

Next, I will elaborate on the methods used by researchers to evaluate wetland policy implementation and outcomes as well as the methods used to evaluate the application of sustainability principles in the built environment. By reviewing the literature, I was able to ascertain I did not have the skills, data, or ability to quantify the outcomes of the *Calgary WCP*. I do not have the skills to analyze aerial photographs nor do I have the resources or experience to know how to properly review planning files and/or search out water act approvals. However, I did develop interview skills in my research methods course and I recognize the value of speaking with practitioners, hence why I choose to conduct semi-structured interviews.

1.2.4 Examples of ‘Rational’ Approaches to Evaluation

In the literature, researchers used various methods to determine the outcomes of wetland management. These methods included: reviewing planning, engineering and drainage files; analyzing aerial photographs; interviews; and reviewing data from *Water Act* Approvals (Clare, 2013; Schulte-Hostedde et al., 2007). What follows is a review of methods found in the literature to evaluate wetland policy and the incorporation of sustainability principles in new communities. They are reviewed in part to explain why I choose two of my methods. Semi-structured interviews with key informants and a review of the Environmental Reserve (ER) wetlands to be conserved plan area of the *Northeast Regional Policy Plan* (City of Calgary, 2006).

Schulte-Hostedde et al. (2007) focused on planning policy in Ontario and its contribution to wetland protection. The authors first reviewed the history of wetland policy in Ontario, looked at problems associated with it, then analyzed cases to examine whether wetland conservation did or did not factor into development decisions, urban stormwater management, and agricultural drainage. The authors methods included: reviewing planning, engineering and drainage files; interviews; and interpreting aerial photographs to assess wetland change over time. The authors found different outcomes in the rural and urban landscape in Southwestern Ontario.

Through analysis of aerial photographs, in the Township of Zora, the authors documented a decrease in wetland area in the rural landscape and attributed it to agricultural production (Schulte-Hostedde et al., 2007, p. 90). The authors also documented decreases in the size of wetlands of provincial and local significance. The authors attributed this to “drain construction, which created discontinuities in wetlands” (p. 90). Ontario’s wetland policy exempted agricultural production. An air photo analysis of the urban area, London, “show[ed] no appreciable gain or decline in the extent of PSWs [Provincially Significant Wetlands] and LSWs [Locally Significant Wetlands], suggesting that past policies ha[d] maintained the form of wetland areas in London” (Schulte-Hostedde et al., 2007, p. 88). The authors indicated more studies were needed to investigate if there were changes to wetland function. In summary, development in London did not remove wetlands from the landscape; however, it was unknown if wetland function was impacted.

Clare (2013) sought to “describe and explain the factors that ha[d] influenced wetland policy implementation and compensation outcomes in central and southern Alberta since the inception of the interim wetland policy in 1993” (p. 4). Clare used a mixed-method approach, including both qualitative and quantitative methods. Her methods included a historical analysis of wetland management in Alberta, a review of wetland management literature from 1989 to 2010, semi-structured interviews with key informants, quantitative data from Water Acts approvals from 1999 to 2010, and lastly a Q methodological study to examine wetland policy discourses. Clare found it difficult to quantify the outcome of wetland policy, she stressed “one of the key insights gained from [her] study [was] that gathering the data to evaluate compensation outcomes in Alberta [was] exceptionally challenging, as the data [was] located in various forms and [was] held by a number of different agencies. In absence of a centralized repository for wetland approval data, it becomes exceptionally difficult to effectively, efficiently, and accurately evaluate compensation outcomes” (p. 86).

Damianil (2008) focused on new community development in Calgary and whether it was in alignment with the policies of the 1995 *Sustainable Suburbs Study* (SSS). She conducted an ex-post policy evaluation by developing a framework that included themes, 16 outcome statements and indicators. She then analyzed select communities. When she reported her results, she highlighted four limitations:

1. Limited literature on “*the use of indicators at the spatial level of the community or neighbourhood*” (p. 28).
2. Limited data availability in “*the development and application of an indicator-based evaluation framework*” (p. 28).
3. Researcher’s subjectivity in the composite ranking system (Wong as cited in Damianil, 2008, p. 28-29).
4. Lastly, “*the evaluation [was] focused on...the built form and land uses of communities planed and developed since 1995. Due to the long-term timeframe of ASPs and the pace of development none of the communities to which the evaluation framework [was] applied [was] completely built-out*” (Damianil, 2008, p. 29).

The last limitation is relevant to my research.

I narrowed the scope of this study by looking at which Environmental Reserve (ER) wetlands were to be preserved in the *Northeast Regional Policy Plan* (City of Calgary, 2006). The area encompassed by this regional plan had the largest concentration of natural wetlands in Calgary. This area is not completely built out. While the regional policy plan and subsequent three Area Structure Plans (ASPs), adopted in 2006, 2007 and 2014, included maps identifying Environmental Reserve (ER) wetlands, decisions on whether to acquire and protect wetlands are not made until the Outline Plan/Land Use Amendment stage.

There are various Outline Plans (OP)s that flow out of the ASPs. I took Map E from the *Northeast Regional Policy Plan* (City of Calgary, 2006), entitled Wetland Conservation Inventory, and placed an overlay to indicate which wetlands were to be conserved according to the Outline Plans (see Chapter three and Figure 3-16). I hesitate to say the wetlands identified in Outline Plans will be conserved because in the OPs that flow out of the Northeast Industrial ASP (LOC 2008-0089 and LOC 2008-0090), it states the following:

A wetland has been protected if the integrity of the wetland can be maintained. If the integrity of the wetland can not be maintained due to lack of sustainable water, bird/airport mitigation measures, or the sole functioning of a storm pond, then voluntary compensation will be provided to The City” (Calgary Planning Commission, 2007c, p. 7 Attachment 3).

The Cornerstone ASP (2014) was the last ASP adopted for this area and the Cornerstone Outline Plan for the Walton lands was approved in 2015 [LOC2014-0173 (OP)]. However, the land use amendments, which are approved by Council, are being phased. According to Kassa (2017), this “was an atypical approach for a staged outline plan / land use amendment application

processing, as usually the land use amendment application boundaries follow those of the outline plan” (p. 5). While land use amendments have been sought for some of the neighbourhoods, land use amendments have not been sought for the neighbourhoods featuring the wetlands to be conserved in their natural state. Perhaps it is pessimist but, in my opinion, until all the land use amendments are sought, and neighbourhoods are built out, it is too early to say whether wetlands identified for protection will indeed be protected because developers could still seek approval under the *Water Act* to remove wetlands and pay compensation.

I have reviewed the methods of other researchers in part to explain why I choose my methods: a review of the grey literature, semi-structured interviews with key informants, and a review of the Environmental Reserve (ER) wetlands to be conserved in the *Northeast Regional Policy Plan* (City of Calgary, 2006).

1.2.5 Generating Valid (truthful) and Reliable (dependable) Data

Qualitative approaches are sometimes suspect, critics of this approach generally focus on the analysis and say it lacks “methodological rigour, [is] prone to researcher subjectivity and based on small cases or limited evidence” (Gray, 2009b, p. 493). Hence the importance of the concepts of validity and reliability. Validity asks if “a researcher is observing, identifying or measuring what they claim they are” (Mason, 2002 as cited in Gray, 2009b, p. 493). There is internal validity and external validity. In qualitative research, questions of internal validity center on how close to the truth is the researcher, did he/she capture reality accurately? Further was there “researcher bias and any distortion or obfuscation of the observations?” (Gaber & Gaber, Introduction, 2007a, p. 10). A technique I used to ensure validity in my interview transcription was I asked my interviewees to check the interview transcripts, I gave them an opportunity to edit them.

Gaber and Gaber (2007a) stressed in qualitative research questions of external validity center on how to “generalize observations of a particular research project to other related situations” (p. 12). Stake (1995) cautioned that “case study research is not sampling research” (p. 4). Observations from one case study cannot be directly applied to another research. However, Gaber and Gaber (2007a) highlighted that researchers can learn from case studies by

applying ‘theoretical inference’, which is when broad conclusions from one study can be applied in another (p. 13).

The question of reliability asks, could other researchers get similar results if they used similar research techniques. One way to approach “...the reliability problem is to make as many steps as operational as possible and conduct research as if someone were always looking over your shoulder” (Yin as cited in Gaber & Gaber, 2007a, p.13). I have documented my procedures, both data collection and data analysis. I have provided my Interview Schedule see *Appendix A – Interview Questionnaire*. I transcribed my interviews and provided my interviewees with the opportunity to edit the transcripts. For my data analysis, I used qualitative coding, I had a key with the codes to ensure I applied them consistently, see *Appendix C – Coding Framework*. I also double checked to ensure I had applied codes consistently.

Creswell (2009) identified eight strategies to validate findings: “Triangulate, use member checking, use rich thick description, clarify the bias, present negative or discrepant information, prolonged time in the field, peer debriefing, and external auditor” (pp. 191-192). The strategies I used in my research were triangulation, member checking, thick description, clarifying bias and presenting discrepant information. I analyzed the grey literature to develop an understanding of the context. I also asked my interviewees questions related to context to see if I missed anything. I used member checking, interviewees read and edited interview transcripts. The next chapter provides a thick description on the case study with data backing up my analysis. Before moving on to the next chapter, I will clarify my biases to acknowledge I bring my personal background and bias to the study. Lastly, I present discrepant information (see sections 3.3.3 and 4.4).

1.2.5.1 Biases and Limitations

I have a few biases to disclose: I am from Calgary, I am fond of the city and the Alberta landscape; I was a municipal government practitioner for five years before returning to school, so when I write I keep the municipal practitioners in mind; I believe in biophilia and the value of preserving ecosystem services; and I am currently working in a province that has adopted a ‘no loss’ wetland policy approach. The limitations are related to time.

I have a personal attachment to the City of Calgary; I was born and raised there. The parks I played in as a child had mowed grass and play structures. They were ecologically poor

I do not remember wetlands being present in the landscape. Someone who is familiar with Calgary would point to the wetlands in northeast Calgary in the rural area, and those in Fish Creek Provincial Park, which is in the southern part of the City. However, I grew up in the city's northwest and I recall going to Fish Creek Park twice, once as a teenager and once as an adult. When I lived in Calgary I did not own a vehicle and I relied on transit as my primary mode of transportation. In the past, going to Fish Creek Park via transit was an ambitious undertaking, I only attempted it once. Now, the light rail train (LRT) goes to Fish Creek Park and perhaps this encourages more Calgarians to visit.

Prior to attending the University of Manitoba, I lived and worked in Grande Prairie, Alberta, which is in the northwest part of the province. I went to Grande Prairie because of the Alberta Municipal Affairs' *Internship Program for Administrator*. During my time there, I was fortunate enough to spend time with the Planning Department and learn from the City's land use planners. So, I learned about wetlands and riparian areas and the role cities play in protecting the presence and functioning of these features in the landscape. When I was working for the City of Grande Prairie, I heard Calgary was a wetland restoration agent. I was interested in conducting a case study on Calgary because I believe rich context-dependent knowledge is valuable. I suspected planning professionals could benefit from my research because I seek to document what practitioners have learned attempting to conserve and restore wetlands in the City of Calgary.

I believe in/support the biophilia hypothesis/concept, that nature and humans are intrinsically linked. The term biophilia was popularized by E. O. Wilson, he described it as "...the innately emotional affiliation of human beings to other living organisms. Innate means hereditary and hence part of the ultimate human nature" (Wilson as cited in Beatley, 2011, p. 3). I also believe wetlands are important because they provide ecosystem services. The cost of replacing wetlands function is high, in Edmonton's case, it is in the millions of dollars (Pratt, 2015). Likewise, for Calgary. The City of Calgary constructed the Shepard Wetland, Canada's largest constructed stormwater treatment wetland, the City notes the wetland is 156 hectares (City of Calgary, n.d. C). Wang, Neupane, Vickers, Klavins, and Bewer (2011) noted that the Shepard Constructed Wetland was 230 hectares and "the total cost of the project was \$58 million, or about \$252,000 per hectare (p. 24). The authors note this could be an

underestimate if the land acquisitions were not included in total cost, as the authors assumed. What can be surmised is the cost of replacing wetlands' ecological function is high, in Florida's case it is estimated to be in the billions of dollars (Woodworth, 2006).

Another possible bias, is I'm currently working for a municipality in Ontario as a Committee/Council Assistant. I support the work of committees and committee coordinators. The Planning Committee is one of the committees I help support. I attend the meetings and observe the items going before Committee and then Council for approval, and I listen. The more I listen, the more I learn, and I am impressed with how planning is done in Ontario. In my professional practice class, I commented I wanted to be the type of planner who started by listening. This leads me to discuss my limitations. I have limited time because I work full time, and I am also very near the end of my time in the program.

1.3 Significance of Research

Nature and the natural processes that occur within nature should shape cities. However, natural features and functions are often erased from a city's landscape. As a result, the hydrological cycle is altered, and this contributes to flooding, erosion, and pollution (Hough, 2004). City planners should consider water: water storage, groundwater recharge, and stormwater drainage. Barss (2003) noted "where municipalities may be most effective in protecting the environment is influencing the design and form of a subdivision in a way that maximized compatibly with the current landscape" (p. xvii). Establishing reconnections to the landscape – both the land and the water – should be a priority and should guide growth (Hough, 2004).

Appendix eight of the *Calgary WCP* reviewed wetland policies in Canada, the United States and internationally. The authors of the Plan commented, "the provincial directive of wetland protection guides most municipalities as no wetland policies specific to cities within Canada have yet been found" (City of Calgary, 2004, p. 67). Municipalities are 'creatures of the province' (East York (Borough) v. Ontario (Attorney General), 1997). Therefore, provincial wetland policy informs municipal wetland policies.

To my knowledge the *Calgary WCP* was the first municipal plan in Alberta and Canada dedicated to wetland management. Ryan (2015) noted it was the first in North America. The

Alberta Urban Municipalities Association (AUMA) profiles it as an exemplary municipal plan (Alberta Urban Municipalities Association, n.d.). I learned of the *Calgary WCP* when I was working as a municipal professional. I knew municipalities could play a role in wetland protection; however, I did not know how they could or should exercise their authority. In searching for examples, I discovered several municipalities had adopted wetland and riparian policies. However, I was unable to ascertain which policies were effective, especially in an urban setting.

When Galatowitsch (2012) described ecological restoration in the preface on her book entitled *Ecological Restoration*, she noted "...much of the evidence of accomplishments from practice is web-based and geared for public relations" (p. xv). This is a semi-accurate characterization of the *Calgary WCP*. In 2008, The City of Calgary received the Alberta Lieutenant Governor's Greenwing Conservation Award, created by Ducks Unlimited Canada (DUC). This award is given to individuals and organizations "that have made a significant contribution to protecting wetland habitats and to promoting the value of conserving habitat within the province" (Clark, 2008). The *Calgary WCP* raised awareness of the importance of wetlands; however, to my knowledge the plan had not been evaluated to assess if it protected wetland habitat.

The reason Galatowitsch's description of ecological restoration is semi-accurate in the Calgary context is because reports went to Council in 2008 describing Administration experience implementing the plan. Administration highlighted lessons learned through early experience namely, "there [was] a strong tendency to go straight to compensation without a thorough evaluation of the feasibility of all mitigation priorities" (Manderson, 2008, p. 2). Manderson (2016) gave a presentation at the Alberta Land Institute (ALI) Land Use Conference entitled, *Ecosystem Services & Municipal Priorities: Conservation, Compensation & Unintended Consequences*. He identified lessons learned from the *Calgary WCP*. Because "Planners make plans that combine a multiplicity of viewpoints and voices" (Hoch, 2002, p. 57), a qualitative research strategy that captures the multiplicity of voices is needed.

Rubec and Hanson (2009), highlighted the literature acknowledged the value of learning from practice, "the importance of monitoring the success and failures of mitigation measures has been repeatedly stated (Cox and Grose 2000, ELI [Environmental Law Institute] 2004; Austen

and Hanson unpublished)” (p. 12). The current research seeks to understand the outcomes of the *Calgary WCP*. Planners may be interested in this research because “[a] key challenge in the sustainability discourse is to illustrate practical approaches to putting sustainability into practice, especially in planning” (Hanna & Slocombe, 2012, p 30). Galatowitsch (2012) highlighted the importance of learning from practice when she noted, “[s]haring what we've learned from past and ongoing restoration efforts is needed to inspire and inform others embarking on new projects and programs” (p. xiii). The timeframe for this research is 2001 to 2015. Documents or events outside of this timeframe are referenced when appropriate.

1.4 Chapter Outline

This document is made up of five chapters and four appendices. Chapter 1, sets the parameters for the research; including: the problem, the broad phenomenon, and the central research question this practicum investigates. The research methods are also reviewed. Chapter 2, provides context, using concepts from public policy to structure the work, such as the policy cycle (Howlett, Ramesh, & Pearl, 2009 as cited in Howlett, 2013) and policy instruments that promote wetland conservation (Scarth, 1998). Chapter 3 reviews findings of the research. Chapter 4, returns to the findings, recommendations are provided and as well as suggestions for further research. Chapter 5, reflects on the project and suggests three alternatives to Calgary’s policy approach: biodiversity, regional planning, and environmental planning. Alternatives are reviewed because there are different solutions to deal with the problem of wetland loss. The appendices contain a sample of the interview questions, the consent form, my coding framework, and a list of reports from Administration I reviewed.

Chapter 2. Context

Prior to assessing the outcomes of a plan, it is necessary to understand a plan's context (Hoch, 2002). Planners need to look at the genesis of plans to inform their assessment of them. Therefore, first I will assess what was the context of the *Calgary WCP* (City of Calgary, 2004). The aim of this chapter is to further the readers understanding of the environmental, economic, social and political context; as well as the legislative and policy context. Furthermore, to explain how the problem, wetland loss, was recognized and how a made in Calgary solution was developed to address it. Lastly, relevant literature is reviewed. Like Nicol (2013), my case study is “set within the wider provincial water and land management frameworks of the Water for Life Strategy and the Land Use Framework” (p. 82). I will not delve into these frameworks; however, having a broad awareness of them is important.

2.1 Building Context using Content Analysis

Case studies are described as thick or dense, context is important. To gain an appreciation of the context, first I reviewed the environment, economic, social and political context. I used content analysis to review the political context (Gaber & Gaber, 2007b). Content analysis is a method used to systematically analyze written and oral communication (p. 103). Content analysis research can be approached either quantitatively (manifest) or qualitatively (latent) (Gaber & Gaber, 2007b). A manifest approach involves counting how many times a word or phrase is used, looking at the word or phrase's use over time, and pattern searching (p. 104). A latent approach involves “matching issues with particular interest groups to determine who said what” (Gaber & Gaber, 2007b, p. 104). Mixing these approaches strengthens research. Next, I describe my approach.

To build the political context, I reviewed Council priorities, business plans, and budget documents from the City of Calgary. These documents were integrated when the City moved toward integrated business plans and budgets. From an archival researcher's point of view, the integration of these documents is useful because these documents then form part of the public record. Finding some of the records took a bit of digging through the electronic data base and required following up with the Office of the City Clerk in some instances.

When I analyzed Council Priorities from 2002-2018, I used a quantitative approach and searched out the word wetlands. Gaber and Gaber (2007b) describe words as “the smallest unit of analysis...used in a manifest content analysis to analyze frequency and intensity” (p. 109). Then I did a trend analysis to see how the use of the word changed over time (p. 110). See section entitled, Political Context and in particular Table 2-1. When the *Calgary WCP* was adopted I did a latent analysis on the letters of support submitted to committee and Council. Letters came from the Province, Ducks Unlimited, and the development industry. All the letters expressed support for the *Calgary WCP*; however they offered additional considerations.

Next, I reviewed the legal and policy frameworks. Municipalities receive their authority from the provinces, they are commonly known as ‘creatures of the province’ (*East York (Borough) v. Ontario (Attorney General)*, 1997). Therefore, any discussion about context must also discuss the provincial legislation. The *Municipal Government Act* (MGA) (R.S.A. 2000 c. M 26) empowers municipalities to engage in planning and regulate activity on private land, therefore it was reviewed. Next, I reviewed relevant Calgary plans approved by Council. Municipal councils are embodiments of municipal authority, which is exercised either through by-law or resolutions. This translates to plans, both statutory and non-statutory, policy and legislation. Statutory plans “must follow the procedures outlined in the *Municipal Government Act*...Non-statutory plans provide policy guidance and are not legally binding” (City of Calgary, n.d. A).

I used a quantitative approach and searched out the word wetland and environmental reserve in the *Calgary Plan* (City of Calgary, 1998b) and the 2009 *Municipal Development Plan* (2014 b, City of Calgary). Wetlands were scarcely mentioned in the *Calgary Plan*, and Environmental Reserves were only mentioned with respect to undevelopable lands and in the floodway definition. Wetlands and ER featured more prominently in the 2009 *MDP*. When I reviewed the regional policy plans and/or regional context studies I also did manifest content analysis searching for reference to wetlands and the *Calgary WCP*. I discovered themes related to wetlands. Gaber and Gaber (2007b) stressed “[t]hemes usually describe a sentence...that has a string of words conveying an idea” (p. 109).

The provincial wetland management framework was also reviewed. The *Water Act* (R.S.A 2000, c W-3) and *Public Lands Act* (R.S.A. 2000, c P-40) were reviewed because this

legislation is used to implement the provincial wetland policy (Alberta North American Waterfowl Management Plan (NAWMP) Partnership, 2016). Many of the reports I used are grey literature. Ridley (2008) described grey literature as including “reports, theses and dissertations, conference proceedings, research in progress, leaflets and posters, media reports, patents, letters, and diaries” (p. 32).

The criteria I used to decide if I should include or exclude material in my review and analysis was, what was the context of the *Calgary WCP* (City of Calgary, 2004)? If a source helped me establish context: ecological, economic, social or political as well as the legislative and policy context, then I included it. Hayer (2015) provided context for his research via secondary source and archival analysis. He used the following criteria to determine if he should include or exclude sources from his analysis: relevancy, supportability, and trustworthiness (Thyer, 2001 as cited in Hayer, 2015, pp. 56-57). These are also the criteria I used to determine whether I should include or exclude a source.

2.2 Context: Environmental, Economic, Social and Political

To provide background, the environmental, economic, political and social contexts are reviewed. In brief, Calgary is in the Prairie Pothole Region, in this region, wetlands were once abundant. However, it is estimated 90 percent of Calgary’s pre-settlement wetlands have been eliminated (City of Calgary, 2004, p. 6). Wetlands in the Prairie Pothole Region have specific characteristics and functions and wetland loss is connected to “poor water quality, desertification and declines of fish and wildlife” (Lynch-Stewart et al., 1993, p. 3). The City’s spatial growth has eliminated natural habitat, fragmented ecological networks, and changed the way water moves over the landscape (City of Calgary, 2011a). Calgary grew rapidly because of a strong economy and rapid population growth. The suburbs have and continue to accommodate most of this population growth (City of Calgary 2005d; 2014a; 2017a). This resulted in a recognition from residents and politicians that the environment and wetlands needed to be protected.

2.2.1 Environmental Context

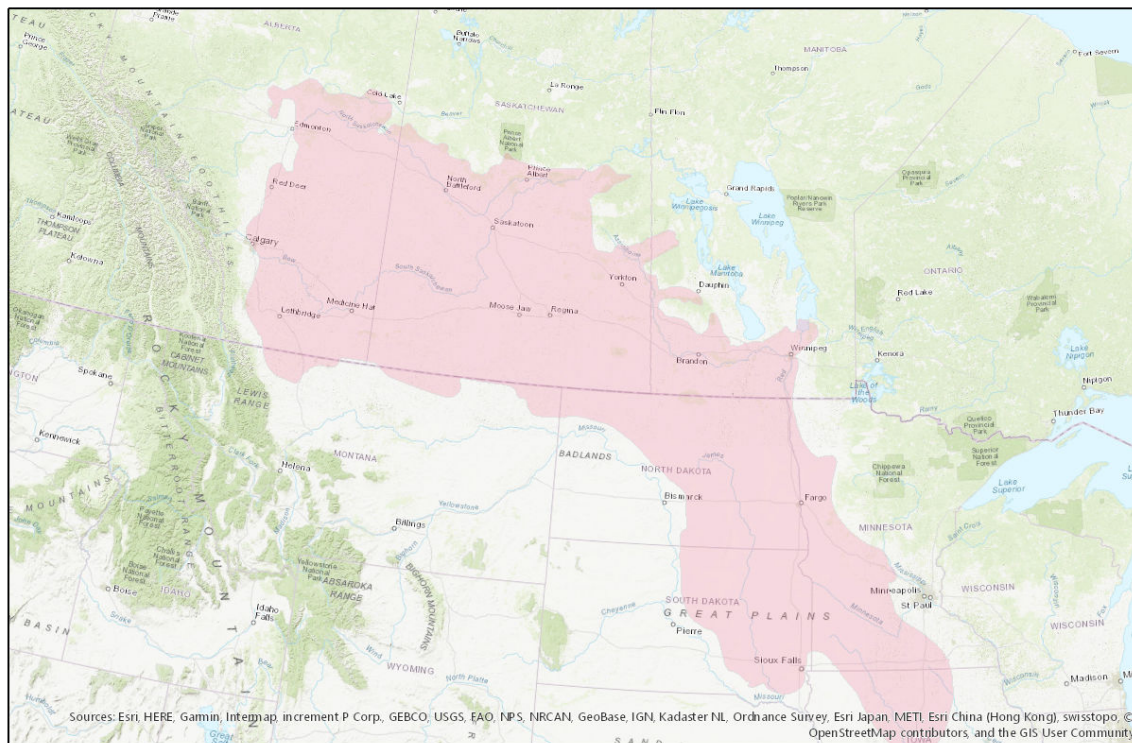
How to describe the landscape? One way to do it is through ecoregions. The City of Calgary is in the Prairie’s Ecozone, more specifically in the Aspen Parkland and Fescue Grassland ecoregions (Tyler et al., 2008). Alberta “has the largest area of rough fescue grassland

in the world” (Shorthouse, 2010, p. 66). The Fescue Grassland ecoregion makes up two percent of the province’s total area and most of this ecoregion has been farmed or grazed with only five percent in pre-settlement condition (Shorthouse, 2010). This small ecoregion is dominated by grasslands with intermittent wetlands, ponds and stream (Alberta. Agriculture and Rural Development, 2013). The wetlands on the southern plains of Alberta are referred to as ‘sloughs’ and ‘potholes’ (Lynch-Stewart et al., 1993).

2.2.1.1 Prairie Pothole Region

Portions of Alberta are part of the Prairie Pothole Region (PPR), a 780,000 km² area stretching from north-central portions of Iowa to south-central Alberta and from western Minnesota to the foothills of the Rocky Mountain (Leitch & Fridgen, 1998; Clare, 2013;).

Grady Mann (1974) outline of the Prairie Pothole Region (PPR)



Map created by Lucy Ramirez in ArcGIS Pro
Data from United States Geological Survey

0 100 200 400 600 800 Kilometers



Figure 2-1: Map of Prairie Pothole Region Source: Grady Mann (1974) as cited by United States Geological Survey. Note: Ducks Unlimited (n.d.) has a map showing where they work and it has expanded and refined boundaries, see the [Prairie Pothole Region](#).

Historically there was “...an abundance of depressional wetlands...dependent primarily on precipitation for hydrological inputs, these pothole wetlands are subject to climate fluctuations that drive frequent wet-and-dry cycles...” (Mitsch and Gosselink 2007 as cited in Clare, 2013). These wetlands were a common landscape feature and “...the adoption of many of the regulations and laws aimed at eliminating standing water on the landscape came as a direct response to the physical nature and abundance of wetlands in the region” (Clare, 2013, p. 20).

Characteristics of wetlands in the Prairie Pothole Region:

- Individual wetlands are part of wetlands complexes, they are connected (Galatowitsch, van der Valk, & Budelsky, 1998).
- Wetlands exist on a ‘continuum of wetland permanence’ (Cuthbert & Tyler, 2016, p. 4).
- A wetland classification system was developed specifically for this region by Stewart and Kantrud (1971) (Cuthbert & Tyler, 2016, p. 4). The Stewart and Kantrud wetland classification system “...is based primarily on the characteristic vegetation zones associated with different periods of water permanence. The greater the extent of water permanence and the more vegetation zones then, the higher the classification” (p. 4).
- Here, wetlands are dynamic, they go through wet and dry cycles and the ‘wetland cover cycle’ can be quite long (Cuthbert & Tyler, 2016). Hence, the importance of developing methods to map the hydrology of the landscape pre-development .
- Wetlands in this region also have an “interrelationship with the surrounding environment” (Lynch-Stewart et al., 1999, p. 1). The water and land are connected, which means, wetlands conservation entails conserving riparian areas, also known as uplands (Stewart, 2008).

Functions of wetlands in the Prairie Pothole Region:

- Commonly referred to as the kidneys of the landscape because they help mitigate pollution found in stormwater. They do this by trapping sediments and assimilating nutrients (Scarath, 1998).

- Ephemeral waterways “play key roles in regulating water balance in the Prairie Pothole landscape” (Cuthbert & Tyler, 2016, p. 5). They store surface water and recharge ground water.
- Provide important habitat for organisms (LaBaugh, Winter, & Rosenberry, 1998).
- Provide ecosystem services. There are four types of ecosystem services, they are: “nutrient cycling, provisioning freshwater and food, regulating floods, and cultural use” (United Nations Environment Program (UNEP) as cited in Cuthbert and Tyler 2016, p. 2).

2.2.1.2 Wetlands in the Calgary region and The City of Calgary

The Calgary area is in a wetland-rich landscape, the north and eastern portions of the City have many wetlands. Brunen, from Ducks Unlimited wrote “a dense and diverse mosaic of wetlands dominate[d] much of the undeveloped fringe areas within the City of Calgary as well as the outlying areas surrounding it” (City of Calgary. Park Development and Operations, 2001, Attachment 3). What is known about wetlands in the Calgary region? Tyler et al. (2008) interpreted spatial data for the area known as the Calgary Regional Partnership (CRP). They looked at available data sets, which they then grouped into three regional scale functions: wildlife habitat, hydrology, and land cover (p. iii). This was their framework for analysis. The data was interpreted, and information gaps were identified. They then looked at where growth and development were planned for and where it conflicted with the regions’ critical ecological infrastructure.

Tyler et al. (2008) stressed, “identifying critical ecological infrastructure at the landscape level [was] necessary to ensure sustainable development” (p. 5). Dale (2012) defined sustainable development as “a process of reconciliation of three imperatives: the ecological imperative to ensure global biophysical carrying capacity for the future, the social imperative to ensure the development of culturally sustainable systems of governance, and the economic imperative to ensure a viable standard of living for all” (p. 4). Dale recognized definitions are dynamic and continuously evolve; further it is difficult to define and apply sustainable development. This is a challenge experienced in numerous professions, including planning practice (Hanna & Slocombe, 2012).

Tyler et al. (2008) identified five ‘hot spot’ where development pressures threatened the regions critical ecological infrastructure. Among them, a “wetland complex along the eastern edge of Calgary” (p. v).

Calgary’s Administration initiated a wetland inventory to protect wetlands in advance of development. Latter, Ducks Unlimited helped Calgary with their inventory. Calgary’s wetland inventory identified over 8000 wetlands using aerial photography, wetlands were classified using the Stewart and Kantrud wetland classification system (City of Calgary, 2004, p. 15). It was reported “[m]ost of the areas identified [were] in Calgary's extreme northeast, along the eastern fringe of the city, and in the southeast” (Canton, 2002, B10). Kevinsen, Patrick, and Bharadwaj (2013) noted the wetland inventory was a motivating factor behind the *Calgary WCP*. Of note, the plan distinguished between four types of wetlands: Crown owned, Environmental Reserve, Natural Area and Engineered Stormwater (City of Calgary, 2004, p. 13). This is important because only Environmental Reserve Wetlands, wetlands classified as seasonal, semi-permanent, permanent or alkali ponds, were to be dedicated to the City (City of Calgary, 2004, p. 7 and 18). What does this mean in practical terms? According to Pearsell (2004), when the City of Calgary completed their wetland inventory they “...identified 7,423 wetlands that range[d] from temporary ponds to permanent water bodies. They estimate[d] that less than 8% (588) of the wetlands would be eligible to be classified as environmental reserve lands” (p. 1). The remaining wetlands in the inventory, approximately 6,800, were classified as ephemeral and temporary ponds. Rarely were ephemeral and temporary ponds protected (City of Calgary – Biologist, Environmental Planner, personal interview).

Ephemeral wetlands have an ecological function; however, they are generally not protected because wetlands are assessed individually and not as part of larger wetland complexes (Cuthbert & Tyler, 2016). Ephemeral wetlands are seasonal and generally not seen as valuable. This viewpoint, disregards the scientific evidence from the fields of ecology and hydrology, which argue ephemeral wetlands are valuable. According to an interviewee, in Calgary wetlands consist of smaller ephemeral systems that cannot be protected just by protecting the basin itself, the larger context of the landscape needs to be considered (City of Calgary – Urban Conservation Lead, personal interview).

MAP 2 – ENVIRONMENTAL RESERVE WETLANDS 1:125,000

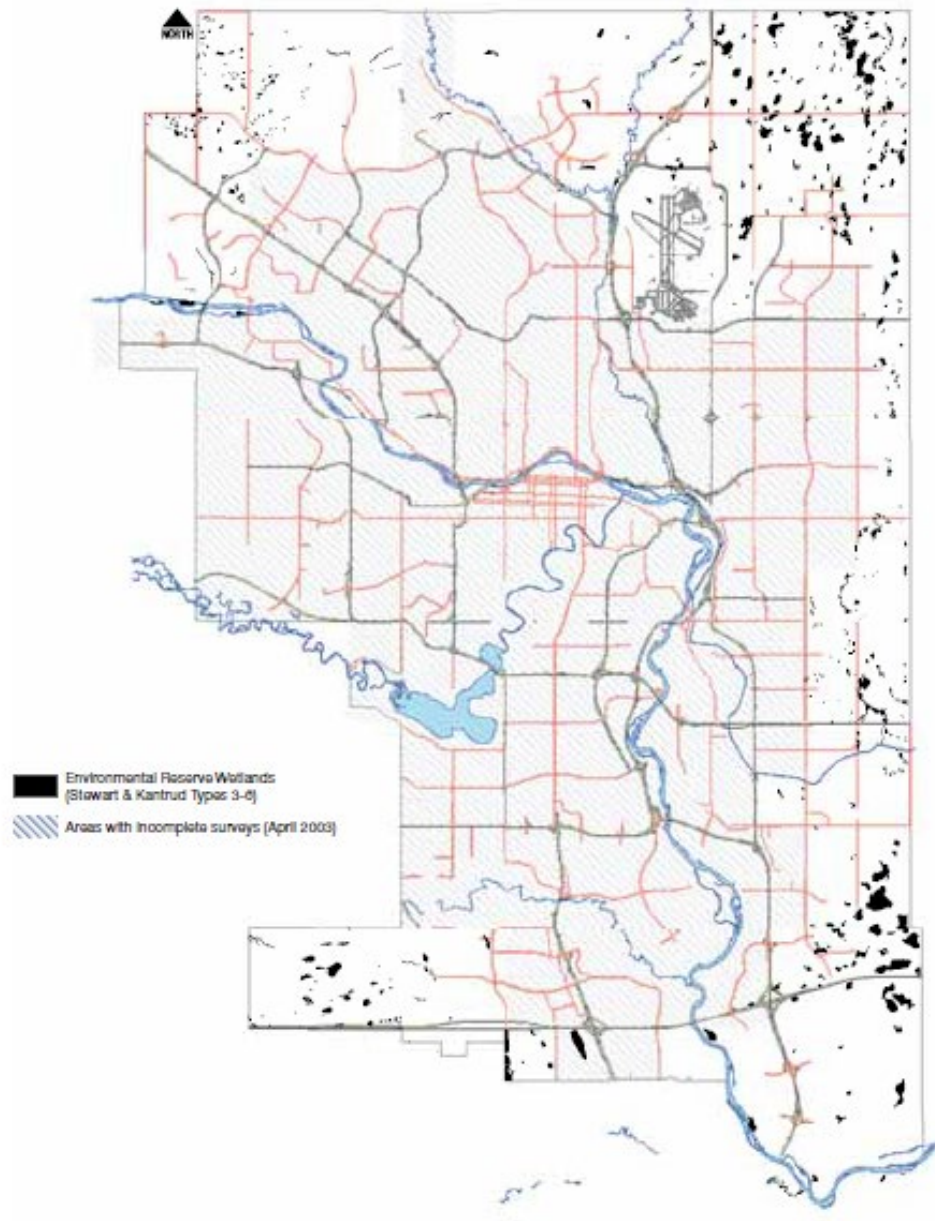


Figure 2-2: Environmental Reserve Wetlands in City of Calgary Source: (City of Calgary, 2004, p. 78, one of 43 images or figures)

MAP 3 – NATURAL AREA WETLANDS 1:125,000

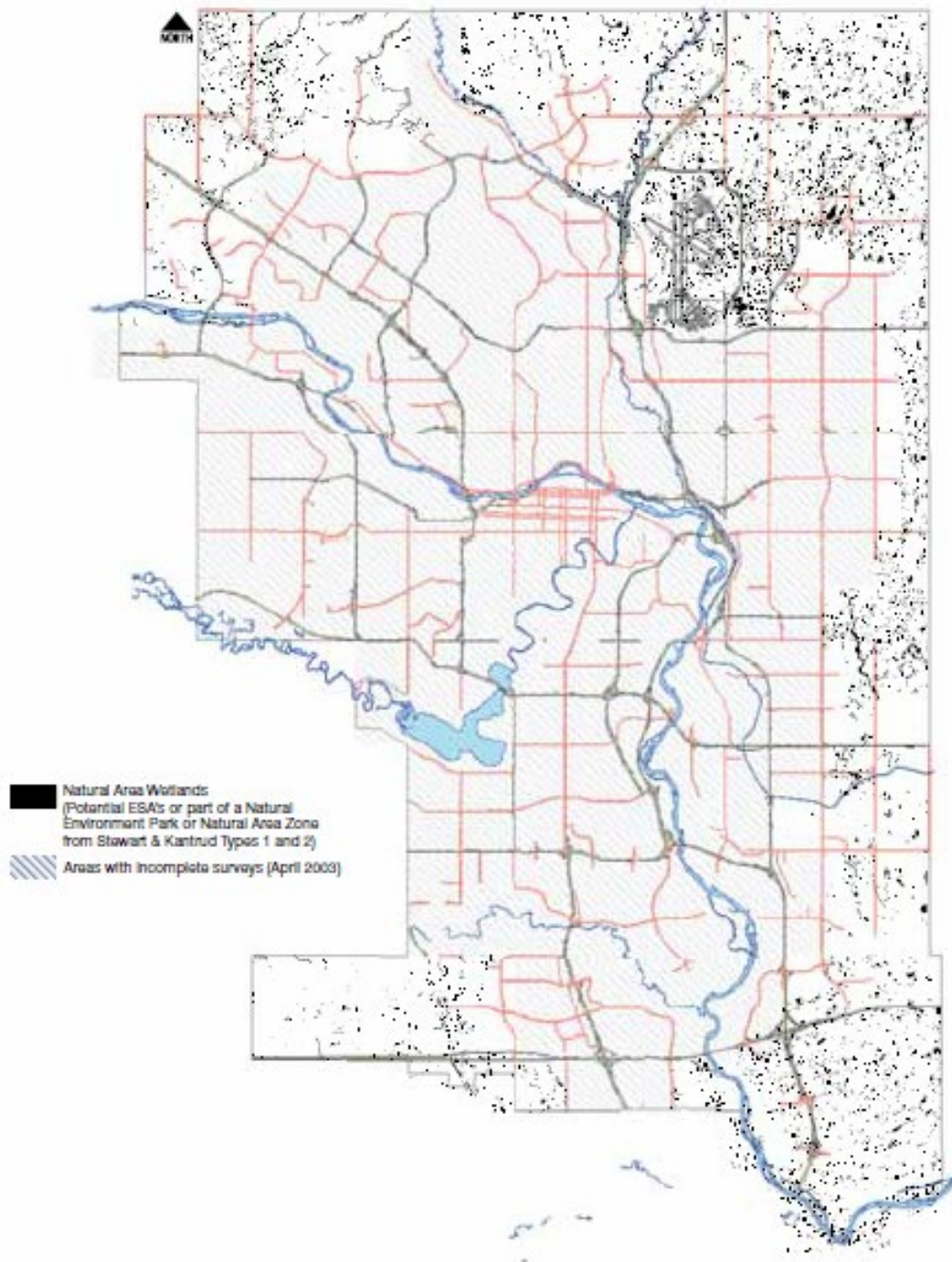


Figure 2-3: Natural Area Wetlands, City of Calgary Source: (City of Calgary, 2004, p. 79, one of 43 images or figures)

Before moving on to discuss the economic context, there are two additional things I want to highlight about the environmental context, the first is in Calgary, urbanization leads to a significant increase in stormwater runoff. Wetlands typically store surface water, eliminating this function and increasing the flow of water to local creeks and rivers increases erosion and sedimentation to those local water bodies. Ryan (2015) explained it well:

“... inside city limits, the natural wetlands and areas of intermittent shallow open water tend to get drained and backfilled during development. In semiarid environments with low natural drainage density, there are large areas that rarely (if ever) discharge surface water to the local creeks and rivers. This is referred to as “internal drainage” or non-contributing drainage area. The natural hydrologic connectivity is low. When the traditional hardened stormwater infrastructure is imposed on these types of areas, the hydrological connectivity increases dramatically... Increased runoff discharge from urbanization is particularly significant in a semi-arid environment such as Southern Alberta that has a naturally low drainage density and includes non-contributing landscapes with sloughs and pothole wetlands” (p. 4).

The second, thing I want to highlight, which is significant is in August 2006, the Province approved “the Water Management Plan for the South Saskatchewan River Basin (SSRB)...As a result of this plan, the Province stopped accepting applications for new allocations of water in the Oldman, Bow, and South Saskatchewan sub-basins in southern Alberta” (Pernitsky & Guy, 2010, p. 79). Essentially, the Province closed the South Saskatchewan River Basin. As noted by interviewee participants this would have implications for wetland conservation and restoration.

2.2.2 Economic Context

Cheung and Granovsky (2016) explained “Housing starts and building permits data are commonly used as leading indicators of economic activity” (p. iii). To gain an understanding of the economic activity in Calgary from 2001 to 2015, see Figure 2-4.

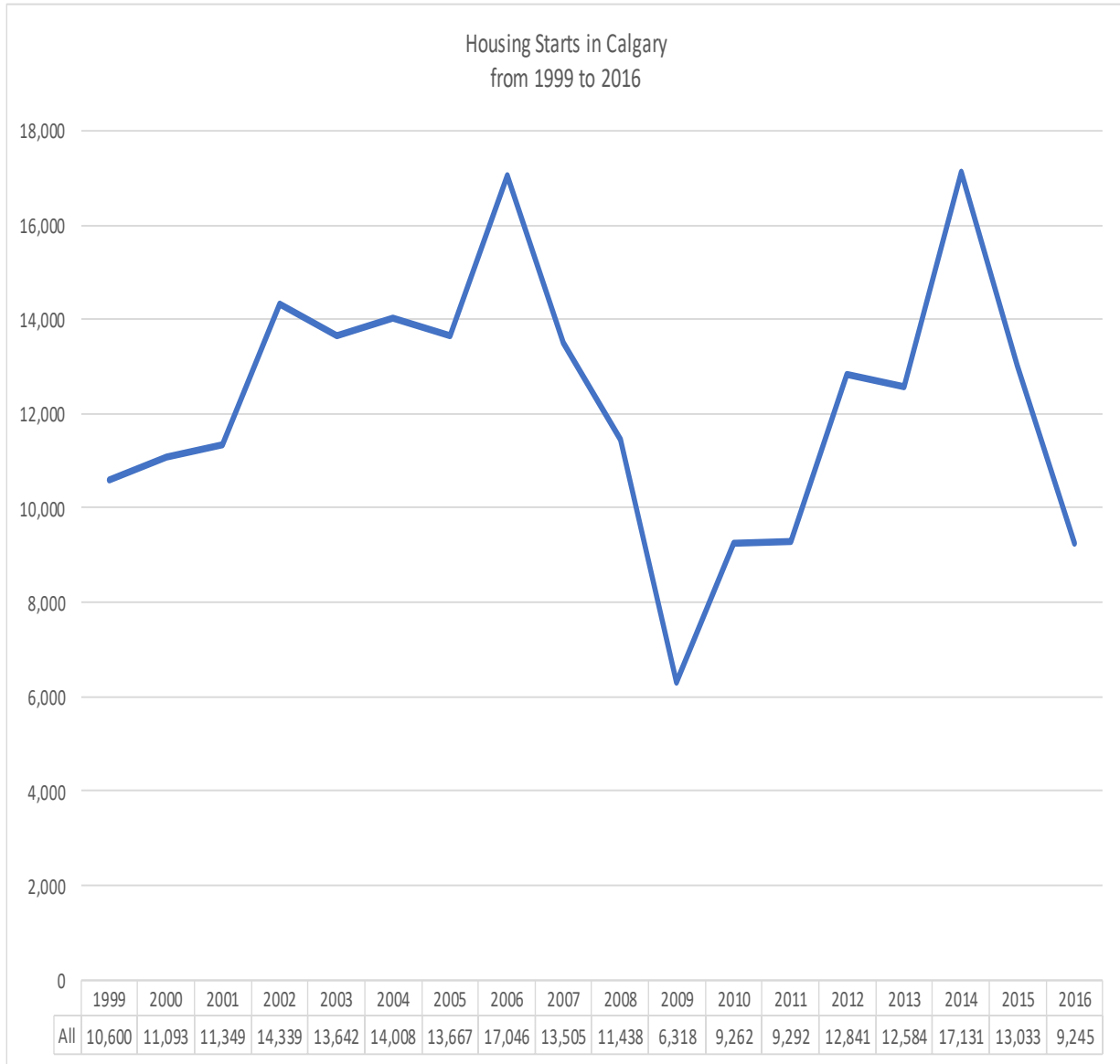


Figure 2-4: Housing Starts in Calgary from 1999 to 2016 Source: Created by Lucy Ramirez using data from Canada Mortgage and Housing Corporation (CMHC) 2018

What figure 2-4 shows is Alberta’s economy is cyclical, it is characterized by booms and busts. The data reflects the peaks and valleys of recent economic activity. Continued economic growth is visible from 1999 to 2006. The economic recessions are also visible. Housing starts decreased in the years following the recessions. Sturges (2010) asserted the boom-and-bust economic cycle resulted in Alberta municipalities “allow[ing] massive development during boom times and push[ing] for freedom from regulations during hard times” (pp. 119-120).

2.2.2.1 Land Development in Calgary

The City sprawls across the prairie landscape. The need to contain urban sprawl was acknowledged early. Calgary was established as a town in 1884 and in 1914, Thomas Mawson had a plan to control the city's urban sprawl and provide additional green space (Smith D. B., 2005, p. 152). His plan was not implemented. Historically, cities have developed as walking cities, then transit cities, and then automobile cities (Neuman, Beatley, & Boyer, 2009, p. 89). Calgary's land use pattern reflects this transportation evolution. From 1950 onward, Calgary developed as an automobile city marked by suburban drift. Calgary's suburbs expanded over the surrounding grasslands (Smith D. B., 2005). The *Sustainable Suburbs Study* (1995) was an attempt to "encourage developers, city departments and other stakeholders to develop more sustainable communities" (City of Calgary, 1995 p. iii as cited in Damianil 2008 p. 2)

The suburbs have accommodated virtually all of Calgary's population growth. The *Calgary Plan* (City of Calgary, 1998b) "anticipate[d] population growth of over 500,000 people over 20-25 years" (p. 89). It was anticipated "most of the growth [would] occur in new suburbs at the city's edges" (p. 89). While housing starts give a broad understanding of economic activity. Housing starts by dwelling type allows us to appreciate the impact urban development has on the landscape (see Figure 2-5). In Calgary, single dwelling housing starts dominated, from 1999 to 2006, there was a 59 percent increase. Apartments were the next most common dwelling start. In 2008, there were more apartment dwellings starts than single dwelling starts. This happened again in 2014 and appears to be a trend.

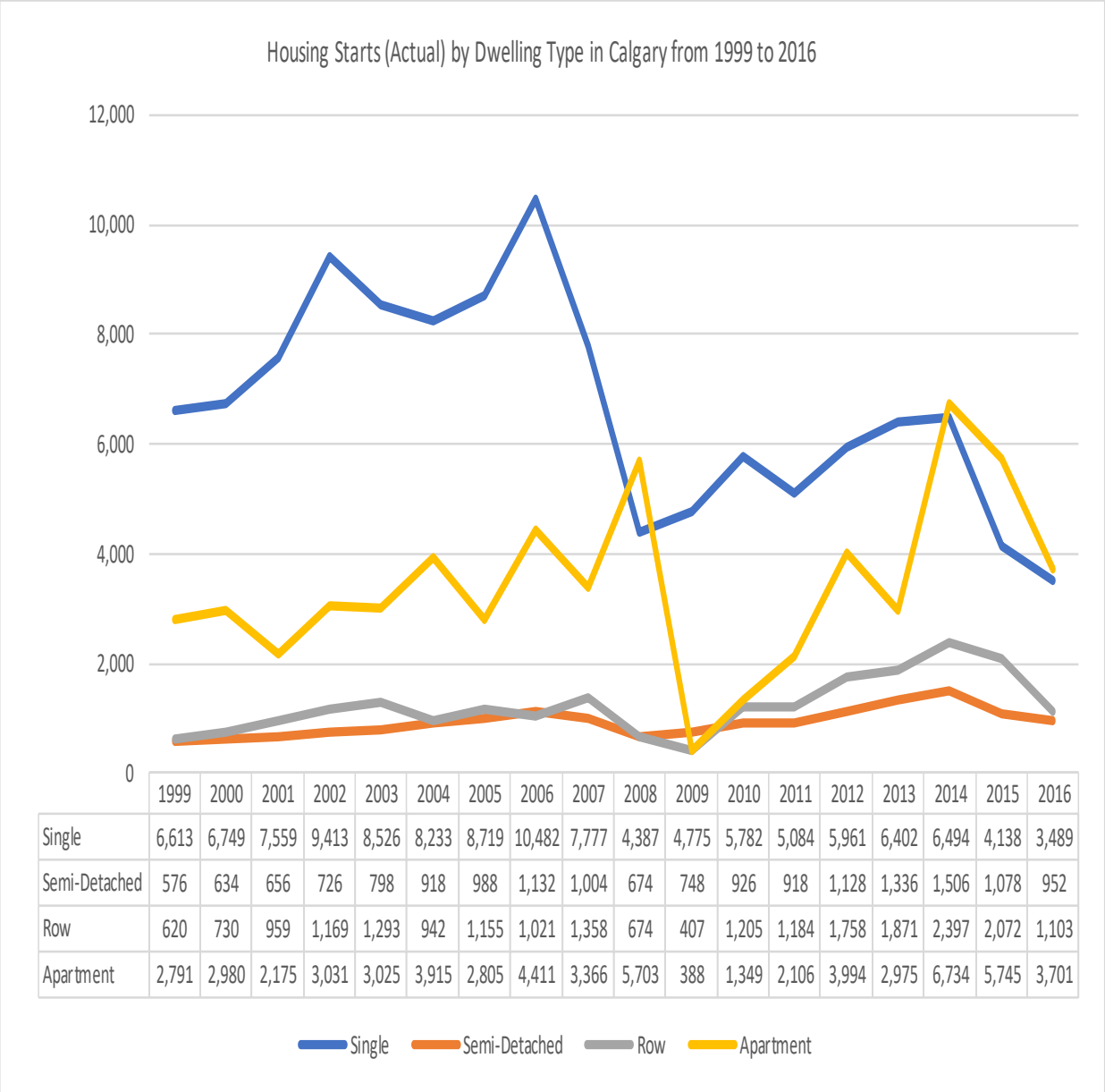


Figure 2-5: Housing Starts (Actual) by Dwelling Type in Calgary from 1999 to 2016 Created by Lucy Ramirez using data from Canada Mortgage and Housing Corporation (CMHC) 2018

Starting in 2010, Canada Mortgage and Housing Corporation (CMHC) provided geographic information on the location of housing starts. Why is this significant? From 2000 to 2005, it was reported that within Calgary, most of the population growth occurred in the suburbs, “new communities (on the outer edges of Calgary) accommodated about 113,000 people, representing 109 per cent of total net population growth as the population in established

communities declined.” (City of Calgary, 2005c, p. 7). This trend continued, “[b]etween 2006 and 2012, 96 per cent of Calgary's population growth occurred in new suburbs” (City of Calgary, 2014a, p. vi). In 2017, the City anticipated the suburbs would accommodate 78 of the expected population growth (City of Calgary, 2017a). Growth, especially rapid growth, challenges municipalities. The City of Calgary (2007) acknowledged it struggled to keep pace with growth,

“Over the past 30 years, nearly all of Calgary’s new growth has been in the suburbs. There is an increasing need to manage this growth, not merely accommodate it. We need to grow smart, to make more efficient use of our available land resources, and to design more livable, sustainable, complete communities” (City of Calgary, 2007, p. 6).

2.2.3 Social Context

The 2016 Canadian Census put Calgary’s population at 1,239,220 residents (Statistics Canada, 2017). According to 2016 census data, Calgary is Canada’s fastest growing city (Robertson, 2017). Calgary Economic Development (CED) emphasized the City has led national economic and population growth (Seskus, 2018). The Canadian census program confirms over the past twenty years, population growth in Calgary has outpaced population growth in Alberta and the country (see Figure 2-6).

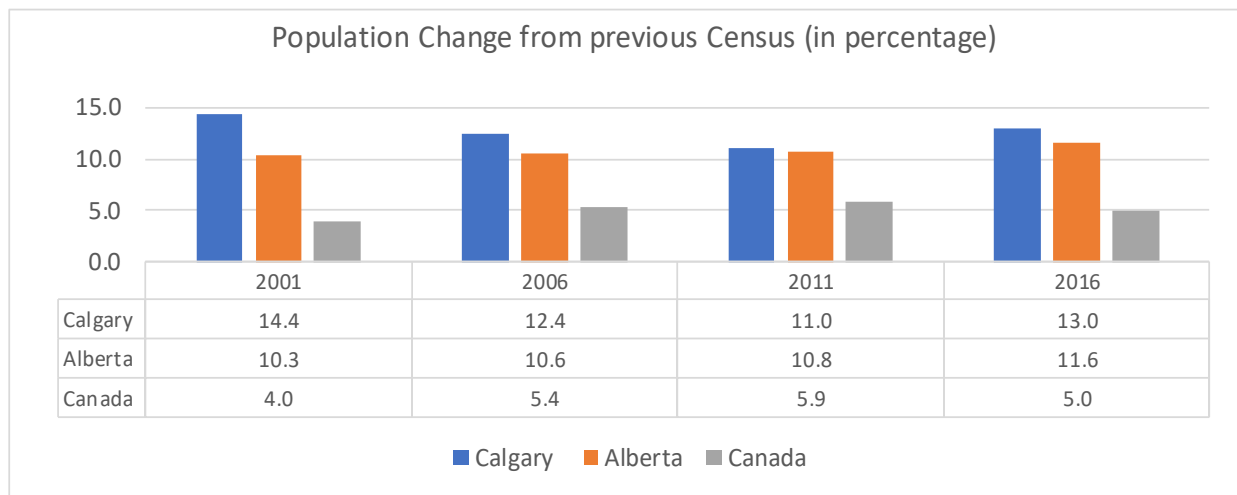


Figure 2-6: Population change in Calgary, Alberta, and Canada from 2001 to 2016 Source: Created by Lucy Ramirez using data from Statistics Canada (2009 and 2016)

In 2005, it was noted “even with more compact community development 1,500 to 1,700 acres of raw (agricultural) land per year [would] need to be developed to accommodate Calgary’s population growth” (City of Calgary, 2005a, p. 8). Calgary’s population growth as a percentage

was significant; so was the percent growth in outlying areas around the city. Worbets and Ryan (2004) reported that from 1999 to 2001, Calgary's population increased 14 percent, and outlying areas saw a 30 percent increase.

2.2.4 Political Context

The *Calgary WCP* was developed and adopted because there was strong political support for protecting wetlands in the city (Strong-Duffin, 2005). Prior to summarizing how wetlands were prioritized for protection, I will elaborate on the political context at the time. The 2001 municipal elections brought a lot change to Calgary City Council. Dave Bronconnier, who had served on Council for nine years, was elected Mayor (Pitts, 2010). Furthermore, five rookies were also elected to Council, which is made up of 14 councillors and the mayor. Seskus (2004) reported the composition of the 2001 Council "punctuated one of the biggest shake-ups Calgary city hall had seen in more than a decade" (p. B1). Bronconnier "turned city hall on its head" (Seskus, 2010, p. A2.). He redefined the mayor's office and consolidated power within it (p. A2.). Bronconnier was Calgary's Mayor for nearly a decade, he did not run for re-election in 2010 (Pitts, 2010). In October of 2010, Naheed Nenshi was elected mayor (Seskus, 2010).

In 2001, Bronconnier's mayoral campaign emphasized the need to invest in infrastructure, particularly transportation infrastructure. However, "less well known [was] his interest in natural areas, wetlands and grand parks. Bronconnier [saw] less focus on the rote provision of large open space in subdivisions and more sensitive integration into the community. And perhaps reconsideration of some of the policies and bylaws that set up the requirements" (Burgener, 2001). Bronconnier's interest in natural areas, wetlands and grand parks became evident when he proposed using a portion of the Enmax annual dividend to create three large parks on Calgary's edges (Derworiz & Thompson, 2003, p. B4).

What exactly did Mayor Bronconnier propose? He introduced a Notice of Motion (NM2003-40), entitled *Legacy Park Fund*, it was adopted as follows:

"Establishment of a 5-year, \$50 million Legacy Parks Fund; \$30 million for purchase and development of 3 new regional parks; \$20 million for purchase and development of parks within the city limits. Parks is to bring forward to Council recommendations on an acquisition strategy (through Land Committee) and implementation strategy (through the S.P.C. [standing policy committee] on Community and Protective Services), which maximize[d] public investment and impact for the 3 new regional parks. A steering

committee [was] to be established consisting of the Mayor, the Administration and up to 3 Members of Council via the S.P.C. on Community and Protective Services” (Calgary. Office of the City Clerk, 2003).

The acquisition and implementation strategies mentioned in the motion resulted in the 2003 *Enmax Legacy Parks Program*, which “...included a number of projects with both land acquisition and projects identified both ‘inside the City’ and ‘outside’ the [then] City limits. There was a very specific focus on three major regional parks, Bearspaw/Haskayne, Clearwater, and Ralph Klein Park which were identified as being in major growth or annexation areas” (Marter, 2013, p. 2). The reason I diverge into the *Legacy Park Program* is because it is an example of the political support for protecting the environment and wetlands in and around the city. Two of the regional parks have wetland habitat. One, Ralph Klein Park, now features the Shepard Wetland, the largest constructed stormwater treatment wetland in Canada (City of Calgary, n.d. C).

Some of the *Legacy Parks* were identified by Administration in the report entitled, *Land Acquisition Strategy for Natural Areas* (City of Calgary. Park Development and Operations, 2001). This report was a response to another Notice of Motion, this one from Alderman [Councillor] Hawkesworth, which directed:

“Park Development and Operations, with support from Corporate Properties Group, develop a short and long-term acquisition for natural areas to include the identification of priority lands, costs, funding alternatives, and partnerships. Further ...that Park Development and Operations prepare a 10-year growth package on natural area acquisitions for the 2002-2012 Capital Budget” (City of Calgary, Park Development and Operations, 2001).

The following year, the *Open Space Plan* (City of Calgary. Parks, 2002) was introduced. In this plan it was stated “the City ha[d] few legislative options for protecting natural features on developable private land” (City of Calgary. Parks, 2002, p. 43). Included in the *Open Space Plan* were policies on Environmental Open Space (EOP). These policies were revised because of the 2014 New Community Planning Guidebook (NCPG) (Walls, 2014). I will elaborate on this when I discuss Area Structure Plans (ASPs).

All this to highlight there was strong political support for protecting the environment and wetlands in and around the city. In the following sub-section, I will provide a summary on how wetlands did or did not factor into past Council priorities from 2001 to 2015 and into department

business plans from 2006 to 2015. This is the in-depth political context. Before I review the in-depth political context, I will briefly review the City of Calgary's move toward integrated business plans and budgets. Why? Because the multi-year business planning and budget process produces: business plans, budgets, and performance measures (City of Calgary, 2017b). In addition, accountability and corporate reports are produced.

2.2.4.1 Integrated business plans and budgets

During the 2001 to 2003 Council term, work commenced “to revamp the budget process” (Seskus, 2004). However, it was not until the next term that “Council agreed to directly link multi-year business planning to the budget process” (City of Calgary, 2005d). In March 2004, Council decided it would “...adopt a three-year operating budget [and business plans] that ‘lagged’ the Council term by one year” (Dunfield, 2009, Attachment 4 p. 2). A brief history of Calgary experience with multi-year budgeting and business planning is provided in the report entitled, *Review of the City of Calgary Planning and Budgeting Process (AC2009-04)*. When Council priorities, department's business plans and the multi-year budget were linked it allowed Council to “declare to all Calgarians and City Administration, the direction and deliverables to which Council [was] committing” (City of Calgary, 2007, p. i).

Integrated business plans and budgets were important because prior to 2006 The City had, “...business plans that were more aspirational in nature than grounded in financial reality” (Good, 2006). The first multi-year business planning and budget cycle was from 2006 to 2008. I have provided a summary of how wetlands did or did not factor into Council's priorities, from 2001 to 2015, and department business plans from 2006 until 2015 (see Table 2-1). The reason I reviewed Council priorities and how wetlands factored into them and into department business plans, is because Council ultimately directs the actions of Administration. Departments have obligations from other orders of government; however, Council and their priorities help guide work plans.

From 2002 to 2008, wetlands were generally under Council's priority of *protecting the environment*. Explicit language was used such as wetland policies, wetland strategy, and wetland conservation. After 2008, this language was not used again in Council priorities. It could be because a new *Municipal Development Plan* was adopted in 2009 and it incorporated policies on wetlands. I will elaborate on this in the legislative context section. Returning to my summary,

wetlands still fell under Council’s *sustainable environment* priority for 2009 to 2011; however, they also fit under the *community well-being* priority. The language used for Council priorities and strategies during the 2009 to 2011 cycle was wetland management and “*Protect the quality of water in our rivers and stream*” (City of Calgary, 2008b, p. 6). In 2012 to 2014, wetlands fell under the priority “*Investing in great communities and a vibrant urban fabric*” (City of Calgary, 2011b, p. 5). More specifically the priority *Protect natural/environmentally sensitive areas*, some of the actions related to this priority centred on wetland restoration. In 2015 to 2018, wetlands fell under Council’s priority of ‘*a healthy and green city*’, and under the strategic action “*Manage the interrelationship between flood protection, water quality and quantity, and land use*” (City of Calgary, 2014a, p. XIX). In the Community Services and Protective Services department business plan the action associated with this strategy was “Continue implementing the *Calgary Wetland Conservation Plan* to ensure there is no net loss of wetlands in the city” (City of Calgary 2014a, 333). In sum, initially wetlands factored under the protecting the environment Council priorities, then wetlands factored under Council priorities focused on place.

2.2.4.2 Inclusion of wetlands in Council Priorities and Business Plans from 2002 to 2018

Years	2002-2004
Council Priority and Goals	“ <i>Protecting our Environment</i> ” (City of Calgary, 2002, p. 1)
What Council wanted to achieve	<ul style="list-style-type: none"> • “<i>An assured acquisition and funding mechanism for securing and protecting our natural areas...</i>” • <i>Effective proactive wetlands policies</i>” (p. 7)
Priorities/Strategies	<i>Protecting and acquiring key natural areas and green spaces</i> (p.7)
Actions	<ul style="list-style-type: none"> • “<i>Identify potential mechanisms for acquiring and protecting high priority natural areas as funds allow</i>” • <i>Fund, complete and implement phase 2 of wetland strategy</i> [not labelled as an action, instead as how will we get there]” (p. 7).

Years	2006-2008 first multi-year business planning and budget cycle
Council Priority and Goals	<i>“Enhancing, protecting and respecting our environment”</i> (City of Calgary, 2005a, p. 3).
What Council wanted to achieve	<i>“The City’s environmental efforts, plans, program and systems are working well”</i> (p. 9).
Priorities/Strategies	<ul style="list-style-type: none"> ● Wetland Conservation <ul style="list-style-type: none"> ○ <i>“Maintain implementation of the current policy;</i> ○ <i>build and evaluate functional assessment methods;</i> ○ <i>work with the province to develop the Provincial Wetland Conservation Plan;</i> ○ <i>work on regional wetlands planning with MDs [Municipal Districts] (inventory and assessment);</i> ○ <i>pilot new wetlands reconstruction/restoration techniques (Wetlands Research);</i> ○ <i>continue with restoration and rehab projects;</i> ○ <i>do ongoing maintenance of established wetlands”</i> (CS& PS department). ○ <i>Create, protect and restore environmentally significant lands”</i> (City of Calgary, 2005d, Section E, p. E11).
Actions	<i>“Work with Province to develop provincial plan, create/reconstruct/restore regional wetlands</i> (City of Calgary, 2005a, p. 9).”
Years	2009-2011 Council committed to “incorporate applicable <i>imagineCALGARY</i> Targets in the 2009-2011 Business Planning and Budget Process” (Lewis, 2007).
Council Priority and Goals	<i>“Sustainable environment</i> (City of Calgary, 2008b, p. 2). <i>to protect, preserve and sustain our environment”</i> (p. 6). <i>Community well-being</i> (p. 2).
What Council wanted to achieve	<i>“Safeguard the environment by implementing ‘green strategies’ reducing the impact of our activities on air, water and land resources and our Ecological Footprint”</i> (p. 5). <i>“Collaborate and leverage resources with partners to foster a healthy physical and social environment”</i> (City of Calgary, 2008a, Community Services and Protective Services B6).
Priorities/Strategies	<i>“Protecting the quality of water in our rivers and stream”</i> (City of Calgary, 2008b, p. 6).
Actions	<i>“Coordinating water conservation and wetlands management within Calgary’s open spaces”</i> (City of Calgary, 2008b, p. 6). <i>“Participate in water conservation, urban forestry, natural area management and protection, wetlands [emphasis added] and pesticide management, horticulture best practices, and balancing differing public uses within open spaces [S2.3.3]”</i> (City of Calgary, 2008a, Community Services and Protective Services C4).

Years	2012-2014 New Approach to Business Plans and Budgeting’ (NABB) incorporated public engagement, sustainability, and a preliminary budget envelope.
Council Priority and Goals	“Investing in great communities and a vibrant urban fabric (Priority Area 2)” (City of Calgary, 2011b, p. 5)
What Council wanted to achieve	<ul style="list-style-type: none"> • “Waste management, watershed protection and other environmental programs. • Redevelopment and restoration of existing parks. • Implement the Municipal Development Plan” (p. 6).
Priorities/Strategies	“P8. Protect natural/environmentally sensitive areas. P11. Improve new community and established community development standards in pursuit of MDP goals” (City of Calgary, 2011c, p. 3)
Actions	“Major redevelopment projects were planned for parks, particularly Bowness Park and Laycock Park Wetland Restoration ” (City of Calgary, 2011c, p CPSC 12 [Summary of Plans and Budgets])
Years	2015-2018
Council Priority and Goals	‘a healthy and green city’ (City of Calgary, 2014a, p. 1)
What Council wanted to achieve	“We steward our air, land, and water while encouraging healthy lifestyles for all Calgarians” (p.1).
Priorities/Strategies	H3 Manage the interrelationship between flood protection, water quality and quantity, and land use” (XIX).
Actions	H.3.2 “Continue implementing the Calgary Wetland Conservation Plan to ensure there is no net loss of wetlands in the city” (p. 333).

Table 2-1: Summary of inclusion of wetlands in Council Priorities and Business Plans from 2002 to 2018

Source: Excerpts from 2002, 2005, and 2008 Council Priorities; Proposed Business Plans and Budgets 2006-2008; 2011 Our City. Our Budget. Our Future; Approved Business Plans and Budgets 2009-2011; 2014 Action Plan 2015-2018 [emphasis added]

2.2.5 Summary of Environmental, Economic, Social and Political Contexts

To summarize the context, wetlands were once a common landscape feature in the Calgary area, historical wetland loss was attributed to agriculture and contemporary wetland loss is attributed to urban land development. The City of Calgary has experienced strong economic growth and rapid population growth, managing this growth challenged the City of Calgary, especially because the suburbs accommodated most of the population growth. This placed considerable development pressure on the landscape. As a result, protecting the environment

featured among Council's priorities. Wetlands initially featured under protecting the environment priorities. There has been a shift from placing wetlands under this Council priority to placing them under Council priorities focused on place. Next, I review the legal and policy context.

2.3 Context: Legal and Policy Frameworks

The 1867 Constitution Act established the structure of government in Canada, it divided powers between the federal and provincial governments. The provinces give municipalities their powers through provincial legislation, and so municipalities are 'creature of the provinces' (East York (Borough) v. Ontario (Attorney General), 1997). In the *Spraytech v Hudson* case, the Supreme Court of Canada, an important source of judicial law, liberally interpreted municipal powers granted under provincial legislation (114957 Canada Ltée (Spraytech, Société d'arrosage) v. Hudson (Town), 2001). The case affirmed municipalities have the power to legislate in areas of concurrent provincial and federal jurisdiction (National Advanced Certificate on Local Authority Administration (NACLAA): Municipal Law I, Fall 2011). This is notable because the Supreme Court of Canada is the highest court in a hierarchical court system and the doctrine of binding precedent means all similar cases across the country must be treated in the same way (NACLAA: Municipal Law I, Fall 2011). All this to highlight, while municipalities are not recognized by the Canadian Constitution, they are an important level of government with authority. Municipal Councils are embodiments of that authority, exercised either through bylaws or resolutions. That translates to plans, both statutory and non-statutory, policy and municipal legislation. Any discussion about the planning context must begin with the provincial legislation.

2.3.1 Planning Context in Alberta and Calgary

In Alberta, municipalities are given considerable autonomy as planning authorities. Barss (2003) emphasized "the essence of the [Municipal Government] Act, other provincial policies, and ministerial statements [was] to treat municipalities as independent sectors who [were] allowed to make unilateral land use decisions of regional, provincial and national consequence with minimal outside input" (pp. x-xi).

2.3.1.1 Municipal Government Act (MGA)

In Alberta, the *Municipal Government Act (MGA)* (R.S.A. 2000 c. M 26), specifically Part 17, entitled Planning and Development, gives municipalities the responsibility to regulate development on private land. Municipalities exercise considerable independence in doing so. The 1994 *MGA*, heralded the end of the regional planning system, which was dissolved the following year (Sturgess, 2010). This regional planning system had been in place for forty years (Barss, 2003; Sturgess, 2010). Sturgess (2010) noted under the old regional system “environmental and conservation issues were almost ignored at the regional level” (p. 42). When the regional planning system was dissolved, every municipality in the province acquired the same powers, “municipalities were given control over zoning, subdivision and development decisions... (Sturgess, 2010, p. 55)”. Barss (2003) highlighted it was the cumulative effect of subdivisions that drastically altered the landscape.

Part 17 of the MGA provides the planning framework for municipalities, it lays out the requirements for statutory plans and a land use bylaw. The *MGA* requires every municipality to have a Municipal Development Plan (MDP) to address “future land use, development and transportation, relationships with municipal neighbours, provisions of municipal services and facilities...” (City of Calgary, 1998b, p. i).

I want to highlight an important definition included in the *MGA*, which is the *Environmental Reserve* (ER) definition. The *Calgary WCP* was empowered by this definition, the plan used it to define *Environmental Reserve Wetlands* (City of Calgary, 2004, p. 13). I will elaborate on this when I discuss the *Calgary WCP*, for now I want to highlight the ER definition, which is as follows:

“Environmental reserve

664(1) *Subject to section 663, a subdivision authority may require the owner of a parcel of land that is the subject of a proposed subdivision to provide part of that parcel of land as environmental reserve if it consists of*

- (a) a swamp, gully, ravine, coulee or natural drainage course,*
- (b) land that is subject to flooding or is, in the opinion of the subdivision authority, unstable, or*
- (c) a strip of land, not less than 6 metres in width, abutting the bed and shore of any lake, river, stream or other body of water for the purpose of*
 - i. preventing pollution, or*

- ii. *providing public access to and beside the bed and shore*” (Municipal Government Act, R.S.A 2000 c. M-26, s 664 (1)).

In the report entitled *Land Acquisition Strategy for Natural Areas* (City of Calgary. Park Development and Operations, 2001), there was the recognition wetlands and their shores qualified as ER. In this report, parks were identified for acquisition and prioritized as high, medium or low priority. Wetlands featured in some of these parks.

The *Environmental Reserve* definition in the *MGA* was problematic because it failed to facilitate adequate upland delineation, this was a problem also encountered in Ontario (Schulte-Hostedde et al., 2007). In Alberta, the prescribed six-meter minimum environmental reserve setbacks in the *MGA* became the default. Thus, across the province the onus was placed on municipalities to implement greater environmental setbacks, which takes considerable administrative capacity. Cuthbert and Tyler (2016) noted “[h]istorically, municipalities that have tried to do more than meet minimum development approval requirements under Alberta’s Municipal Act have invited legal and political challenges from both the private and public interests related to the loss of developable land or lack of compensation for the loss of valued ecological features” (p. 2).

The *MGA*, was recently, modernized. Both the urban and rural municipal advocacy organization advocated for a better ER definition, specifically:

“that the MGA be amended to provide greater clarity in the definition to environmental reserve including:

- a. *Adding wetlands to the list of eligible ecosystems in section 664(1) (a).*
- b. *Clarifying which classes of wetland are eligible to be designated as environmental reserves.*
- c. *Clarifying that the setback referred to in section 664(1) (c) applies to wetlands”* (Alberta NAWMP Partnership, 2016, p. 12).

The Government clarified the definition of Environmental Reserve (ER) to “assist municipalities in identifying and designating these types of reserve” (Alberta, 2017). Wetlands were not specifically mentioned, instead it clarified “ERs are used to preserve natural features of land, prevent pollution, ensure public access, and prevent the development of land that is subject to flooding or unstable” (Alberta, 2017). A municipal practitioner, a Biologist, Environmental Planner with a specialized municipality said the following:

“I knew my municipal co-workers and so many others wanted a much better definition of ER, and we did not get it. All they did was add in a conservation reserve, which really does not benefit us at all and I think hampers what we’ve been trying to do for decades” (Specialized Alberta municipality – Biologist, Environmental Planner; personal interview).

With the Modernized MGA, a new tool was introduced to help with land conservation, a conservation reserve:

“The MMGA [Modernized Municipal Government Act] introduced Conservation Reserve (CR), a new type of land dedication collected during the subdivision application process, for lands that have an environmentally significant feature that municipalities wish to conserve. Municipalities must provide compensation to developers for lands dedicated as CR, and the CR designation cannot be removed from the title, nor can the land be sold” (Alberta, 2018a).

The stumbling block municipalities will encounter with the conservation reserve is it requires municipalities to purchase of land. During the 2014 *MGA* consultation, the Environmental Law Centre (ELC) submitted a letter to the *MGA* Review Team and the Minister of Municipal Affairs with recommendations on how to empower municipalities to engage in environmental management, it recommended “the *MGA* should expand the revenue generation options available to municipalities to enable environmental stewardship and, particularly, land conservation” (Powell, 2014). This recommendation was meant to address the municipal concern of ‘responsibility without capacity’.

My research will not delve into the new tools the *Modernized MGA* provides, it is too soon to tell whether they will be effective, I have my doubts. It took over two decades to figure out how to use the previous ER definition and develop municipal policies from it. Further it resulted in “differing interpretations on the intention of an Environmental Reserve” (Alberta, 2018a). The result, ER provisions were inconsistently applied across the province. Perhaps this explains why Calgary’s updated Environment Open Space policy is “neutral with respect to the presence of ER” (Snell, 2016, p. 3). Instead, Environmental Open Spaces are inventoried and mapped consistently, “regardless of the tools available to acquire or protect the ESA (Municipal Reserve, Environmental Reserve, purchase, etc.)” (p. 3).

I have briefly reviewed the provincial legislation empowering municipal planning; next, I describe the plans in place. Before I do, I want to highlight important milestones and plans, this

helps build context. Clare (2013) identified and described “key historical events and factors (i.e., ecological, social, economic, and political) that ha[d] influenced contemporary wetland management and policy decisions in Alberta” (p. 4). I have attempted to do the same (see Figure 2-7).

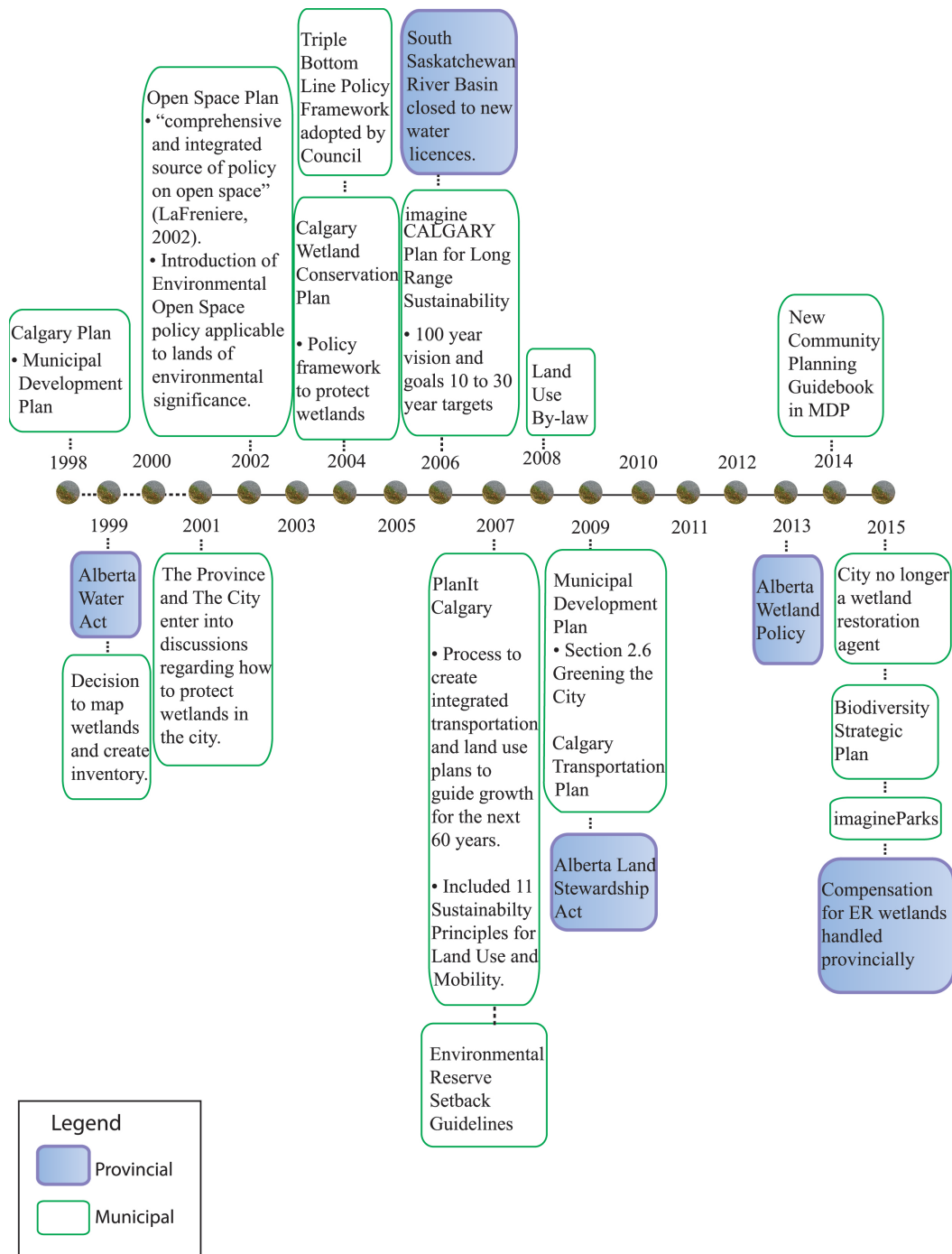


Figure 2-7: Timeline of important milestones and plans from 1999 to 2015 Source: City of Calgary documents

I have outlined the provincial legislation that gives municipalities their planning authority, as well as influential community plans, both statutory and non-statutory (see Figure 2-8). Ultimately, all this planning leads to subdivision and the development of lands. The regulatory instrument municipalities have to regulate private land is the Land Use By-law.

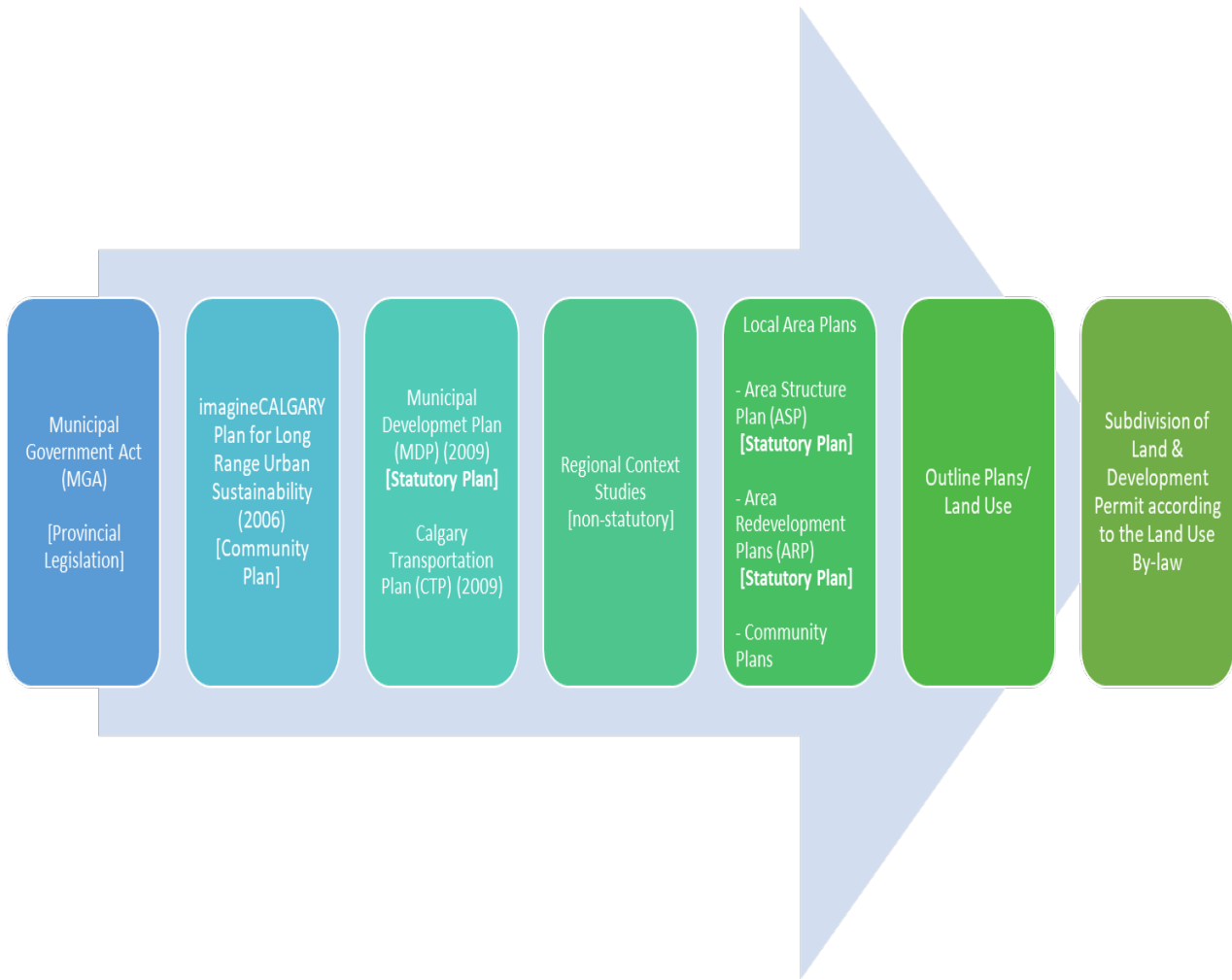


Figure 2-8: Plans and land use planning process, City of Calgary Created by Lucy Ramirez using information from the City of Calgary

I highlight the chronological order of important legislation, milestones, plans and policy (see Figure 2-7). However, I am going to start my review of the policy framework by highlighting the 2006 *imagineCALGARY Plan for Long Range Urban Sustainability*. Before I start the review I want to highlight the *Calgary WCP* predates many of Calgary’s current planning document.

2.3.1.2 imagineCALGARY Plan

The *imagineCALGARY Plan* (City of Calgary, 2013) is at the apex of the City's hierarchical systems of plans, it is a community plan, which "include[d] a long-range vision and goals...It also include[d] a series of targets" (City of Calgary, 2007, p. 18). The *imagineCALGARY Plan* contains a 100-year community vision and "...all of the 30-year targets and goals, as well as strategies for accomplishing these goals" (City of Calgary, 2011b, p. 4). The targets related to river and watershed health, and in turn to wetland management are as follows:

- "By 2036, watershed health – as measured by loss of wetlands, water quality, non-compliance with pollution standards, in-stream flow and groundwater levels – improves.
- By 2036, the number and/or size of protected or restored habitats increases to a state of health and functionality" (City of Calgary, 2007, p. 20).

The time-frame of these targets is appropriate and acknowledges realistic time-horizons.

2.3.1.3 Municipal Development Plan (MDP)

The most important statutory plan an Alberta municipality has is the *Municipal Development Plan* (MDP). Calgary's current *MDP* was adopted in 2009, it has been amended many times since then. The 2009 *MDP* replaced the previous one, entitled the *Calgary Plan* (City of Calgary, 1998b). In this section I review both of these documents.

Calgary Plan

In brief, the *Calgary Plan* (City of Calgary, 1998b) was the broad framework meant to guide development. The plan incorporated the concepts of sustainability, growth management and protecting Environmental Significant Areas (ESA). The plan was a response to a legislative requirement. As such, the *Calgary Plan* consolidated existing Council approved policies, new policies were only developed if required by the 1994 *MGA*, such was the case for policies on the dedication of reserve land. The dedication of environmental reserve was only mentioned when referring to undevelopable lands and in the definition of a floodway. Wetlands were scarcely mentioned in the City's first MDP. Seen in this context the *Calgary WCP* was quite innovative. Like the *Calgary WCP*, implementation of the *Calgary Plan* was to be via statutory plans, such as

Area Structure Plans (ASPs). When the *Calgary Plan* was adopted, concern was expressed regarding the lack of an implementation plan.

The *MGA* requires every municipalities to have a *MDP*. The *Calgary Plan* was a response to this requirement, it replaced the *General Municipal Plan* (1979). The *Calgary Plan* was the broad framework meant to “guide more detailed plans and policies” (City of Calgary, 1998b, p. 1). Sustainability principles permeate the plan, as a result environmental, social and economic objectives are included. The plan sought to manage growth, protect the environment and promote healthy communities. The integration of land use and transportation systems was a key part of managing growth. Part of the rationale behind growth management was to protect environmentally significant areas (ESA), which were defined as follows:

“A natural area which, because of its features or characteristics, is significant to Calgary from an environmental perspective, and has the potential to remain viable within an urban environment” (City of Calgary, 1998b, p. 101).

The *Calgary Plan* indicated ESAs could be protected “where feasible, through good management, land acquisition, land use policy, diversion of traffic and provision of better mobility choices which alleviate the pressure to build new river crossings” (p. 31). I will elaborate more on ESAs in the section on local area plans.

Administration started working on the *Calgary Plan* in early 1996, simply to update and consolidate, “*Council-approved strategic policy into one document*” (City of Calgary, 1998b, p. 1). New policies were only developed if required by the *MGA*, which included new requirements on to reserve land dedication. Therefore, the *Calgary Plan* contained policies meant to “address the municipal requirement for the dedication and allocation of reserve land owing as a result of the subdivision of land” (City of Calgary, 1998b, p. 4). In the *Calgary Plan* wetlands were mentioned once, in an excerpt from the *Urban Parks Master Plan*, when describing the importance of the river and creek valleys.

*“River valleys are dynamic, living systems. They are comprised of flowing waters, springs, wetlands, islands, riverbanks, ravines, escarpments, terraces and forested slopes. They change yearly with the seasons and over decades and centuries as bank erosion, flooding and channel realignment alter their courses.
... As cities like Calgary have matured, the river valleys around which they have grown have increasingly become sanctuaries from the stresses of daily life, aesthetic resources*

and areas for recreation" [emphasis added] (Urban Park Master Plan, 1994 as cited in The City of Calgary 1998, p. 26)

While wetlands were scarcely mentioned, there was a recognition that land and ecosystems needed to be protected. In Part Two entitled, *Life in the City*, there is a chapter on *Healthy Environments*, which noted "a healthy city require[d] a high standard of air and water quality, and protection of the land base and the ecosystems it support[ed]" (City of Calgary, 1998b, p. 19). The *Calgary Plan* included impressive policies on Natural Areas, Policy 2-1.4A:

"give highest priority to the protection of environmentally significant areas in the allocation of land uses" (p. 25).

This policy carried over into the new MDP (2009). However, an interviewee stated while the *MDP* notes "protection of environmental significant areas should be the highest priority in allocating land use, we do not do that" (City of Calgary – Urban Conservation Lead; personal interview).

In the past, some land use concepts in ASPs did not showed environmental significant areas. I narrowed the scope of this study by looking at the area encompassed by the *Northeast Regional Policy Plan* (City of Calgary, 2006), this area had the largest concentration of natural wetlands in Calgary. While the regional policy plan and the three ASPs flowing out of it, adopted in 2006, 2007 and 2014, included maps identifying Environmental Reserve (ER) wetlands, not all land use concepts showed ESAs. The land use concept for the *Northeast Industrial ASP* (City of Calgary. Land Use Planning and Policy: Planning, Development and Assessment, 2006a) did not shown ESA. Whereas the concept plans for the other two ASPs did, *Northeast Community 'A' ASP* (City of Calgary. Land Use Planning and Policy: Planning, Development, and Assessment, 2007b) and *Cornerstone ASP* (City of Calgary. Local Area Planning and Implementation: Planning, Development & Assessment, 2014). The former was amended in 2015. It is difficult to give ESA highest priority in land allocation if they are not shown on land use concept maps.

The *Calgary Plan* included policies stating natural areas were to be protected and integrated into urban development. Policy 2-2.2.5I was as follows:

"Endeavour to protect and integrate natural areas into both regional and neighbourhood open space systems in the design of new suburbs" (City of Calgary, 1998b, p. 48).

Like the *Calgary WCP*, implementation of the policies and objectives in the *Calgary Plan* were to be via statutory plans, such as Area Structure Plans (ASPs). The *Northeast Community 'A' ASP* integrated a wetland conservation area into the community and the *Cornerstone ASP* integrated wetlands into regional and neighbourhood open space. This is a considerable achievement, when the *Calgary WCP* was developed, no thought was given to how wetlands would be integrated into development (City of Calgary – Manager, Community Planning; personal interview). This problem was not unique to the *Calgary WCP*, it was symptomatic of the time. When the *Calgary Plan* was adopted, concern was expressed regarding implementation, specifically about the “lack of a comprehensive implementation plan and monitoring program” (City of Calgary, 1998a).

Before moving on to discuss Calgary’s current *MDP*, I want to briefly discuss the policies related to the dedication of reserve land. In part two of the plan entitled *Life in the City*, in the chapter on *Growth Strategy – Linking Land Use and Mobility* were policies on municipal reserve and school reserve (2-2.2.5). Environmental reserves were mentioned three times in the *Calgary Plan*, first when it noted undevelopable lands would be dedicated as environmental reserve (City of Calgary, 1998b, p. 24). Second, when section 666 of the *MGA* was discussed, which deals with municipal and school reserves. Stewart (2008) explained section 666 well, basically “environmental reserve and PUL [Public Utility Lots] dedications are deducted from the total acreage in [a] subdivision proposal area before the 10 % [municipal and school reserve] is calculated” (p. 158). The third instance when ER was mentioned was in the floodway definition:

*“The river channel and adjoining lands would provide a pathway for flood waters in the event of a flood of a magnitude likely to occur once in one hundred years. This land is dedicated as **environmental reserve** when subdivision over .8 hectares (2 acres) occurs. Refer to the Land Use Bylaw 2P80 for the legal definition”* [emphasis added] (City of Calgary, 1998b, p. 101).

The reason I elaborate on the inclusion of environmental reserves in Calgary’s 1998 *MDP* is because the *Calgary WCP* (2004) is empowered by the *MGA*’s ER definition. After reviewing the *Calgary Plan*, it is evident the *Calgary WCP* used the ER definition in a novel way.

Municipal Development Plan (2009)

In brief, the next iteration of the *MDP* carried over policies from the *Calgary Plan* (1998) and included impressive policies aimed at incorporating green infrastructure into Calgary’s urban

form, there were also policies informed by landscape ecology. Calgary’s current land use plan, *Municipal Development Plan (MDP)*, is integrated with its transportation plan, the process used to create these integrated plans was called *PlanIt Calgary*. The integration of land use and transportation planning dates back to 1995 and the *Sustainable Suburbs Study (SSS)*, which Damianil (2008) asserted, “was a pivotal document in the history of land use planning in Calgary” (p. 3). The current *Municipal Development Plan (MDP)* and *Calgary Transportation Plan (CTP)* “describe the policies that will shape the urban form of Calgary over the next 30 to 60 years...Their purpose [was] to integrate social, economic and environmental objectives into decision making processes”. (City of Calgary, 2014a, p. xi). The *MDP* has seven fundamental goals, the one I want to highlight is *Greening the City*.

The stated goal of the *Greening the City* policy is to “conserve, protect and restore the natural environment” (City of Calgary, 2014b, p. 2-39). The greening the city policy details six environmental objectives (see Table 2-2).

Sub-section		Environmental Objective
2.6.1	Green infrastructure	Connect green infrastructure throughout the urban fabric.
2.6.2	Land	Minimize the amount of land that is taken from undeveloped areas and placed in permanent use for residential, commercial, industrial, transportation or utility corridors.
2.6.3	Water	Protect, conserve and enhance water quality and quantity by creating a land use and transportation framework that protects the watershed.
2.6.4	Ecological networks	Maintain biodiversity and landscape diversity, integrating and connecting ecological networks throughout the city.
2.6.5	Energy	Reduce the demand for non-renewable energy resources.
2.6.6	Waste	Support The City’s goals for waste reduction” (City of Calgary, 2014b, pp. 2-39 to 2-55)

Table 2-2: Environmental objective of sub-sections of Greening the City policy Source:(City of Calgary, 2014b, pp. 2-39 to 2-55)

The greening the city objectives I want to emphasize are: 2.6.1 Green infrastructure and 2.6.4 Ecological Networks. The green infrastructure objective aims to have “...an interconnected network of natural green and engineered green elements that provide ecological services (e.g., water filtration, air filtration and food production) in urban environments” (City of Calgary, 2014b, p. 2-40). Wetlands and riparian areas are included in the natural green elements.

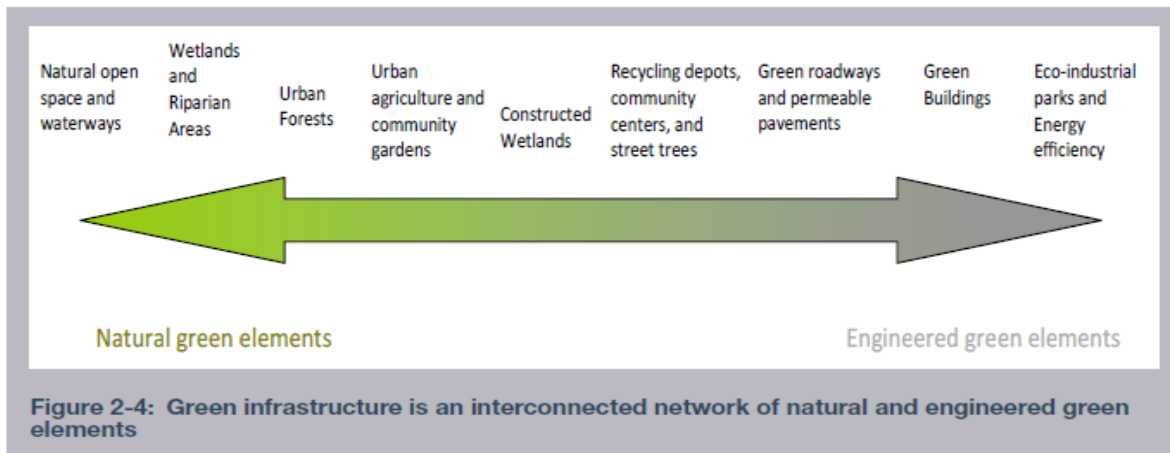


Figure 2-9: Green Infrastructure figure from Calgary Municipal Development Plan Source: (City of Calgary, 2014b, p. 2-41, one 108 images of images or figures)

The objective of the ecological networks policy is “*Maintain biodiversity and landscape diversity, integrating and connective ecological networks throughout the city*” (City of Calgary, 2014b, p. 2-46). The *MDP* describes an ecological network as “...a network of natural areas and open space providing the conditions necessary for ecosystems and species populations to survive in a human-dominated landscape” (p. 2-46). The ecological network policy is rooted in landscape ecology concepts.

Ecology is the study of the “interactions among organism and their environment” (Dramstad, Olson, & Forman, 1996, p. 12). Landscape ecology is defined as “...the ecology of large heterogeneous areas, of landscapes of regions, of portions thereof, or simply of land mosaics...” (p. 11). Landscape ecology focuses on three characteristics: (1) structure, (2) functioning, and (3) change. The landscape structure consists of patches, corridors and the matrix (Dramstad, Olson, & Forman, 1996). The City of Calgary uses these spatial patterns in their Open Space Typology (City of Calgary, 2014b, p. 2-47). Wetlands are identified as a natural patch and linear wetland complexes are identified as corridors in the open space typology. Dramstad, Olson and Forman (1996) advocated for the application of landscape ecology across various scales to maximize ecological integrity and minimize land degradation.

Two ecological protection policies I want to highlight are 2.6.4 a and b:

- a) “*Give the highest priority to the protection of environmentally-significant areas in the allocation of land use.*”
- b) “*Protect biodiversity within river valleys, ravines, coulees and wetlands*” (City of Calgary, 2014b, p. 2-47).

The reason I highlight these policies is because the first (2.6.4a) is a carry over from the *Calgary Plan* (City of Calgary, 1998b) and the second is an example of how ESAs and wetlands are more prominent in the 2009 *MDP*. The definition of ESA included in the 2009 *MDP* is as follows:

“Environmentally Significant Area (ESA) A natural area site that has been inventoried prior to potential development and which, because of its features or characteristics, is significant to Calgary from an environmental perspective and has the potential to remain viable in an urban environment. A site is listed as an Environmentally Significant Area on the basis of meeting one or all of the criteria listed in Appendix C of The City of Calgary Parks’ Open Space Plan” (City of Calgary, 2014b, p. 6-5).

The *MDP* provides the broad framework for development, local area plans are where planning for specific areas is done.

2.3.1.4 Local Area Plans

A local area plan (LAP) is “a generic term used to describe a range of plans for communities, neighbourhoods and other geographic areas. Examples of local area plans include area structure plans, area redevelopment plans, regional context studies and other forms of local community plans” (City of Calgary, n.d. A). These plans can be statutory or non-statutory. Recall the *MGA* sets out requirements for statutory plans, they “must follow the procedures outlined in the Municipal Government Act...Non-statutory plans provide policy guidance and are not legally binding” (City of Calgary, n.d. A).

There are several regional policy plans and regional context studies, some were worked on when the *Calgary WCP* was being developed, others were developed after Council adopted the *Calgary WCP*. The regional plans and/or context studies refer to wetland protection and the *Calgary WCP*.

Regional Policy Plans and/or Regional Context Studies

The City’s Planning and Development online resource library lists eight regional policy plans and/or context studies, below I have ordered them chronologically.

1. Southeast Planning Area Regional Policy Plan
(City of Calgary. Land Use Planning and Policy: Planning, Development and Assessment, 2004)

2. Northeast Residual Area Policy Plan
(City of Calgary. Land Use Planning and Policy: Planning, Development and Assessment, 2005)
3. Southwest Regional Policy Plan
(City of Calgary. Land Use Planning and Policy: Planning, Development and Assessment. (2006b)
4. Northeast Regional Policy Plan
(City of Calgary, 2006)
5. South Macleod Trail Regional Policy Plan
(City of Calgary. Land Use Planning and Policy: Planning, Development and Assessment, 2007a)
6. East Regional Context Study
(City of Calgary Land Use Planning and Policy: Planning, Development and Assessment, 2009)
7. West Regional Context Study
(City of Calgary Land Use Planning and Policy: Planning, Development and Assessment, 2010a)
8. North Regional Context Study (City of Calgary Land Use Planning and Policy; Planning, Development and Assessment, 2010b)

The regional policy plans and context studies are introduced here; I will return to the *Northeast Regional Policy Plan* (City of Calgary, 2006) in chapter three when I review the implementation of *Calgary WCP*.

The regional plans noted above are long range planning documents, they are the comprehensive policy framework that coordinates the more detailed community plans, which are know as Area Structure Plans (ASP) (City of Calgary. Land Use Planning and Policy: Planning, Development and Assessment, 2004). Regional policy plans and/or context studies are not statutory plans, their purpose is as follows:

“Regional Policy Plans [were] intended to provide a level of strategic planning between the Calgary Plan[MDP], area structure plans and community plans. They identif[ied] key land use and transportation components and establish[ed] the sequencing of subsequent area structure plan or community plan preparation” (City of Calgary. Land Use Planning and Policy: Planning, Development and Assessment, 2009, p. 3).

In reviewing the regional policy plans and context studies, the following reoccurring themes emerged:

- The conservation of environmentally significant areas and wetlands was to be “refined through the ASP preparation process and at the Outline Plan/Land Use Amendment

application stage” (City of Calgary Land Use Planning and Policy: Planning, Development and Assessment, 2006b, p. 31).

- The plans highlight the need to ensure natural wetlands were sustainable within an urban landscape. Often the regional plans indicated, “The Master Stormwater Drainage Plan should address the stormwater engineering solutions to be introduced to ensure the sustainability of natural wetlands that are to be conserved” (p. 32).

The regional plans assume the only way to ensure the viability of wetlands in an urban environment is by diverting stormwater to them. Before diverting stormwater into a natural wetland, a Biophysical Impact Assessment is required:

“Prior to the approval...of any new master drainage plans that incorporate storage and existing wetland, a Biophysical Impact Assessment shall be conducted by the developer, in consultation with Parks, to determine if the following conditions apply, which would allow for clean water to be accepted into an environmental reserve from a PUL [Public Utility Lot]:

- a. The water is needed to maintain the predevelopment character of the environmental reserve; and*
- b. The water will not cause any unacceptable environmental change to the natural area” (City of Calgary. Parks, 2002, p. 59).*

Ryan (2015) provided a good summary of the engineering solutions needed to maintain the sustainability of natural wetlands:

“...since wetlands have natural fluctuations of water level, which tend to be seasonal rather than episodic, maintaining a relatively natural water level fluctuation is critical to the survival of the ecological function of the wetlands. The end result is that urban stormwater management should include forebays that slowly release water to the natural wetland and that constructed/engineered wetlands should be separate from natural wetlands, except to maintain the natural water levels of the natural wetlands” (p. 128).

Environmentally Significant Areas (ESA)

Before I move on to discuss Area Structure Plans (ASPs), I want to return to a definition which was referred to in the 1998 *Calgary Plan*, the 2009 *MDP*, and is referred to in local area plans, Environmentally Significant Area (ESA). The *Calgary Plan* defined ESA as follows:

“A natural area which, because of its features or characteristics, is significant to Calgary from an environmental perspective, and has the potential to remain viable within an urban environment” (City of Calgary, 1998b, p. 101)

The same definition is used in the regional plans and/or regional context statement; however, it is elaborated on in the *Northeast Regional Policy Plan* (City of Calgary, 2006):

The significance of a natural area is determined by a combination of the following criteria:

- *quality of biotic habitat,*
- *level of importance to the healthy maintenance of the human system,*
- *level of importance to the healthy maintenance of the natural system,*
- *presence of distinctive and/or unusual landform,*
- *limited representation within the area or city” (p. 7).*

The reason it was important this plan elaborated on the ESA definition, was because wetlands were abundant in this area, it had “the greatest concentration of natural wetlands within the City of Calgary” (City of Calgary, 2006, p. 11). And not all ESAs are protected.

To be protected, ESAs must be inventoried prior to development, (City of Calgary Parks, 2002). The *Northeast Regional Policy Plan* (City of Calgary, 2006), notes “Environmentally Significant Areas (ESA) are not automatically acquired and/or protected from urban development, but rather subject to review and decision making at the Outline Plan and Land Use Amendment stage” (p. 11). The *Open Space Plan* (City of Calgary. Parks, 2002), noted historically ESA were protected when:

- *“a coincidental overlap between undevelopable land (i.e. Environmental Reserve) and the natural habitat occurred;*
- *the area could be designated as Municipal Reserve; or*
- *the City could protect the area through outright purchase” (p. 43).*

Further, the *Open Space Plan* (City of Calgary. Parks, 2002) noted, “the City ha[d] few legislative options for protecting natural features on developable private land” (p. 43). Enter the *Calgary WCP*, which was to be implement through ASPs.

Environmental Significant Areas (ESAs) are consistently identified in ASPs; however, the terms to describe ESA has varied. In his report to Standing Policy Committee on Planning and Urban Development, Tim Walls (2014) highlighted:

“Historically, Parks has identified (mapped) areas of environmental significance, along with associated policy direction, in Council-approved Area Structure Plans (ASP). These areas have been mapped on the ASP Land Use Map, as well as a stand-alone map further distinguishing the areas (e.g., wetland, ravine, escarpment, etc.). Policy accompanies the

mapped areas to give direction on how to conserve or direct development in these areas. Although Parks has been consistent in identifying and providing policy direction for lands of environmental significance, the use of terminology that identified these areas has been inconsistent. For example, areas have been given terms Environmentally Significant Area, Wetlands Area, Escarpments, Open Space, etc.” (pp. 1-2)

The reason this was problematic was because “MDP policy require[d] that the highest priority be given “to the protection of environmentally-significant areas in the allocation of land use” (2.6.4(a))” (Walls, 2014, pp. 1-2).

Walls (2014) gave an overview of the process used to determine which areas are environmentally significant, essentially it entails technical guidelines such as the Biophysical Impact Assessment Framework:

“A subject matter expert such as a biologist or hydrologist follows the technical guidelines to determine which lands have conservation value. These lands are then identified on the land use map in the ASP” (Walls, 2015, p. 3).

It was highlighted “[t]he requirement for Biophysical Impact Assessments (BIA) has been in place since early 1990’s as a requirement of the Calgary Municipal Development Plan” (City of Calgary. Parks, Urban Development Institute - Calgary, 2010, p. 1). In the *Calgary Plan* (City of Calgary, 1998b), environmental impact assessments are referred to in the section entitled, *Life in the City: Healthy Environments*, Policy 2.1H was as follows: “undertake environmental impact assessments when transportation corridors or river crossings are proposed within the river valleys system” (p. 20). This was a narrow application of environmental impact assessments.

The *Open Space Plan* (City of Calgary. Parks, 2002) incorporated processes for when to do an ESA assessment and biophysical impact assessment. If a wetland was identified as environmentally significant then an BIA was to be done prior to the OP stage. This is an example of how the *Environmental Protection and Enhancement Act* is a piece of legislation used to implement wetland policy because its “regulations cover a wide range of activities relevant to wetlands, including environmental assessment, reclamation, conservation easements, wastewater and storm drainage, and substance release” (Alberta NAWMP Partnership, 2016, p. 11). Of note, the *Open Space Plan* (City of Calgary. Parks, 2002) also included appendices on Identifying and Delineating a Wetland and a Wetland Evaluation and Development Assessment (pp. 86-89).

Area Structure Plans (ASPs)

This section reviews, the *MGA* requirements for ASPs, how Calgary describes ASPs, and how the development of ASP changed with the adoption of the New Community Planning Guidebook (NCPG). Because of the guidebook, Council directed Administration to amend the Environmental Open Space (EOS) policy to add clarity and consistency. Administration responded to Council's direction with the Environmental Open Space Work Plan, which included the *Ecological Inventory Framework: Area Structure Plans* (City of Calgary, 2016). The reason these developments are important is because the *Calgary WCP* foresaw implementation at the ASP and OP planning stage. Also, the EOS Work Plan was meant to address the implementation gap between policies and reality.

ASPs are detailed community plans and must comply with the procedures outlined in the *MGA*, which are as follows:

“Areas Structure Plans

633(1) For the purpose of providing a framework for subsequent subdivision and development of an area of land, a council may by bylaw adopt an area structure plan.

(2) An area structure plan

(a) must describe

- (i) the sequence of development proposed for the area,*
- (ii) the land uses proposed for the area, either generally or with respect to specific parts of the area,*
- (iii) the density of population proposed for the area either generally or with respect to specific parts of the area, and*
- (iv) the general location of major transportation routes and public utilities, and*

(b) may contain any other matters the council considers necessary” (Municipal Government Act, R.S.A, 2000 c. M-26, s 663 (1)and (2)).

Staff at the City of Calgary describes ASPs as follows:

“long term, strategic policy documents for new communities that refine and implement The City's broader planning objectives, policies and growth strategies for logical planning cells. Area Structure Plans provide direction to Administration, landowners, developers, builders and citizens about how a new community will develop over time. Once an Areas Structure Plan is approved, detailed applications for outline plans/land use amendments may proceed, followed sequentially by subdivision, development permit applications and building permit applications” (Chan, 2013, p. 3).

The reason ASPs are important to this research was because the *Calgary WCP* anticipated implementation would occur through municipal plans such as ASPs or OPs. It is at this stage where broad policies are adapted to the local context of the ASP area. Cuthbert and Tyler (2016) highlighted ASPs are “the largest unit of municipal development planning, [and] landscape systems are routinely restructured and replaced by municipal infrastructure to create drainage and conveyance systems which ‘mimic’ some of the specific landscape processes lost in the development process” (p. 5). In summary, urban land development often replaces natural landscape features and their functions with man made features.

In 2014, the City of Calgary altered the process whereby ASPs were prepared. In the past, ASPs were prepared in house, “by a cross corporate team of policy planners, parks planners, transportation engineers, water services engineers, and representatives from Fire, Corporate Properties & Buildings and other business units as required” (Chan, 2013, p. 17). Depending on the size and complexity, it could take upwards of two years to develop an ASP. In December 2012, Council directed Administration to:

“investigate developer-funded Area Structure Plans (the “Pilot Project”). This decision was intended to investigate providing more ASPs (Area Structure Plans) in a shorter timeframe” (Chan, 2013, p. 1).

In 2013, Council directed Administration to amend the *MDP* to include a New Community Planning Guidebook (NCPG). In 2014, the City adopted the NCPG to “provide the core policies necessary for a condensed format of Area Structure Plan (ASP)... The NCPG contains policy that is applied in conjunction with the policies of new ASP’s. It provides the basic building blocks for neighbourhood development” (Galoska, 2015, p. 1). After the adoption of the NCPG, ASPs were to provide “supplemental policies required in a particular plan area” (Calgary Planning Commission, 2014).

Administration was directed to bring back amendments to the NCPG “on an ongoing basis, as required, in accordance with the Land Use Planning and Policy recommendations” (City of Calgary. Office of the City Clerk, 2014a, pp. 30-31). However, when the NCPG was adopted, Council specifically asked that amendments be brought back to clarify policies around environmental open space (pp. 30-31). Specifically, Council directed Administration “to review and clarify Environmental Open Space Policies and refine relevant technical components in

consultation with stakeholders” (Walls, 2014, p. 1). Refinements to the technical components was meant to address inconsistent implementation. Administration was also directed “to seek clarity on understanding the application of environmental reserve (as per the Municipal Government Act)” (Galoska, 2015, p. 1).

Before turning my attention to OPs, the “initial stage in a major subdivision application that conforms to the area’s ASP or ARP [Area Redevelopment Plan]” (City of Calgary, 2016), a brief overview of the *Open Space Plan* (City of Calgary. Parks, 2002) is required. This research has already referred to this plan so a brief overview of the plan is timely.

Environmental Open Space policies originate from the Open Space Plan (2002)

In brief, the *Open Space Plan* (City of Calgary. Parks, 2002) included general policies and policies for the following: River valley systems; Natural environment parks and environmentally significant areas (ESAs); and Urban forest. Not all-natural environment parks are classified as ESAs, to classify an area as environmentally significant, assessments are needed. Natural environment parks were meant to “conserve dominant natural elements that enhance[d] the character, appearance and health of the city” (City of Calgary. Parks, 2002, p. 43). Natural elements included: escarpments, creek and river valleys, and wetland complexes. The *Open Space Plan* established different typologies, the Alternative Use Open Space and Environmental Open Space policies are of interest to this research.

In this plan, stormwater management features were included in the Alternative Use Open Space land use policies and wetlands feature in this subsection. I’ve highlighted a few policies below to foreshadow the conversations the City and the Province had after the adoption of the *Calgary WCP*, I will elaborate more on this in chapter three:

- “28. Existing wetlands that qualify for ESA status may have limited suitability for dual use in stormwater management. Such sites will be managed for habitat protection and long-term sustainability.
29. Retrofitting for engineered stormwater wetlands will be supported in Major Natural Environment Parks where the wetlands can be integrated into an existing natural drainage course with minimal disturbance to the quality of the natural system.
30. Engineered stormwater wetlands in ERs will be supported if they can function as part of the natural drainage system of the reserve and can be designed and managed to function in a natural manner” (City of Calgary. Parks, 2002, p. 60).

The Open Space Plan introduced the Environmental Open Space (EOS) policy, which “guides planning decisions for lands of conservation value” (Walls, 2015, p. 2). Wall (2014) provides a good summary of the EOS policy:

“Environmental Open Space (EOS) was introduced as policy in the Council-approved Open Space Plan (CPS2002-42). EOS provides policy direction for lands that have been inventoried and are considered to be environmentally significant [ecologically, historically, and related recreational significance]. The Council-adopted Municipal Development Plan (MDP) directs Administration to, “give the highest priority to the protection of environmentally-significant areas in the allocation of land use”. Council further adopted EOS as policy into the MDP New Community Planning Guidebook in 2014. In 2014 February, Council directed Administration to clarify EOS policies in consultation with stakeholders” (p. 1).

The EOS Work Plan was a result of the Council direction. Snell (2016) gave a good overview of the work program, which consisted of four interrelated projects:

1. *“Amend EOS policy contained within the Municipal Development Plan, New Community Planning Guidebook (CPC2015-219);*
2. *Develop a document that provides a technical framework for determining what lands qualify for direction under the EOS policy at the Area Structure Plan stage;*
3. *Clarify the terminology relevant to Environmental Reserve in the Municipal Government Act; and*
4. *Standardize how ESAs are depicted on Area Structure Plan maps” (p. 5).*

Because of this work program a new definition of Open Space Network was included in the MDP and wetlands were specifically mentioned as a feature included in the definition:

*“**Open space network:** Comprises current and future land and water areas offering public access. These areas may include features such as wetlands, sports fields, grasslands, plazas, cemeteries, neighbourhood parks, utility corridors and stormwater management facilities. The network is composed of three open space categories: Recreational Open Space (ROS), Environmental Open Space (EOS) and Alternative Use Open Space (AUOS)” (Galoska, 2015, p. 8).*

In summary, policy is not static, it evolves. Calgary’s MDP is a living document that is routinely amended. Over time, wetlands have featured less prominently in Council priorities; however, wetlands feature more prominently in the City’s planning documents such as the MDP, regional plans and Area Structure Plans. I will now turn my attention to the next level of detailed planning.

Outline Plans (OPs)

The Outline Plan (OP) is a non-statutory site plan that identifies land uses, open space and road networks (City of Calgary, 2015). It is the “initial stage in a major subdivision application that conforms to the area’s ASP or ARP” (City of Calgary, 2016). The Calgary Planning Commission approves OPs. To implement an OP, the default land use designation given to undeveloped land must be changed, the change is made via a land use redesignation such as a Land Use Bylaw Amendment Application, Council approves these applications (City of Calgary, 2015). Often, the OP and the Land Use Amendment Application are processed concurrently, or the amendment can be processed separately.

When land use, outline plan and road closures (LOC) applications are active, information is readily available to the public through the *Engage* portal. To access information on completed LOC applications there are fees and a process associated with accessing information stored offsite. Therefore, it is difficult to access past OPs for research purposes. The Planning Commission, which approves OPs, only has the last year’s agenda packages and minutes on their website. However, Administration’s reports to the Commission can be requested if they are not listed on the website.

Outline Plans are important because it is at the OP stage when decisions are made on whether lands should be:

1. “Protected;
2. Integrated/modified to advance goals of the ‘green network’ policies in the ASP;
or
3. Lost to development” (Walls, 2015, p. 3).

These decisions are based on the information the applicant provides as part of their proposal, which includes:

“overall open space plan, BIA and/or Environmental Significances Assessment, Environmental Reserve, Municipal Reserve, Municipal School Reserves, Stormwater Ponds (Dry Ponds, Wet Ponds, and Engineered Wetlands), Landscape Concepts Plans for MR Sites and ER Sites, and Pathways” (City of Calgary. Parks, 2002, p. 72).

The Biophysical Impact Assessment Framework (City of Calgary. Parks & Urban Development Institute - Calgary, 2010) guides assessments at the OP stage. A requirement of the

framework is a Biophysical Impact Assessment (BIA) report (City of Calgary, 2016). A part of the BIA report is a wetland functional assessment, to address:

“wetland mitigation where there are impacts requiring compensation. The assessment [is] used as a means of evaluating the roles and benefits of the wetland on the basis of its ecological, hydrological and socio-economic functions. These functions...provide a basis for determining appropriate mitigation” (City of Calgary. Parks & Urban Development Institute - Calgary, 2010, p. Appendix 2).

It is at the OP stage where mitigation occurred if wetlands could not be avoided or impacts could not be minimized. However, even when OPs identified wetlands for protection, they could still be removed if they were not viable post urban development. In the OPs flowing out of the Northeast Industrial ASP (LOC 2008-0089 and LOC 2008-0090), it states the following:

A wetland has been protected if the integrity of the wetland can be maintained. If the integrity of the wetland can not be maintained due to lack of sustainable water, bird/airport mitigation measures, or the sole functioning of a storm pond, then voluntary compensation will be provided to The City” (Calgary Planning Commission, 2007c, p. 7 Attachment 3).

Policy 2.2.10 of the *Calgary WCP* set out the mitigation process as follows:

“2.2.10 Once all avenues of avoidance and minimization of development impact have been explored by a proponent of development, and an appropriate level of disturbance has been authorized by the approving authority at the Community Plan stage, mitigation by the proponent for the impact on the wetland will adhere to the “No Net Loss” principle of the Wetland Conservation Plan and shall include one, or all of the following options in order of priority:

Priority 1 - Restoration of wetlands that have been disturbed;

Priority 2 - Enhancement of wetlands within the same watershed of the Outline Plan area;

Priority 3 - Creation of wetlands within the same watershed of the Outline Plan area;

Priority 4 - Compensation Banking for the enhancement or creation of wetlands within the same watershed, outside the Outline Plan area;

Priority 5 - Enhancement of wetlands outside the watershed, within the Outline Plan area;

Priority 6 - Creation of wetlands outside the watershed, within the Outline Plan area;

Priority 7 - Compensation Banking for the enhancement or creation of wetlands outside the watershed, and outside of the Outline Plan area, located within the Corporate Limits of the City of Calgary” (City of Calgary, 2004, p. 19).

Manderson (2008) authored a reported entitled, Wetland Compensation Update (UE2008-09) that when adopted by Council added two additional priorities to the wetland mitigation framework (policy 2.2.10)

“Priority 8 – Compensation Banking for the enhancement or creation of wetlands outside the Corporate Limits of the City of Calgary, within a watershed local to Calgary

Priority 9 – Compensation Banking for the enhancement or creation of wetlands outside the Corporate Limits of the City of Calgary, outside of a Calgary watershed (Attachment 1 p. 1).

Further, the policy amendment maintained

Note: Consideration of compensation sites outside of the City of Calgary will only be considered when all feasible options have been evaluated and in partnership with a Land Trust or Conservation Agency to facilitate acquisition and long-term management of the site. (Attachment 1 p. 1)

These amendments are what enabled pilot projects outside of Calgary’s boundaries to occur. I will elaborate on the outcomes of the *Calgary WCP* in chapter three; however, I will note in general wetlands were not avoided and despite a mitigation process with multiple priorities, compensation became a routine practice.

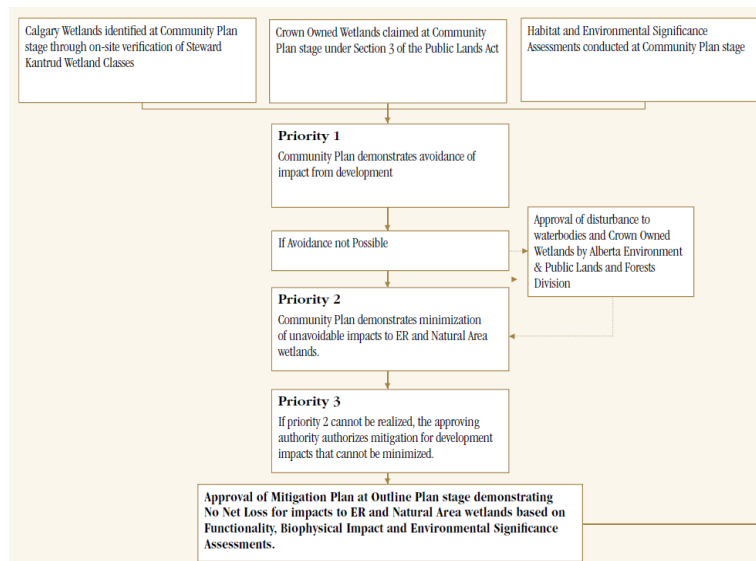


Figure 2-10: Summary of mitigation process from Calgary WCP Source: (City of Calgary, 2004, p. 24, one of 43 images or figures)

The planning process ultimately leads to the subdivision of land. Barss (2003) noted “where municipalities may be most effective in protecting the environment is influencing the design and form of a subdivision in a way that maximized compatibly with the current landscape” (p. xvii). Further, he observed “using the land use bylaw municipalities [could] require environmental assessments, dictate the size of riparian areas, select environmental reserves and preserve wildlife corridors” (p. xvii). In summary, land use by-laws can be powerful tools used to protect the environment.

2.3.1.5 Land Use By-Law (Zoning By-law)

Every municipality must have a Land Use Bylaw (LUB) and it “may prohibit or regulate and control the use and development of land and buildings in a municipality (Municipal Government Act, Revised Statutes of Alberta, 2000 c. M-26, S 640 (1)). Stewart (2008) argued municipalities have the statutory authority to enact municipal water management by-laws and land use bylaw regulation to protect wetlands and riparian lands from urban land development. Whether or not municipalities know how to exercise their statutory authority is another matter.

Stewart (2008) researched land use bylaw tools to protect wetlands and riparian lands from the impact of development. She then reviewed the land use bylaws of nine Alberta municipalities, looking specifically for reference to natural area land use districts, building development setbacks, and environmental reserve policies. Calgary was one of the municipalities she researched. Stewart (2018) found “policies in Calgary’s Wetland Conservation Plan correlate[d] to the Urban Nature Special Purpose Land Use District” (p. 185). However, these policies generally only applied to municipal owned land. She concluded, “Calgary employ[ed] a variety of municipal tools to protect wetlands and riparian lands from the impacts of development, but few in the land use bylaw” (p. 185). Further, “there [were] huge gaps in Calgary’s LUB for regulating the land use and development of wetlands and riparian lands” (Stewart, 2008, p. 186). The implementation gap is a reoccurring theme.

2.3.1.6 Summary of Planning Context

In summary, municipalities are creatures of the provinces, and the Province sets out the municipal planning framework. The City of Calgary has a system of plans that guide development. The *ImagineCalgary* community plan, adopted in 2006, contains the long term

vision and target for river and watershed health, and in turn for wetland management. The Municipal Development Plans, both the 1998 and 2009 MDPs, note the highest priority in the allocation of land use should be protection of environmentally significant areas (City of Calgary, 1998b, p. 25; City of Calgary, 2014b, p. 2-47). The *Calgary Plan* scarcely mentioned wetlands; however, they were more prominent in the subsequent *MDP*. Wetland protection was discussed in regional policy plans and/or context studies. While regional plans and studies contained policies for the protection of ESAs and wetlands, it was anticipated that the conservation of ESAs and wetlands was to be refined when ASPs were prepared and at the OP/Land Use Amendment application stage. Master drainage plans are a requirement of the ASP process and emphasized natural wetlands needed to be considered during their preparation to ensure conserved wetlands remained viable in the urban landscape.

Municipal policies aimed at protecting wetlands and riparian areas reflect provincial policies. Therefore, to understand municipal policies, it is necessary to develop an understanding of provincial policies. This brings me to a discussion of water legislation and wetland policy.

2.3.2 Wetland Management

Wetlands fall under provincial jurisdiction except in cases where wetlands are located on federal lands or in Canada's northern territories, which is approximately 29 percent of wetlands in Canada (Rubec & Hanson, 2009, p. 3). Rubec and Hanson (2009) outlined the development of wetland conservation and management in Canada; the authors included a summary of the federal and provincial legislative frameworks. In Alberta, legislation used to implement wetland policy includes: the *Water Act*, *Public Lands Act*, and the *Environmental Protection and Enhancement Act* (Alberta NAWMP Partnership, 2016). In Alberta, "wetlands cannot be altered without approval because the water, bed and shore are owned by the Crown" (Alberta NAWMP Partnership, 2016, p. 11).

In Alberta, it was acknowledged wetland protection required a "coordinated effort by provincial and municipal governments" (City of Calgary. Office of the City Clerk, 2002, p.3600). More recently, in Alberta it was acknowledged that while the Province has a key role to play in implementing the Wetland Policy, it "cannot achieve policy goals and outcomes without the support of Alberta's municipalities" (Alberta NAWMP Partnership, 2016, p. 4). An interviewee stated that while the wetland policy may explicitly acknowledge the role of

municipalities, in practice the role was not recognized (City of Calgary – Urban Conservation Lead; personal interview).

Wetlands are not regulated by one piece of legislation, “wetland resources are administered under a variety of laws” (Alberta. Water Resources Commission, 1993, p. 9). The provinces have “water legislation setting out a permitting process for those wishing to drain wetlands” (Scarth, 1998, p. 170). This can be for agricultural or development purposes. The *Water Act*, protects “all waterbodies, or requires compensation for their loss” (City of Calgary, 2011, p. 44). The definition of a water body is as follows:

“Water body means any location where water flows or is present, whether or not the flow of water is continuous, intermittent or occurs only during a flood, and includes but is not limited to wetlands and aquifers” (Water Act Revised Statutes of Alberta, 2000, c W-3, p. s 1(1)ggg).

The *MGA* does not refer to *water bodies* but it does reference *bodies of water* in the Environmental Reserve and Land Use Bylaw sections. Stewart (2008) argued the water body definition in the *Water Act* could be imported and applied to the provisions of the *MGA* where a ‘body of water’ was referred to. Stewart argued “municipalities may apply the broad definition of ‘water bodies’ from the *Water Act* to create land use bylaw regulations and building development setbacks from ‘water bodies,’ which includes wetlands and aquifers” (p. 9). Further, she argued the water body definition was “important to understand the authority granted by the Province” (p. 9). After all, municipalities have the power to legislate in areas of concurrent provincial and federal jurisdiction (NACLAA: Municipal Law I, Fall 2011).

In reviewing the literature, I learned there are generally two policy approaches to wetlands conservation. Before moving on to discuss the two policy approaches for wetland conservation I will briefly touch on the *Public Lands Act* R.S.A. 2000, c. P-40, the legislation states the Province owns the title to the bed and shore of: “(a) all permanent and naturally occurring bodies of water, and (b) all naturally occurring rivers, streams, watercourses and lakes” (s. 3(1)). This is important, because it cements the Province’s control over wetlands, essentially the Province has “ownership of the bed and shore of all permanent and naturally occurring wetlands, unless ownership has been specifically granted to another party” (Alberta NAWMP Partnership, 2016, p. 11).

2.3.2.1 Policy approach to wetlands conservation: ‘no net loss’ versus ‘no loss’ of wetlands and wetland functions.

Wetland policies are a non-regulatory tool used to conserve wetlands. Alberta was among the first provinces to adopt a wetland policy in the early 1990s, Ontario and Saskatchewan were other early adopters (Lynch-Stewart et al., 1993). Wetland policies can either articulate a ‘no loss’ or a ‘no net loss’ approach to wetlands and/or wetland functions (Schulte-Hostedde et al., 2007; Lynch-Stewart et al., 1999). Adopting a ‘no net loss’ approach to wetlands and wetland functions means adopting a mitigation hierarchy and/or mitigation banking. This is done either explicitly in policies or inexplicitly through practice.



Figure 2-11: Wetland Management Approaches in Canada Figure created by Lucy Ramirez, data from Schulte-Hostedde et al., 2007; Lynch-Stewart et al., 1999; Lynch-Stewart et al.,1993; Rubec & Hanson, 2009

In the following sections I elaborate on Alberta’s no net loss approach and Ontario’s no loss approach. Both approaches make assumptions.

No net loss of wetlands and wetland functions - Mitigation sequence

Most Canadian jurisdictions adopt a no net loss approach to manage wetlands. This approach reconciles development and environmental protection (Schulte-Hostedde et al., 2007). Adopting a ‘no net loss’ approach to wetlands and wetland functions means adopting a mitigation hierarchy, which is as follows: avoid, minimize, and lastly compensate. Clare et al. (2011) highlighted, “many studies have shown that compensatory laws and policies have not been effective in maintaining wetland area and function” (p. 166). In practice, wetland losses are incurred, and it is simply “hop[ed] that compensation will replace lost wetland area, values, and function” (p. 166). In summary, a no net loss approach is an aspatial approach that does not consider the local context and results in “broad changes in the distribution, type, size, quality, and connectivity of wetlands” (Clare et al., 2011, p. 172).

Alberta's 1993 interim policy adopted a 'no net loss' approach to wetland management and a mitigation sequence. The no net loss approach to wetland management is deeply flawed. Clare's (2013) research, an evaluation of the outcomes of Alberta's interim wetland policy, highlighted when a mitigation hierarchy is adopted, compensation becomes the de facto practice. Clare (2013) stressed:

“there is broad agreement among scholars, scientist, policymakers, regulators, and the regulated community that the first and most important step in [the] mitigation sequence, avoidance, is ignored more often than it is implemented” (Burgin 2008; Environmental Law Institute 2009; Hough & Robertson 2009; Murphy et al.. 2009a as cited in Clare, 2013, p. 37).

Flawed assumptions underlie the 'no net loss' policy approach to wetland management, namely compensation is a deterrent and wetlands and their functions can be replaced. Compensation is not a deterrent to the elimination of wetlands in the landscape. Clare's (2013) research clearly illustrates this, she found in Alberta “wetland impacts [were] rarely avoided and compensation ha[d] become a routine decision-making practice” (p. i). This was confirmed by City of Calgary staff. Manderson (2008) shared, “[e]xperience over the past 3 years has shown that there is a strong tendency to go straight to compensation without a thorough evaluation of the feasibility of all mitigation priorities” (p. 2). Bowen (2012) , in her presentation entitled, *Biodiversity – Contributing to a Sustainable Community*, spoke about the *Calgary WCP* and lessons learned. She noted, “compensation comes first, [it is] not a disincentive” (p. 4). When the *Calgary WCP* was adopted, it was expected compensation would deter wetlands losses.

Another flawed assumption of the 'no net loss' policy approach to wetland management is wetlands and their functions can be replaced, either through the restoration or creation of new wetlands. However, wetlands cannot simply be traded off, and it is naïve to hope that overall no loss of wetlands and their function will occur because of compensation. The facts are “wetlands vary considerably in their value and function by type, landscape context, and spatial scale (de Groot et al., 2010; Hein et al., 2006; Mitsch & Gosselink 2000 as cited in Clare et al., 2011, p. 173). This researcher believes a 'no net loss' approach prioritizes development, whereas a 'no loss' approach prioritizes the environment. If the goal is to protect wetlands and constrain development, then a 'no loss' approach to wetland management is required. However, a 'no loss'

approach is harder to sell politically, hence the widespread adoption of the ‘no net loss’ approach.

Before moving on to discuss the ‘no loss’ approach, I will turn my attention to wetland policy in Alberta, specifically to the *Wetland Management in the Settled Area of Alberta: An Interim Policy* (Alberta. Water Resources Commission, 1993) and the role of municipal government. Alberta’s 1993 interim policy only applied to the settled area of Alberta, where most of the land is privately owned, which means municipalities regulate its use (Barss, 2003). Below, I’ve highlighted some policy statements from the interim policy the reason, to show urban wetlands, urban stormwater retention, and the role of municipal governments were considered.

- *Retention of natural wetlands within urban areas [would] be encouraged. Mitigation of the impacts of urban development on wetlands may be required to meet regional wetland management objectives” (Alberta. Water Resources Commission, 1993, p. 8).*
- *“Use of wetlands for water management purposes such as flood control, urban stormwater retention, water purification, flow regulation and groundwater recharge [would] be encouraged” (p. 8).*
- *“Municipal governments [would] be involved in the planning and management of wetlands and [would] be encouraged to cooperate regarding wetland management. Municipal governments [would] be encouraged to implement the wetland policy through their programs and activities” (p. 10).*

However, in the policy’s concluding statement the Province’s paramount role is reiterated:

“this wetland management policy will be implemented through the actions of provincial government departments” (Alberta. Water Resources Commission, 1993, p. 11).

Contrast this with the Province of Ontario whose policy goals were to “be implemented through official plans, plans of subdivision, consents, zoning by-laws, minor variances and other planning tools” (Lynch-Stewart et al., 1993, p. 7).

No loss of significant wetlands

The province of Ontario has adopted a ‘no loss’ approach to wetland management, initially only for wetlands of provincial significance. However, since 2005 municipalities are enabled to designate local natural features, including wetlands, as significant. Ontario’s approach to wetland protection is different from most provincial jurisdictions in Canada, except New Brunswick which has adopted a no loss approach to regionally significant wetlands. A no loss

approach recognizes “the removal of existing wetland[s] almost always results in removal of ecological processes which can rarely, if ever, be duplicated” (Ontario, 1993, p. 99 as cited in Schulte-Hostedde et al. 2007, 89). The assumption that underlies a ‘no loss’ approach is not every wetland is valuable.

Lynch-Stewart et al. (1993) maintained Ontario’s policy was “innovative in Canada, and perhaps the world, because it... [was to] be implemented through official plans, plans of subdivision, consents, zoning by-laws, minor variances and other planning tools” (p. 7). *Wetlands: A Statement of Ontario Government Policy* was issued in 1992 under the authority of the *Ontario Planning Act*. The policy goals were “[t]o ensure that wetlands [were] identified and adequately protected through the land use planning process” and “[t]o ensure no loss of Provincially Significant Wetlands” (Lynch-Stewart et al., 1993, p. 7). The policy took a decade to develop and the policy statement was “... jointly prepared by the Ministry of Natural Resources and the Ministry of Municipal Affairs” (Loftus, 1994).

This standalone policy was later incorporated into a consolidated provincial policy statement. Lynch-Stewart et al. (1999) noted it was too early to evaluate Ontario’s policy. Researchers have since evaluated it. Schulte-Hostedde et al. (2007) looked at the implementation of wetland policy in Ontario and whether the 2005 PPS [Provincial Policy Statement] would address problems identified with past wetland policy. The authors found different policy outcomes in the rural and urban landscape; wetland loss was seen in the rural case study but not the urban one. Schulte-Hostedde et al. (2007) suggested more research was needed to determine wetland function was impacted. Patenaude (2011) did research to determine what was more detrimental to wetland function, urbanization or wetland loss; she found wetland loss was more detrimental.

The literature underscored different wetland management approaches can have different outcomes in the urban and rural context. From reviewing Clare (2013) and Schulte-Hostedde et al. (2007), I can hypothesize different wetland management approaches produce different results in the urban landscape. Ontario’s ‘no loss’ policy approach preserved wetlands in the urban landscape, whereas Alberta’s ‘no net loss’ approach did not. However, the ecoregions are quite different; therefore, to say definitively whether one approach produces different results in an urban context, a comparative case study between two similar regions in the different provinces is

needed. I will note Alberta's 2013 Wetland Policy adopted a 'no loss' approach and a mitigation hierarchy. I will return to this in chapter three. Next, I will turn my attention to the issues that affect wetland management in Alberta.

2.3.2.2 What are the Issues With Wetland Management Identified by Research and Policy Analysis

Clare et al. (2011), Clare (2013) and the Alberta Urban Municipalities Association (2013) identified issues with wetland management in general and in Alberta. Clare (2013) reviewed wetland management literature from 1989 to 2010 and identified five reasons why decision makers failed to:

“prioritize wetland avoidance and minimization...in the mitigation sequence:

- 1. A lack of agreement of what constitutes 'avoidance';*
- 2. Current approaches to land use planning do not identify and prioritize wetlands in advance of development;*
- 3. Wetlands are economically undervalued;*
- 4. A 'techno-arrogance' is associated with wetland creation and restoration, resulting in increased wetland loss;*
- 5. Requirements for compensation are inadequately enforced.” (p. 43).*

Clare et al. (2011) and Clare (2013) identified problems applicable generally to wetland management in jurisdiction where a mitigation sequence is adopted. The Alberta Urban Municipalities Association (AUMA) identified Alberta specific problems. AUMA is an association of urban municipalities, which is involved in advocacy. In response to the development of a new provincial wetland policy, AUMA developed a water policy on wetlands. The association put forward fourteen municipal wetland policies (AUMA, 2013), the policies were grouped under the following eleven headings, which reflected municipal concerns:

- *“Engagement in the new wetland policy*
- *Wetland inventory*
- *Municipal Government Act*
- *Wetland Mitigation*
- *Assessing Relative Wetland Value*
- *Restoration Agencies*
- *Location of Wetland Restoration*
- *Constructed Wetlands*
- *Ephemeral Wetlands*
- *Role of Municipalities in Wetland Conservation*
- *Integration with other policies and plan” (pp. 5-9)*

The association noted their “wetland policies reflect[ed] extensive discussion with...members and [were] being used to guide [their] input to implementation of the provincial policy” (AUMA, n.d.).

2.3.2.3 Summary of Wetland Management Framework

The Province generally has control over wetlands because the crown owns all water, and the bed and the shore of permanent and naturally occurring wetlands. Wetland policies are a non-regulatory tool used to conserve wetlands. A review of the literature leads me to conclude, generally wetland policies articulate a ‘no net loss’ or ‘no loss’ approach to wetlands and/or wetland functions (Lynch-Stewart et al., 1999; Schulte-Hostedde et al., 2007). A mitigation sequence is most often adopted when a ‘no net loss’ approach is implemented. The sequence is as follows avoid, minimize and lastly compensate. There is broad agreement that generally wetland avoidance is not practiced. The mitigation sequence assumes compensation is a deterrent to wetland loss, it is not. Clare (2013) identified why decision makers failed to “prioritize wetland avoidance and minimization...in the mitigation sequence” (p. 43). Further, the no net loss approach assumes wetlands and their functions can be replaced, either through the restoration or creation of new wetlands. However, wetlands cannot simply be traded off.

The literature identified fundamental problems affecting wetland management (Schulte-Hostedde et al., 2007). In response to the development of a new provincial wetland policy, AUMA developed a water policy on wetlands (AUMA, 2013). The association put forward fourteen municipal wetland policies “to guide [their] input to implementation of the provincial policy” (AUMA, n.d.). The wetland policies were “part of a broader initiative ... to effectively respond to provincial and federal policies and programs and to build municipal capacity to respond to water related challenges and opportunities” (Aquality Environmental Consulting, 2016).

2.3.3 Context-Based Approaches – A response to wicked problems

Often aspatial federal and provincial government policies need to be spatially targeted (Bradford, 2005). Clare’s (2013) research underscored the need for spatially targeted wetland policies, because she found in Alberta, wetland removal was concentrated around the Edmonton and Calgary areas. Wetlands were removed from these urban regions and restored elsewhere.

Clare (2013) highlighted “[t]he vast majority of compensation occur[ed] outside of the watershed of impact (80%), which has lead to a spatial reorganization of wetlands across the landscape” (p. 79). Wetlands in the Prairie Pothole Region provide ecosystem services and are part of the hydrological flow network (Cuthbert & Tyler, 2016). Removing wetlands from the landscape means removing ecosystem services. Increasingly, municipalities are developing wetland policies to address wetland loss, these policies attempts to keep wetlands and their functions in municiple boundaries and/or watershed.

The urban sustainability literature and policy makers in government have stressed the importance of place (Shugart & Townsend, 2010; Dale & Dushenko, Reflections, 2012).

“Across the country, place-based governance initiatives have been emerging at an accelerating pace at the community, municipal, and landscape or watershed level. These “place-based” approaches develop[ed] out the need to address what are often referred to as ‘wicked’ problems: persistent socio-economic and environmental policy issues requiring a high level of collaboration among governments and with other players. We are rediscovering that economic competitiveness, social well-being, and ecosystem resilience depend, in large part, on collective behaviour in specific ‘places’” (Shugart & Townsend, 2010, p 4).

Wicked problems have been defined as problems that “cross departmental boundaries and resist the solutions that are readily available through the action of one agency” (Perri 6 *et al.*, 2002: p. 34; Sullivan and Skelcher, 2002; Paquet, 1999 as cited in Bradford, 2005, p. 4). Part of the reason wetland loss is a wicked problem is because there are multiple pieces legislation affecting wetland management (Lynch-Stewart et al., 1999; Rubec & Hanson, 2009; Scarth, 1998; Stewart, 2008; Alberta NAWMP Partnership, 2016; MacIntyre, 2011). In part, this is because the environment does not fall under one area of federal or provincial jurisdiction and both levels of governments have powers to protect it. In Canada, the provinces are largely responsible for wetlands policy. Alberta’s interim wetland policy (Alberta. Water Resources Commission, 1993) noted, “[t]he natural resources found in and around wetlands [were] managed by several provincial government departments. At least 14 agencies administer[ed] more than 40 provincial statutes with a direct or indirect effect on wetlands” (p. 5).

Bradford (2005), “[r]ecogniz[ed] that all three levels of government are active in Canadian urban policy and governance” (p. 3). Bradford’s research “explore[d] ways to improve performance through intergovernmental collaboration, an urban policy lens, and tri-level

community programming” (p. 3). He stressed the importance of the ‘urban policy lens’ because he asserted it “would enable a more holistic understanding of what makes cities vital, and how local knowledge can inform the decisions taken at the upper levels of government that presently are attempting to deliver integrated solutions to the place-specific problems of cities and communities” (p. 32). All this to say, context is important. If context is considered perhaps ‘wicked’ problems could be addressed.

2.4 Wetland Loss in Calgary – Problem Recognition (Agenda Setting)

Clare (2013) identified five reasons why decision makers failed to protect wetlands and one of the reasons was “current approaches to land use planning do not identify and prioritize wetlands in advance of development” (p. 43). So, to protect wetlands, they need to be identified and prioritized. A first step is to have an inventory of wetlands. There is an argument to be made that the origin of the *Calgary WCP* was in 1999. The year Administration started to map wetlands (Semmens, 2003). This was a reaction to losing wetlands because they were not mapped in advance of development (City of Calgary – Urban Conservation Lead; personal interview). Howlett and Ramesh (2003) noted “to understand agenda-setting we must comprehend how demands for a policy are made by individuals and/or groups and responded to by government and vice versa” (p. 122).

So, Calgary’s Administration initiated a wetlands inventory project in 1999 to “streamline the development approval process and identify wetlands before they [were] subject to urban development pressures” (Strong-Duffin, 2005, p. 2). In 2001, the City partnered with Ducks Unlimited to further develop its wetland inventory. Howard (2001) reported it was “the first agreement of its kind between Ducks Unlimited and a Canadian city” (p. B4). Other stakeholders were also involved in developing the wetland inventory. Hope (2002b) reported Ducks Unlimited worked “hand in hand with the Urban Development Institute and city officials to catalogue some 14,000 potential wetland areas within Calgary” (p. HS05). Further, Hope reported “the inventory [was] part of an overall wetland policy that [was] being put together by the city with the co-operation of the development industry” (p. HS05). Support was widespread:

“Park Development and Operations ha[d] ...received funding and support from Fisheries and Oceans Canada and Ducks Unlimited as well as a commitment from Alberta Public

Lands to work closely in identifying wetlands” (City of Calgary. Office of the City Clerk, 2002).

There is an argument to be made that an inventory is not enough, hydrological function should also be mapped (Cuthbert & Tyler, 2016). This will be discussed in the section on environmental planning (see section 2.8.2). Before moving on, I note Ducks Unlimited expressed interest in partnering with the City in its *Land Acquisition Strategy for Natural Areas*. A letter from Jerry Brunen indicated, “DU [was] interested in establishing a jointly funded partnership with the City to plan and implement a prioritized and coordinated program to acquire, secure and enhance natural or restored habitat within the City and outlying areas” (City of Calgary. Park Development and Operations, 2001, Attachment 3 p. 1). I am not sure what became of the partnership after the inventory and *Calgary WCP* were adopted.

2.5 Proposal and Choice of Solution - Policy Formulation

While Administration was working on identifying wetlands, Council was directing them to work with the Province to protect them. LaFreniere (2003), provided background on the origin of the *Calgary WCP* in the reported entitled, *Wetland Conservation Plan Progress Report*, Council direction came from the following:

- Wetlands in the Transportation and Utility Corridor (OE2001-44)
- Additional Resolutions for the 2001 Conference of the Alberta Urban Municipalities Association (AUMA) (C2001-47)
- Land Acquisition Strategy for Natural Areas (C2001-82)

Furthermore, LaFreniere (2003) referenced the Looking Ahead – Moving Forward: Council Priorities for 2002-2004.

What follows is a review of Council direction. In 2001, Council directed Administration to highlight to the Province “the significance of the extensive wetland complex in the alignment of the East Freeway within the Transportation Utility Corridor” (City of Calgary, 2001, p. 1). The direction arose when the Land Use Amendment and Outline Plan for McKenzie Towne (Bylaw no 18Z2001) was before Council. Administration wrote a letter, the Province replied, “wherever possible, we will attempt to mitigate the impact of the Transportation and Utility Corridor on the existing wetlands” (City of Calgary, 2001, Attachment 1, p. 1). This response does not communicate a high level of commitment.



Figure 2-12: Signage of Transportation and Utility Corridor near Arad Park in the Royal Oak Community, Calgary Photo credit Lucy Ramirez

Thereafter, the City of Calgary submitted a resolution to the AUMA for consideration at its annual conference; where members consider, debate and vote on resolutions. If resolutions are approved, AUMA writes to the respective Provincial Minister and asked them to consider the resolutions. Calgary submitted a resolution entitled, *Protection of Wetlands in Urban Areas*, specifically it asked:

“the Government of Alberta adopt its draft Wetland Policy for the settled areas of Alberta and seek ways to use this policy and relevant legislation such as the Municipal Government Act, the Water Act and the Public Lands Act to better promote the protection of wetlands in urban Alberta” (City of Calgary Office of the City Clerk, 2001 p. 4915).

The province replied:

“Alberta Environment supports the goal of this resolution. Preservation of wetlands[was] best approached through a coordinated effort by provincial and municipal governments, working with the development community and other stakeholders. Wetland issues should be addressed in the early stages of development planning” (City of Calgary Office of the City Clerk, 2002, p. 3600).

The Province’s response went on and noted it was working on a new wetland policy, and concluded with:

“The proposed wetlands policy, in conjunction with legislation, such as the Municipal Government Act and the Public Lands Act, should provide valuable guidance for both provincial and municipal governments seeking to protect and preserve wetlands” (p. 3600).

Administration from the City of Calgary then updated Council:

*“Alberta Environment recently indicated their interest working with the City to better protect wetlands. This may involve Alberta Environment and the City negotiating a blanket approval under the Water Act for all works involving wetlands in the City. It is not yet clear the full extent or nature of this proposal, but Park Development & Operations along with several other business units are considering the issue. At the same time, there have been several initiatives of the City of Calgary to identify and protect wetlands. **There has also been general consensus between Parks, Planning, Wastewater & Drainage, Urban Development and Environmental Management that we could do a better job of protecting them** (City of Calgary, Office of the City Clerk, 2002, p. 3600) [emphasis added].*

After Calgary’s wetland inventory was done, “[r]epresentatives from Alberta Environment and the City agreed to undertake a review of the remaining wetlands and develop[ed] a policy framework to evaluate and set priorities for the protection of wetlands that [was] consistent with the *Water Act* and other legislation and policy” (Strong-Duffin, 2005, p. 2). The policy framework created was the *Calgary WCP*.

The legal and policy frameworks that were in place when the City adopted the *Calgary WCP* have been reviewed. Now, I will briefly review what the literature pointed out about available policy and legal tools.

2.5.1 Available Policy Tools

Scarth (1998) used four categories to classify policy instruments that influence land use and promote wetland conservation. The categories were: information and extension, land use incentives/disincentives, public acquisition, and land use restrictions (p. 171). These categories were based on the work of Leitch and Baltezore (Scarth, 1998, p. 171). The policy tools the *Calgary WCP* used were public acquisition and disincentives. The City used the Environmental Reserve (ER) definition from the *MGA* to acquire ER wetlands. The disincentive was the high compensation rates paid to the City to remove ER wetlands, the rates were based on the cost to purchase land and to restore wetlands. The City later developed a land use restriction tool, the

Environmental Reserve Setbacks, adopted by Council in 2007. Administration was directed to develop the ER setbacks when the *Calgary WCP* was adopted.

2.5.2 Available Legal Tools

Stewart (2008) argued “municipalities should use the statutory authority provided in the *MGA* to enact municipal bylaws and land use bylaw regulation as tools to protect wetlands and riparian lands within municipal boundaries from the impacts of human land use and development” (p. 4) Stewart researched land use by-law tools, specifically natural area land use districts, building development setbacks and environmental reserve policies. She argued “that in order to protect wetlands and riparian lands from the impacts of development, the definition of ‘land that is subject to flooding’ in land use bylaws might be expanded to included wetlands” (Stewart, 2008, p. 155). Further building development setbacks could/should be applied to an expanded definition of land subject to flooding. Stewart (2008) asserted that “building development setbacks [were] the preferred land use bylaw tools” (p. 11). Legislation and policy work together, they are complementary (Lynch-Stewart et al., 1999). Perhaps, pursuing a policy approach instead of regulatory approach was intentional, as a policy approach offers greater flexibility. This was a required to get the development industry to support the *Calgary WCP*.

2.6 Decision-Making - Choice of Solution

In her submission to the Municipal Excellence Network (MeNet), Strong-Duffin (2005) noted “Discussion in 2002 with Alberta Environment regarding wetland protection led to a decision to pursue a city policy on identification and protection of important wetlands” (p. 3). Manderson (2016) provided a good summary on the rationale behind the *Calgary WCP*, he outlined three reasons why the plan was put in place: “concerns about wetland loss;...to clarify regulatory overlaps with province and federal government; provide a decision-making framework for wetland and watershed conservation” (p. 8)

LaFreniere (2003) provided information on how the *Calgary WCP* was development in the reported entitled, *Wetland Conservation Plan Progress Report* (OE2003-49),

1. Key Stakeholder Advisory Committee approved the project’s Terms of Reference
2. The terms of reference were distributed to:
 - a. Council members,

- b. Wetland Policy Management Team,
 - c. Key stakeholders, and
 - d. Community associations.
3. The Wetland Working Committee conducted research and analysis and developed the 'Draft Plan for Discussion'.
 4. The 'Draft Plan for Discussion' was distributed to members of Council and they were given an opportunity to review and comment
 5. The Draft Plan for Discussion was then present[ed] to public stakeholder groups (57 listed in attachment two of report) and the public.

It was anticipated the Key Stakeholder Advisory Committee would review the public input, review the draft, and work towards consensus on the content, which would then be presented to the Wetland Policy Management Team and Council (LaFreniere, 2003, p. 1-2).

The *Calgary WCP* acknowledged: The Wetland Working Committee, the Key Stakeholder Advisory Committee as well as other key stakeholders, the public and community associations. The key stakeholder group included many individuals from many sectors. The working group consisted mostly of staff from the City of Calgary, albeit from across the organization. The Province was also well represented, and included individuals from Alberta Public Lands, Alberta Environment, and Alberta Fish and Wildlife. Ducks Unlimited was also a member of the Wetland Working Committee.

Documents from Administration frame the *Calgary WCP* as a by-product of the discussions it was having with the Province, and very much a by-product of the City's wetland inventory. However, Ryan (2015) frames the *Calgary WCP* plan differently.

"Staff of the River Valleys Committee (RVC) (a primarily-volunteer stewardship group inside the City of Calgary) were aware of the impact the void in a provincial wetland policy would have on the City's remaining wetlands, especially as the City's boundaries expanded into adjacent areas. A group of people were invited by the RVC to form the Calgary Regional Wetlands Committee. Members included City of Calgary (Parks, Water Resources, Planning, Environmental Management, Corporate Properties, Transportation), Alberta Government (Transportation, Environment, Sustainable Resource Development, Fish Creek Provincial Park) the federal Department of Fisheries and Oceans, several ENGOs (Ducks Unlimited Canada, RVC, BRBC), adjacent municipal districts (MD of Rocky View25, MD of Foothills), UDI and the Calgary Airport Authority. The committee worked together over several years and produced the Calgary Wetland Conservation Plan, which was approved by the City in 2004. This was the first municipal wetland policy in North America" (pp. 126-127).

The *Calgary WCP* went to the Standing Policy Committee (S.P.C.) on Utilities and Environment on April 28, 2004, and the committee supported Administrations recommendations, namely the *Calgary WCP* be adopted, and Parks operating budget be increased (LaFreniere, 2004). The S.P.C added an additional recommendation to those of the report, namely:

“Administration to investigate the issue of utilizing appropriate tools for upland protection, including environmental reserve designation, as a means of preventing pollution to a waterbody and incorporate any such tools into the wetland functional assessment (Appendix 8) and return to the S.P.C. on Utilities and Environment with a status report not later than 2004 November 24” (City of Calgary Office of the City Clerk, 2004b).

So, when the *Calgary WCP* went to Council it included the original recommendation with the additional committee recommendation.

I want to highlight that Alberta Environment, the Urban Development Institute (UDI) - Calgary Chapter, and Ducks Unlimited, all submitted letters supporting the plan, and they all provided additional comments, which clearly shows “Planners make plans that combine a multiplicity of viewpoints and voices” (Hoch, 2002, p. 57). Ian Rudland from Alberta Environment (AENV) wrote about the working partnership that developed between the City and AENV (LaFreniere, 2004, Attachment 4, p. 1). Rudland noted the City’s plan was timely because the Province was also working on a wetland policy. Further he wrote:

“There will be some challenges ahead as the plan is implemented; however, these are not insurmountable and there will be many opportunities for the City and AENV to continue this close working partnership in resolving these challenges as we move through the regulatory process together” (Attachment 4, p. 1).

Rick Harland from Ducks Unlimited Canada wrote:

“The Wetland Conservation Plan is a very important milestone for wildlife conservation in Canada. It is the first comprehensive municipal plan that will both guide urban growth and conserve wetland habitat. It will serve as a model for other municipalities and provinces to follow in the development of similar plans” (LaFreniere, 2004, Attachment 5 p. 1).

Harland also provided three comments/recommendations regarding the plan. First, he emphasized engineered stormwater wetlands “do not provide the multitude of functions that natural wetlands are capable of [and]...are also a potential environmental risk to healthy plant and wildlife communities and consequently are not currently considered suitable mitigation for

the loss of natural wetlands” (LaFreniere, 2004, Attachment 5 p. 1). Harland stressed more studies were needed to investigate the use of natural wetlands to treat urban runoff. Second, Harland stressed the need for regional municipal co-ordination. Lastly, he encouraged the City “to conserve priority wetlands [ER wetlands] and their ecological function” (LaFreniere, 2004, Attachment 5, p. 2). To retain ecological function, he stressed the need to incorporate appropriate upland areas with natural wetland. Perhaps this is the origin of the committee’s extra recommendation to Council that directed administration to investigate environmental reserve setbacks.

Judy A. Ferguson from Urban Development Institute – Calgary Chapter wrote they agreed with the intent and concepts of the *Calgary WCP* and stressed:

“Throughout our discussions with Parks, it was and continues to be our understanding that the intent of this document is to emphasize the first three main priorities [of mitigation]– restoration, enhancement and creation [policy 2.2.1]. The fourth priority, the compensation option, we have been assured will be used as a last resort for mitigating development activities...In addition, we feel the City has taken the initiative to include stormwater wetlands as an integral tool in enhancing and restoring existing wetlands in an urban environment. We see this as an innovative solution that is mutually agreed to be a benefit to both the City and the Development Industry” (LaFreniere, 2004, Attachment 6, p. 1).

When the *Calgary WCP* went to Council on May 17, 2004, Council carried the recommendations from committee unanimously. This could be explained in part, because the value of wetlands and the public’s interest in them was emphasized a few months earlier. In February of 2004, a public hearing was held on the *Southwest Community "A" and Employment Centre Area Structure Plan*. The public hearing stretched over three days. During this hearing, fifty delegations spoke over two days (City of Calgary, Office of the City Clerk, 2004a). A lot of concern was expressed regarding, “Protection of wetlands and ensuring adequate buffering and setbacks of Radio Tower Creek and the Priddis Slough” (Manderson, 2005, p. 1). There was concern increased traffic volumes would require a road to be expanded and encroach on the nearby wetlands. When Council reconvened on February 11, 2004 to debate the item, Jerry Brunen, Ducks Unlimited, was quoted saying “I think this has been a major force in raising awareness of wetland preservation in Calgary. We view this discussion positively. People are starting to realize wetlands are valuable and can no longer be regarded as wastelands” (Remington, 2004). Therefore, when the *Calgary WCP* went to Council, it was well received.

I was unaware the public hearing for the *Southwest Community "A" and Employment Centre Area Structure Plan* generated such a large public turnout and primed Council to be receptive to the *Calgary WCP*. To understand the context of the plan I reviewed the grey literature, Manderson (2005) noted protection of wetlands and uplands was expressed about Radio Tower Creek and Priddis Slough. However, I was unaware of the magnitude of the public response. Creswell (2009) identified triangulation as a strategy to validate findings, hence why I asked interviewees questions about the context to ascertain if I missed anything. I am glad I did.

2.7 Municipal Wetland Policy – Calgary WCP

The *Calgary WCP* is an example of context-based policy, the plan used “planning measures to protect high priority [Environmental Reserve (ER)] wetlands” (City of Calgary, 2011, p. 45). The goal was ‘no net loss’ of ER wetlands. The City adopted a mitigation sequence to protect ER wetlands (City of Calgary, 2004, Appendix 5). The commonly used mitigation sequence is as follows: avoid, minimize, and lastly compensate (Clare, 2013). In Calgary, the sequence was: avoid, minimize and mitigate, which could entail restoration, enhancement, creation, or compensation (City of Calgary, 2004, p. 9). Compensation became the de facto form of mitigation (Manderson 2008; Bowen 2012).

Some of the early outcomes of the *Calgary WCP*, were:

- i. The City defined what a Calgary wetland was, and created a typology, which included naturally occurring and disturbed waterbodies (City of Calgary, 2004, pp. 12-13).
- ii. Established of a Wetland Mitigation Bank described as “...a revenue account that is separate from General Revenue for the future enhancement or creation of wetlands” (City of Calgary, 2004, p.73).
- iii. Developed of “a parallel process for wetland approvals with AEP [Alberta Environmental Protection]” (Manderson, 2016, p 14). However, in 2015 the Province reassumed full responsibility for compensation (Manderson, 2016, p.14).

The *Calgary WCP* identified four types of wetlands in Calgary, below I explain why this is important.

Type	Description
Crown Owned Wetland	“Wetland that is permanent and naturally occurring and is owned by the Province because it was never subject to a grant” (City of Calgary, 2004, p. 13). “subset of the Environmental Reserve wetlands and they may be claimed under Section 3 of the Public Lands Act at the Community Plan stage” (City of Calgary, 2004, p. 14).
Environmental Reserve (ER) Wetland	Class III, IV, V or VI wetland – Stewart and Kantrud High priority wetlands (City of Calgary, 2004, p. 13).
Natural Area Wetland	Class I, II, or VII wetland – Stewart and Kantrud Protected if considered Environmentally Significant as determined by Biophysical Impact Assessment (City of Calgary, 2004, p. 13).
Engineered Stormwater Wetland	Constructed or modified waterbody

Table 2-3: Four types of wetlands identified by the Calgary WCP Source: (City of Calgary, 2004)

With respect to crown owned wetlands, A crown owned water body does not need to be named on title to be crown owned. According to Stewart (2008), the Province does not claim the bed and shores of wetlands on private land if they “contain water less than 7 months of the year” (p. 44). To be crown owned a wetland has to be permanent and naturally occurring. Stewart (2008) goes on to say the Province takes “the position that once water is drained from a wetland, the bed and shore belong to the landowner of the surrounding property (p. 44). The result, confusion around who owns the bed and shore of a wetland, which is resolved only once “a survey is completed, usually during the subdivision process” (Stewart, 2008, p. 44).

In Calgary, before looking at community plans or development applications, Administration refers developers to the Province, specifically Public Lands, to determine if wetlands were crown owned. Confirmation of ownership can be complicated and can take a long time (City of Calgary – Urban Conservation Lead; personal interview). The practice of seeking confirmation of ownership was developed because the City “*had an issue where a wetland was crown owned, Council granted land use on an outline plan that saw a wetland being destroyed, and Public Lands stepped in. They said, ‘hold on, we own that wetland, you need to seek consent*

from the land owner before you do a land use re-designation, we have not consented to this'. The developer ended up buying the wetland from the province” (City of Calgary – Urban Conservation Lead; personal interview).

Stewart (2008) highlighted the reason ownership of the bed and shore is important, municipalities regulate private land, the Province regulates public land. Stewart highlighted, if a wetland is crown owned, the Province “authorizes land use, lease of occupation or disposition” (p. 44). Stewart noted, if a wetland is crown owned, the City can enter “into a license of occupation to enable the City to manage and control the wetland as part of the City's Natural Environment Park system” (p. 183). According to an interviewee the licence of occupation is an effective tool to protect wetlands (City of Calgary – Biologist Environmental Planner; personal interview).

The *MGA*, specifically the definition of Environmental Reserve (ER), was used to protect certain types of wetlands on developable private land. The definition of ER was used and narrowly interpreted to apply only to seasonal, semi-permanent, permanent or alkali ponds wetlands; Class III, IV, V and VI of the Stewart and Kantrud wetlands classification system. Lower class wetlands, temporary and ephemeral, were not prioritized for protection. This is problematic because the science says: lower class wetlands are valuable; wetland complexes should be preserved, not just individual wetlands; and wetlands can change from one class to another depending on if it's a dry or a wet year (Clare, 2013; Galatowitsch et al., 1998; Cuthbert and Tyler, 2016).

Cuthbert and Tyler (2016) highlighted the importance of hydrological function. The authors highlighted in the Prairie Pothole Region, ephemeral flow systems and ground water are important and poorly understood features that help water moves across the landscape, they are part of the landscape flow system. Cuthbert and Tyler (2016) described ephemeral features as “...watercourses and waterbodies that only hold or convey water temporarily in specific seasonal or temporal conditions” (p. 3). The authors highlight water can move through ephemeral features either vertically or laterally and it can be difficult to identify the subsurface movement of water (p. 3). Cuthbert and Tyler (2016) argued “[r]ecognizing the value and function of slow flow ephemeral systems and drainage networks ha[d] the potential to change land use development and practice” (p. 17). The authors highlighted why assessing wetlands individually is

problematic “the spatial interconnections of flow networks that enable them [individual wetlands] to function are neither well understood nor recognized. As such, they are at risk because of the cumulative effects of municipal land use change and road development which disconnects and create barriers to landscape flow” (Cuthbert & Tyler, 2016, p. 7).

With respect to engineered stormwater wetlands, when Clare (2013) conducted her review of wetland management literature she noted one of the reason why decision makers fail to “prioritize wetland avoidance and minimization...in the mitigation sequence...[was] a ‘techno-arrogance’ associated with wetland creation and restoration, resulting in increased wetland loss” (p. 43). A ‘no loss’ approach to wetland management acknowledges “the removal of existing wetland[s] almost always results in removal of ecological processes which can rarely, if ever, be duplicated” (Ontario, 1993, p. 99 as cited in Schulte-Hostedde et al., 2007, p. 89). As previously mentioned, Harland from Ducks Unlimited Canada emphasized engineered stormwater wetlands did not have the same function as natural wetlands and were “also a potential environmental risk to healthy plant and wildlife communities and consequently [they] are not currently considered suitable mitigation for the loss of natural wetlands” (LaFreniere, 2004, Attachment 5 p. 1). He wrote more studies were needed. Research was underway.

The Elbow Valley Constructed Wetland was constructed in 1996, it featured stormwater managements ponds “used to test natural water purification methods and experimental water treatment technologies” (Johnson, 2002, p. 59). A report was prepared by Riparia Ltd entitled, *Efficacy of a Constructed Wetland to Treat Urban Stormwater* that provided results on the Elbow Valley Constructed Wetland (City of Calgary, 2009). Ryan (2015) noted the “experimental Elbow Valley Constructed Wetland proved that constructed wetlands could function effectively in Calgary’s cold climate” (Amell et al., 2004 as cited in Ryan, 2015, p. 107).

“Results from tests showed that the Elbow Valley and the Edgemont Wetlands removed in excess of 95% of TSS and illustrated that combining an adequate forebay with other appropriately scaled cells in an integrated treatment train could reduce stormwater sediments to levels that exceeded provincial standards. Since that time constructed wetlands have been incorporated into the stormwater management plans of numerous Calgary subdivisions, where space and local conditions allow” (Ryan, 2015, p. 124).

Moving on to why the *Calgary WCP* was significant, to my knowledge, no other Albertan or Canadian municipality has established a wetland mitigation bank and a parallel

process to handle wetland approvals. This resembled a new collaborative governance process. New governance models are associated with third-generation responses to urban sustainable development (Dale, Introduction, 2012). They are also associated with place-based approaches. Lamontagne and Carr (2011) noted the latter are difficult to evaluate. The authors assert it is because place-based approaches "...seek to harness social innovation; driven by local opportunities, [further] the paths to objectives are multiple and are unknown during the initial phases. This mean iterative learning and failure is expected as part of the process" (p. 4).

Stewart (2008) complimented the *Calgary WCP*, she asserted the plan was "comprehensive and provide[d] policy for conserving all wetlands within City limits" (p. 185). Stewart described the *Calgary WCP* and the Environmental Reserve (ER) Setbacks Guidelines as "...administrative tools to achieve wetland conservation goals provided for elsewhere in Calgary's statutory planning documents, policies and plans" (p. 185). Stewart was concern because these administrative tools were not enforceable further the effectiveness of these municipal policies were unknown as they have not been evaluated. There is an interplay between policy and legislation. Policy can be strategic and make use of legislative tools. The *Calgary WCP* pulls its authority from the *MGA*, which provides an ER land use designation. Calgary later developed environmental reserve setback guidelines, which used the ER definition also and were an outcome of the *Calgary WCP*.

2.7.1 Environmental Reserve Setback Guidelines

When Calgary's City Council adopted the *Calgary WCP* they also directed Administration "...to investigate the issue of utilizing appropriate tools for upland protection, including environmental reserve designation, as a means of preventing pollution to a waterbody and incorporate any such tools into the wetland functional assessment (appendix 8)" (LaFreniere, 2004, p. 1). Administration went back with a report in January of 2005, which investigated "the feasibility of using Environmental Reserve setbacks greater than six meters as a means of preventing pollution of a waterbody" (Manderson, 2005, p. 1). Administration then recommended Council direct them to develop environmental reserve setback guidelines for "land abutting the bed and shore of any lake, river, stream, or other body of water in accordance with the Municipal Government Act after consultation with City Business Units and other stakeholders" (Manderson, 2005 p. 1). The resulting recommendations were then to be

incorporated into the City's *MDP* and other policy documents. Council adopted these recommendations and requested to be kept informed.

Because of Council direction, Parks and Water Resources engaged a consultant to undertake a study "to prepare background research and recommendations on appropriate, site-specific environmental reserve setbacks to prevent non-point pollution of waterbodies in accordance with the Municipal Government Act" (Manderson, 2006a, p. 1). The background study provided "background information and analysis on the scientific literature and legislation and policy used in determining appropriate setback buffers" (Manderson, 2006b). Based on this research a draft policy with setback criteria was formulated by Administration, the setback criteria factored in "waterbody type, slope, vegetation, cover and local groundwater influence" (Manderson, 2006b, p. 1). The draft policy was circulated to business units and external stakeholders, the guidelines were then "revised and refined in consultation with watershed groups and in discussions with Alberta Environment" (Manderson, 2007, p. 1). The final draft policy went to the S.P.C on Utilities and Environment on April 25, 2007. Stewart (2008) wrote these guidelines were "being used during the subdivision process to ensure that a sufficient strip of land adjacent to lakes, rivers, streams and wetlands is required to be dedicated as environmental reserve" (p. 157).

The development industry did not support the adoption of the ER setbacks. This was evident when Urban Development Institute – Calgary, submitted a letter to the S.P.C. on Utilities and Environment requesting the proposed ER setbacks "by tabled for one month to allow for further consultation with the development industry... We cannot support the proposed ER setbacks and would request the opportunity to meet with Administration to rework and refine the report" (Flynn, 2007, p. 1). However, the committee carried the report recommendation and recommended Council adopted them as well, which it did at its May 7, 2007 meeting. Council "directed Administration to apply the Environmental Reserve Setback Guidelines and integrate the guidelines into the Calgary Wetland Conservation Plan and other documents such as the Calgary Plan, as appropriate" (Posada & Frigo, 2012, p. 1). Two Alderman opposed the recommendations, Aldermen Hodges and McIver (City of Calgary, Office of the City Clerk, 2007).

2.8 Literature

In Chapter two, in the section entitled, Examples of ‘Rational’ Approaches to Evaluation, I reviewed the methods found in the literature to evaluate wetland policy and the incorporation of sustainability principles in new communities. They were reviewed in part to explain why I choose my methods. Review of the grey literature, semi-structured interviews with key informants and a review of the Environmental Reserve (ER) wetlands to be conserved in the *Northeast Regional Policy Plan* (City of Calgary, 2006) area. My research methods and interview schedule, attached as appendix A, were informed by Baer (1997) and Hoch (2002). In this section I elaborate on how the literature informed the rest of the research.

From an exploratory review of the literature I learned there were two wetland policy approaches: ‘no net loss’ versus ‘no loss’ (Rubec & Hanson, 2009). I elaborated on these approaches in section 2.3.2.1. In my review of the literature, I discovered Clare (2013) had “describe[d] and explain[ed] the factors that ha[d] influenced wetland policy implementation and compensation outcomes in central and southern Alberta since the inception of the interim wetland policy in 1993” (p. 4). However, I learned the outcomes of the *Calgary WCP* had not really been investigated. They should be, because in Alberta, contemporary wetland loss is due to urbanization (Clare, 2013 and 2015).

The *Calgary WCP* is illustrative of how increasingly, municipalities are engaging in wetland management. Increasingly, municipalities are engaging in wetland management (Alberta Urban Municipalities Association, n.d.). Stewart (2008) argued “[t]he principle of subsidiarity supports municipalities as the best level of government to regulate human activities and development that impact local wetlands and riparian lands” (p. iii). The *Calgary WCP* has been mentioned in grey literature; however, the outcomes on the plan have not been researched. This is an information gap, another gap identified by practitioners is the provincial-local gap in wetland restoration (Sanderson, 2013). This is an example of the implementation gap identified in the sustainability literature (Dale & Dushenko, Reflections, 2012). After reviewing this gap, I will turn my attention to Environmental Planning and Urban Ecology.

2.8.1 Urban Sustainability and Implementation Gap

The concept of sustainability permeates the City of Calgary plans and policies. The concept is evident in the following:

- Sustainable Suburbs Study (SSS) (1995)
- the *Calgary Plan* (1998)
- the Triple Bottom Line Policy (2004)
- *imagineCALGARY* (2006)
- business plans and budgets which incorporate the triple bottom line perspective
- *PlanIt* Calgary (2007)
- the integrated MDP and CTP (2009), and the 2020 Sustainability Direction

Damianil (2008) acknowledged, the *Sustainable Suburbs Study* (SSS) “was a pivotal document in the history of land use planning in Calgary” (p. 3). The Triple bottom line “is an approach to decision making that considers economic, social and environmental issues in a comprehensive, systematic and integrated way” (City of Calgary Land Use Planning and Policy; Planning, Development and Assessment, 2010b, p. 9). *PlanIt* Calgary was the process used to create integrated land use and mobility plans. The terms of reference for the plans included the 11 Sustainability Principles for Land Use & Mobility, which are based on the Melbourne Principles adopted by the United Nations Environment Program. Principle 3, 5 and 11 resonate with this research:

“Principle 3: *Foster distinctive, attractive communities with a strong sense of place.*

Principle 5: *Preserve open space, agricultural land, natural beauty and*

Principle 11: *Utilize green infrastructure and buildings”* (City of Calgary Land Use Planning and Policy: Planning, Development and Assessment, 2009, p. 6)

In *Urban Sustainability: reconnecting space and place*, Dale (2012) argued “place-based policy-making by all three levels of government [was needed] to drive urban sustainability efforts effectively” (p. 8). Place can be described as a social construct (Dushenko, 2012). It has also been defined place as “a geographic space to which humans attribute meaning” (Tuan, 1974 as cited in Lister, 2012, p. 76). The natural environment is an important component of place that needs to be considered when working towards urban sustainability.

Dale (2012) reviewed responses to sustainable development, she broke the responses down into three categories, with distinct time periods and approaches, see Figure 2-13.

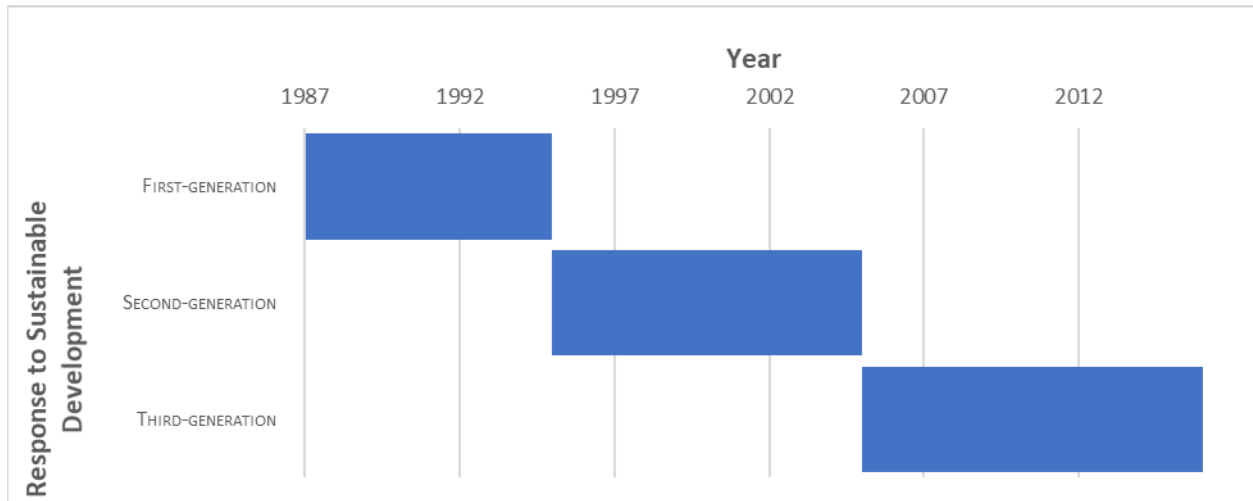


Figure 2-13: Canadian Experience and Sustainable Development Source: (Dale, Introduction, 2012)
 Note: Dale choose the publication of the Brundtland Commission (1987) to start delineating responses to sustainability

The responses were characterized by, “discourse on definitional debates about sustainable development that ha[ve] moved from shallow to deeper conceptualizations, from singular to more systemic changes, and evolve[d] from an emphasis on defining sustainable development to a recognition of the critical need for fundamental institutional reform, which many identify as a key barrier to its implementation” (Dale, Introduction, 2012, pp. 3-4).

Clare (2013) is another researcher who focused on discourse. She used a Q methodology study to examine wetland policy discourses. Clare (2013) used this method to “gain an understanding of the various discourses that exist in the on-going wetland policy debate, and how power operates to promote particular discourses over others” (p. 116). Definitions influence discourse and implementation. Dale (2012) adopted the following definition for sustainable development:

“a process of reconciliation of three imperatives: the ecological imperative to ensure global biophysical carrying capacity for the future, the social imperative to ensure the development of culturally sustainable systems of governance, and the economic imperative to ensure a viable standard of living for all” (p. 4).

Dale recognized definitions are dynamic and continuously evolve; therefore, it can be difficult to define and apply sustainable development, it’s a challenge experienced in numerous professions, including planning practice (Hanna & Slocombe, 2012).

Dale and Dushenko (2012) acknowledged there are barriers to implementing sustainable development and thus, an implementation gap. To address the implementation gap and move towards urban sustainability, Dale and Dushenko focused on seven principles:

- “*Designing ‘with’ rather than over,*
- *place and space,*
- *regenerating the public sphere,*
- *communities as interconnected systems,*
- *mobilizing community capital through strong leadership,*
- *spatial justice for all, and*
- *new governance models” (pp. 273 -280).*

Based on this literature, I expected to find wetlands integrated into the built environment following the adoption of the *Calgary WCP*.

2.8.2 Environmental Planning and Urban Ecology

Municipal environmental planning needs to look at multiple spatial scales, particularly the urban regional landscape. Cuthbert and Tyler (2016) highlighted “there are few active examples of environmental planning at the municipal level in which landscapes systems and processes are physically integrated into land use patterns or development forms other than as a direct response to flood risks or hazardous terrain conditions” (p. 5). Calgary’s *Open Space Plan* acknowledged this, historically ESAs were protected because of “a coincidental overlap between undevelopable land...and the natural habitat” (City of Calgary. Parks, 2002, p. 43).

In brief what I understood from this literature was water and how it moves in the landscape is important. If planners take the movement of water into consideration, then how planning is done will change. Based on the literature, two themes I expected to find in the data were the importance of wetland complexes and hydrological flow, as well as integration of wetlands into the built environment. The importance of these themes was highlighted during interviews with key informants. An interviewee held the view wetlands could not be meaningfully protected unless their entire catchment or the wetland’s natural source of water was protected (City of Calgary – Urban Conservation Lead; personal interview).

Cuthbert and Tyler (2016) argued it was possible to have development and maintain the landscapes’ hydrologic function and ecosystem services. To do this, the authors argued pre-development ‘flow networks’ needed to be identified so they could be incorporated into land use

plans and development. The authors argued development could be strategically configured “to spatially maintain flow networks and help reduce the size and cost of engineered stormwater management systems” (Roseland, 2012 in Cuthbert and Tyler 2016, p. 3). Cuthbert and Tyler identified pre-development ‘flow networks’ in two demonstration sites in the Prairie Pothole Region landscape, then the authors proposed residential development layouts that respected the flow networks. The authors used their method to create a Low Impact Development (LID) residential scenario in their demonstration site and then compared it to a typical residential approach. The result, “[t]he LID scenarios were able to preserve more wetland area and have less of an impact on the hydrology of the two sites” (Cuthbert & Tyler, 2016, p. 15). Cuthbert and Tyler stressed “[b]y incorporating networks rather than removing them the ecological and hydrological performance of urban regional landscapes [could] be improved” (p. 17).

Because of Cuthbert and Tyler (2016), I now understand how planners can practice Low Impact Development (LID), a stormwater management design philosophy. Ryan (2015) described LID as “primarily a stormwater management system that is intended to restore the function of pre-development hydrology to urban areas” (p. 1). Cuthbert and Tyler (2016) noted their method could “...be used ... in the planning process to identify how utilities, roads and building sites [could] be spatially organized to complement rather than conflict with existing landscape flow systems in areas with minimal topographic relief and specifically in the Prairie Pothole Region landscape” (p. 3). For a long time, I struggled to understand the planner’s role in furthering LID. Cuthbert and Tyler (2016) offered insight into my struggle, water and land are bifurcated among professional disciplines, “...water has been viewed as the territory of municipal engineers rather than municipal planners” (p. 2). Understanding water and how it moves in the landscape is important and maintaining wetlands in the landscape requires both land use planning and storm water engineering.

Urban development and stormwater management are inextricably linked, which is why collaboration between professions is important. If you only focus on urban development, then engineers will be left cleaning up non-point sources of pollution with expensive stormwater treatment. Perhaps this is illustrative of why urban ecology is important. McDonnell (2011) defined the discipline as follows:

“Urban ecology integrates both basic (fundamental) and applied (problem oriented), natural and social science research to explore and elucidate the multiple dimensions of urban ecosystems” (p. 9).

Urban ecology is interdisciplinary, it can be conceptualized as either ecology ‘in’ cities or ecology ‘of’ cities (Grimm et al., 2000; Wu, 2008 as cited in Niemelä et al., 2011). A question I have asked myself is, whether engineered stormwater wetlands are a part of ecology ‘in’ cities? Are constructed stormwater treatment wetlands an example of how “ecological patterns and processes differ in cities as compared with other environments” (Niemelä et al., 2011, p. 2)?

2.8.2.1 Stormwater facilities

As mentioned in the section Environmental Context (see section 2.2.1) wetlands in the Prairie Pothole Region have specific characteristics and functions in the landscape. Wetland loss is connected to poor water quality because wetlands help trap pollutants and sediments; this is an important stormwater treatment function. Removing natural wetlands means replacing wetland function. Clare et al. (2011) highlighted in practice when wetlands are removed from the landscape the location of wetland compensation sites is “rarely driven by ecological criteria but...instead influenced heavily by land availability” (p. 172). Therefore, when wetlands are removed from the urban landscape, stormwater management facilities are constructed.

Constructed stormwater treatment facilities are expensive to build and operate. It does not make sense to eliminate wetlands and then replace their function with infrastructure. Particularly since “the removal of existing wetland[s] almost always results in removal of ecological processes which can rarely, if ever, be duplicated” (Ontario, 1993, p. 99 as cited in Schulte-Hostedde et al., 2007, p. 89). This is not sustainable, ecological or financial. The Province acknowledged the high cost of replacing wetland functions in the interim wetland policy, “The costs of replacing the water purification, flow regulation and erosion control function of wetlands is high” (Alberta. Water Resources Commission, 1993, p. 13). Despite this acknowledgement wetlands continued to be removed from cities and replaced with stormwater infrastructure, contemporary wetland loss is due to urbanization (Clare 2013 and 2015).

In Calgary, stormwater facilities have been constructed to offset the loss of wetland function. Manderson (2016) highlighted, in his presentation to the Alberta Land Institute (ALI) Land Use Conference, in 2014 the 1,685 Stormwater facilities amounted to +/-1900 hectares (p.

13). Manderson (2016) noted from 1962 to 2014, approximately 2,163 hectares of wetland area was lost within the 2015 city limit (p. 13). When the City’s parallel process for wetland approvals was in place wetland loss continued, I calculated it to nine percent from 2005 to 2014.

Year	Wetland area (hectares)	Wetland loss (percentage)
1962 (baseline)	3,848	N/A
2005	1,853	52
2014	1,685	9

Table 2-4: Wetland area within Calgary’s 2015 City limits Source: (Manderson, 2016, p. 13). Wetland loss calculated by author

Schulte-Hostedde et al. (2007) highlighted using natural wetlands for stormwater treatment was discouraged:

“[u]sing natural wetlands to mitigate the impact of development contradicts the intent of protecting wetlands from the impacts of development. Instead SWM [stormwater management] facilities that mimic the functions of natural wetlands have been designed and constructed in many communities across Ontario to protect the downstream areas, including natural wetlands” (p. 91).

There are examples of constructed stormwater treatment wetland in Calgary such as the Shepard Wetland, Canada’s largest man-made wetland (City of Calgary, n.d. C). There are other man-made wetlands that predate its construction. The Elbow Valley constructed wetland is an experimental water treatment facility completed in 1996 (Kinniburgh, 1999). Kinniburgh reported the wetland park was “a pilot project funded by the city, province and federal government” (p. B1). Similar ponds exist in the Bridlecreek portion of Bridlewood, Saddle Ridge, Hanson Ranch, Edgemont, and Rocky Ridge (McCormick, 2001; Johnson, 2002). When Ducks Unlimited got involved with Calgary’s wetland inventory, it was reported that in addition to mapping and classifying wetlands, they “offer[ed] advice on how to develop naturalized retention ponds that [would] serve to filter and cleanse stormwater drainage” (Howard, 2001, p. B4).

Ryan (2015) conducted research on “the evolution of Calgary’s stormwater management policies and practices from traditional curb-and-gutter systems to the current approach that attempts to mimic the natural hydrological cycle including the use of LID [Low Impact Development] principles” (p. 7). Readers interested in LID and stormwater should read her work.

The purpose of this section is to highlight constructing stormwater treatment facilities is expensive.

Both Calgary and Edmonton have rivers running through them. These rivers accept stormwater. Both cities have spent considerable amounts of money to treat stormwater, which is provincially regulated. It is paradoxical, the province approves eliminating wetlands in the landscape and by extension, wetland functions. Then the province requires cities to replace the lost ecological functions. Schulte-Hostedde et al. (2007) highlight the dilemma “SWM [stormwater management] and wetland management are provincial interest, but funding [in Ontario] is left to the municipalities. The province should be investigating innovative ways to achieve their interests without undue burden to municipalities” (p. 92). What follows are examples of the costs associated with stormwater facilities in Edmonton and Calgary.

The City of Edmonton was required by the province to have a comprehensive stormwater quality control strategy and total loading plan (Partners FOR the Saskatchewan River Basin, 2015). The City spent \$10 million to construct the Kennedale wetland in Hermitage Park (Pratt, 2015, p. A7). Pratt (2015) reported the constructed wetland, the first of its kind in Edmonton, opened in 2010 and in the first five years it “...kept 7,400 cubic meters of dirt out of the [South Saskatchewan] river” (p. A7). The City of Edmonton also spent \$7.3 million on the Groat Storm Basin End-of-Pipe stormwater treatment facility (Pratt, 2015, p. A7). This facility uses filters to treat the stormwater, after it rains the filters need to be changed, Pratt reported cost of operating this facility was \$450,000 annually (p. A7). It’s reported “[t]he ‘end-of-pipe’ filter chamber, [was] the first of its kind in Canada, [and] capture[d] about 20 per cent of the polluted sediment heading to the river from the big Groat stormwater pipe” (Pratt, 2015, p. A7).

The Shepard Wetland Project is a stormwater treatment facility in Calgary. According to the City’s website, the wetland:

“functions as both a stormwater storage facility and a treatment wetland that naturally filters stormwater, improving [its] quality...At 156 hectares (385 acres), it is the largest constructed stormwater treatment wetland in Canada” (City of Calgary, n.d. C).

The Shepard Wetland was built over two years, 2007 to 2009: was

“designed to manage and treat stormwater before eventual discharge to the Bow River. It receives stormwater runoff from nearly 6,000 hectares...on the east side of the City of Calgary. The total cost of the project was \$58 million, or about \$252,000 per hectare” (Wang et al., 2011, p. 24).

In 2018 dollars, the cost of building the Shepard Wetland was roughly \$64.5 million (Bank of Canada, n.d.). The Shepard Wetland Project was a long time in the making, “the origins of the project date back to the early 1980’s when The City wanted to provide serviced land for industrial development on the east side of Calgary” (Chivers, 2011). In the 2005 budget documents it was noted the Shepard Wetland was “financed by self-supported debentures, government grants and private contributions” (City of Calgary, 2005b, p. D40).

2.9 Summary of Context

Before evaluating the outcome of the *Calgary WCP* this research sought to understand the context of the plan. This was a daunting exercise, because it involved a review of the following:

- Environmental, economic, social, and political context
- Planning context
- Water management context
- Policy cycle, including problem recognition, policy formulation, choice of a solution and the policy itself
- Relevant literature

In summary, the City of Calgary has experienced strong economic growth and rapid population growth. Managing growth has been a challenge, especially because the suburbs accommodated almost all the population growth. This put considerable development pressure on the landscape. As a result, protecting the environment emerged as a Council priority. Wetlands were featured under this priority; however, gradually wetlands were placed under Council priorities that focused on place.

The *Calgary WCP* is an example of how municipalities are increasingly developing wetland policies to address wetland loss. These policies are context-based approaches and they are a reaction to aspatial provincial policies. The Government of Alberta’s interim wetland policy, resulted in wetlands being removed from the major urban areas, Calgary and Edmonton, and restored elsewhere (Clare, 2013). Municipal wetland policies are making use of land use

planning tools. In Alberta, municipalities are given considerable autonomy as planning authorities, so the planning framework was reviewed.

The *Calgary WCP* was adopted prior to many of Calgary's current planning documents, such as *imagineCALGARY* and the 2009 *MDP*, which replaced the *Calgary Plan* (City of Calgary, 1998b). The *Calgary Plan* was a response to a legislative requirement, it consolidated existing Council approved policies and new policies were only developed if required by the 1994 *MGA*, such was the case for dedication of reserve land. Wetlands were scarcely mentioned in the *Calgary Plan*. The dedication of Environmental Reserve (ER) was only mentioned when referring to undevelopable lands and in the definition of a floodway. Seen in this context the *Calgary WCP* was quite innovative. While there was some recognition wetlands and their shores qualified as ER (City of Calgary. Park Development and Operations, 2001). The *Calgary WCP* utilized the ER definition in a novel way, to secure priority wetlands for conservation. Approximately 600 of the 8000 wetlands identified in Calgary's wetland inventory qualified as ER wetlands (City of Calgary, 2004, p. 7 and 15).

Calgary municipal wetland policy reflected the provincial wetland policy, which adopted a 'no net loss' approach to wetland management and a mitigation hierarchy. There were many stakeholders involved in the process to develop the *Calgary WCP*, as was evidenced by the letters of support presented to Committee and Council. The plan truly did combine a multiplicity of voices, such as the Province's, Ducks Unlimited and the development industry. The letters submitted reflected different perspectives on matters such as engineered stormwater wetlands and the need to protect uplands around wetlands. When the *Calgary WCP* went to the standing policy committee, the committee added an additional recommendation before sending the plan to Council for final approval. The additional recommendation was to investigate appropriate tools for upland protection, the result of this additional recommendation was the Environmental Reserves Setback Guidelines, which were adopted by Council in 2007.

When the *Calgary WCP* went to Council, the committee recommendations were unanimously carried, the *Calgary WCP* was timely because a few months earlier, during the public hearing for the *Southwest Community "A" and Employment Centre Area Structure Plan*, Council heard from many members of the public that wetland protection was important, this was

in the context of protecting Radio Tower Creek and the Priddis Slough from urban development with adequate buffers and setbacks.

When the *Calgary WCP* was adopted it was expected the implementation would occur through planning documents. The regional policy plans/or regional context statements refer to wetland protection; however, it was expected wetlands conservation was subject to further review at the Area Structure Plan (ASP) and Outline Plan (OP) /Land Use Amendment application stage. Environmentally Significant Areas (ESA) and Environmental Open Space (EOS) are important definitions and policies found in Calgary's planning documents. Wetlands can feature into these definitions. ESA are identified at the ASP level; however, the decisions regarding protecting these features happens at the OP planning stage.

Lastly, relevant literature was reviewed to inform my research. In brief, the literature informed my topic selection, my methods, interview schedule and my data analysis. Through my review, I discovered the *Calgary WCP* had been mentioned in grey literature; however, the outcomes on the plan have not been researched. This is an information gap. Another gap identified by practitioners is the provincial-local gap in wetland restoration (Sanderson, 2013). This is an example of the implementation gap identified in the sustainability literature (Dale & Dushenko, Reflections, 2012). Designing 'with' rather than over is a requirement of sustainable development, to do this environmental planning is needed. However, there are few examples of it in Alberta, as result stormwater management facilities are constructed to replace lost wetland function. Cuthbert and Tyler's (2016) research identified how planners can practice low impact development and maintain the hydrological function of the urban region.

Chapter 3. Context-Based Policy: The Calgary Wetland Conservation Plan(WCP)

3.1 Practice, Calgary WCP

Wetland policies have been developed at both the federal and provincial level, although not every province has a policy in place (Lynch-Stewart et al., 1999; Lynch-Stewart et al., 1993; Rubec & Hanson, 2009). Often federal and provincial government policies are aspatial; however, there is a need for spatially targeted approaches (Bradford, 2005). Clare's (2013) research underscored the need for spatially targeted wetland policies. Clare found in Alberta, wetland loss was concentrated around the Edmonton and Calgary. The City of Calgary recognized its urban expansion threatened both the existence and functioning of wetlands (City of Calgary. Office of the City Clerk, 2001). The creation of a wetlands inventory was the first step "to create a made-in-Calgary [wetland] policy, rather than have it imposed by the provincial or federal governments" (Hope, 2002a, p. HS05). The inventory was an essential precursor to the *Calgary WCP*, which is the municipal policy framework used to prioritize wetlands for protection in Calgary.

The City of Calgary adopted the *Calgary WCP* in 2004. Calgary was identified as among the "first cities in Canada to define priorities and best practices for wetland conservation" (City of Calgary, 2011, p. 45). Ryan (2015) suggested the *Calgary WCP* "was the first municipal wetland policy in North America" (p. 127). The plan was certainly exemplary, planning measures were used to protect high priority wetlands. Using the land use planning process to identify and protect high priority wetlands is an innovation of the Government of Ontario. Lynch-Stewart et al. (1993) asserted *Wetlands: A Statement of Ontario Government Policy* (1992) was "innovative in Canada, and perhaps the world" (p. 7).

The *Calgary WCP* has been described and/or referred to in the literature: Kevinsen et al. (2013), MacIntyre (2011), Ryan (2015) and Stewart (2008) all mention it. The literature pointed out the following:

- An inventory of wetlands was a necessary precursor to the *Calgary WCP*.
- The plan was innovative and raised awareness of the importance of wetlands functions.
- The plan was empowered by the Environmental Reserve definition of the *Municipal Government Act*

- No net loss of Calgary wetlands was a policy goal, as a result a mitigation hierarchy was adopted, the hierarchy was avoid, minimize, and mitigate. With compensation listed as the last priority in mitigation.
- The City was paid compensation when ER wetlands were removed, this compensation was considerably higher than what was paid to the province. The intent behind compensation was to deter the removal of wetlands.
- The results of the *Calgary WCP* are mixed

What follows is a more detailed review of the *Calgary WCP*, by various authors.

Stewart (2008) asserted the plan was innovative and would either protect wetlands or ensure impacts were mitigated:

“The Wetland Conservation Plan is innovative and is being used to ensure that wetlands are protected from the impacts of development. Using the Guide, Calgary has successfully obtained compensation for wetland restoration or enhancement if wetlands cannot be avoided during the process of subdivision and development, or the impacts cannot be mitigated. The Wetland Conservation Plan also provides for a regional strategy to ensure that wetlands in the Calgary region are inventoried, mapped and protected” (p. 183).

MacIntyre (2011) mentioned the *Calgary WCP* in passing when he referred to plans and documents that support the environmental policies in Calgary’s MDP. The MDP “includes policies that call for the protection of biodiversity within wetlands and the protection of aquatic habitats through preservation, restoration and the creation of wetland bank sites [Policy 2.6.4 q]” (City of Calgary, 2011a, p. 45).

Keivinsen et al. (2013) provided a good summary of the *Calgary WCP*:

“An in-depth classification and inventory of the wetlands within Calgary was conducted during the development of the plan and was an important factor in the plan’s going forward. The main component of the plan is a flexible no-net loss approach. When developers are subdividing municipal land with wetlands present, the city of Calgary has the right to take that land as an environmental reserve through the Municipal Government Act. The developers are given the option to retain the land by paying compensation to the city for the cost of the land plus what it would take to construct a new wetland in another location. This compensation is considerably more than the provincial equivalent. The compensation generated from the plan is collected in a fund which is used to improve other existing wetlands or create new ones in more sustainable locations. The additional cost is intended to be a disincentive for developing over wetlands” (p. 121).

Ryan (2015) wrote the *Calgary WCP* contributed to changing the practice whereby all wetlands were drained in advance of development.

“The Wetland Conservation Plan was the catalyst for acknowledging that wetlands are an integral part of a healthy watershed in the Calgary region and provide critical functions such as water quality protection, flood control, and aesthetic, recreational and economic benefits... While the policy has had variable results in protecting the remaining wetlands that lie in the city’s growth area, it did change the common practice of draining virtually every wetland before development. The plan encourages “no net loss of function” based on functionality, biophysical impact and environmental significance assessments. That function includes groundwater discharge/recharge, and water quality improvement, as well as planning for the quality and discharge rates of stormwater runoff in new communities... Wetland protection is now included in stormwater plans and erosion and sediment control practices, although there is a constant battle between the development industry and the City’s Parks and Water Resources business units regarding the question of natural wetland protection, especially in areas with a high percent of ephemeral wetland coverage” (pp. 127-128).

This research seeks to further understand the outcomes of the *Calgary WCP*, a municipal policy created to protect wetlands in an urban context. I conducted what Baer (1997) termed a ‘post hoc evaluation of the plan outcomes’. To conduct this type of evaluation, it was necessary to understand the context of the plan, so I reviewed the grey literature. Key informants were questioned about the context of the *Calgary WCP* to triangulate my research. Further, I sought their input on the outcomes of the plan, and whether they believed changes to provincial wetland policy enabled municipalities to conserve wetlands and address issues identified through past policy analysis.

It was essential to talk to practitioners, because policy does not necessarily reflect practice. This was acknowledged in Calgary’s *Open Space Plan*, “Policy does not necessarily reflect how business is being done but rather how it should be done” (City of Calgary. Parks, 2002, p. 73). When I was a municipal practitioner, I discovered there is often a gap between what a plan aspires to and what is done. This implementation gap is identified in the urban sustainability literature (Dale & Dushenko, Reflections, 2012). Further, practitioners have identified a ‘provincial-local gap’ in wetland restoration (Sanderson, 2013). This gap was identified at a 2013 forum organized by the Alberta North American Waterfowl Management Plan Partnership (NAWMP), where 78 wetlands professionals gathered to discuss *Wetland Restoration in Alberta: Current Status and Future Potential* (Sanderson, 2013, p 2).

Lastly, to my knowledge, no other municipality in Alberta or Canada has established a wetland mitigation bank and parallel process with a provincial regulator for wetland approvals. This resembled a new collaborative governance process. New governance models are associated with third-generation responses to urban sustainable development (Dale, Introduction, 2012). They are also associated with context-based approaches.

3.1.1 Semi-Structured Interview Research

Interviews are a good way to get information on peoples' perspectives. Why is this important? Plans, "...combine a multiplicity of viewpoints and voices" (Hoch, 2002, 57). Gray (2009) noted interviews are the favoured approach when "there is a need to attain highly personalized data, opportunities for probing are required, and a good return rate is important" (p. 371). I conducted semi-structured interviews with key informants and a good response rate was important. I prepared questions ahead of time to guide the interview, my interview questionnaire is attached in the appendices (see Appendix A – Interview Questionnaire).

My interview questions were grouped into three categories: context; outcomes; and whether the 2013 provincial wetland policy responded to issues identified in the past. The search for outcomes was informed by Baer (1997) and Hoch (2002), I incorporated the following questions into my interview schedule:

1. What was the intention of the *Calgary WCP*?
2. Was the plan implemented? Who used the plan? What were the expected outcomes? What were the unanticipated outcomes?
3. What are the similarities between the plan and reality. What difference did having a plan make?

I also asked interviewee if in their opinion the 2013 provincial wetland policy responded to issues identified in the literature, such as: "fragmented jurisdiction, interagency communication; financial arrangements, enforcement and promoting informed decision making" (Schulte-Hostedde et al., 2007, p. 83).

Not all the questions were asked, and new questions arose during the interview. Gray (2009a) noted with respect to structured and semi-structured interviews "the issue of validity can be directly addressed by attempting to ensure that the question content directly concentrates on the research objectives" (p. 375). My interview questions centred on the context of the *Calgary*

WCP, plan outcomes, and whether the new provincial policy responded to issues identified through past policy analysis, these issues were from the literature.

3.1.1.1 Key Informant Identification

From my preliminary research, I identified five individuals whom I wanted to interview, I interviewed three of them. My initial interviewees and/or contacts then passed along my background information and three additional people contacted me to arrange interviews. Between April 16 and May 10, I conducted six interviews: three in-person and three over the phone. The individuals were familiar with The *Calgary WCP* and/or Provincial Policy. To demonstrate to readers the trustworthiness of the interviewees, I include a job title and/or description of how the interviewees are familiar with Calgary’s Plan and/or Provincial Policy. I clearly communicated this to interviewees when I sought their consent to be interviewed and I worked with them to come up titles they were comfortable with (see Appendix B – Interview Consent Form).

My interviewees included the following:

Job Title/Description	Identifier in Practicum
• Biologist and Environmental Planner, City of Calgary	City of Calgary – Biologist, Environmental Planner
• Biologist, Environmental Planner, Specialized (urban and rural) Alberta municipality. Was on the team that developed the mitigation piece of the Alberta Wetland Policy	Specialized Alberta municipality – Biologist, Environmental Planner
• Biologist, Parks Planner and Urban Conservation Lead, City of Calgary	City of Calgary – Urban Conservation Lead
• Manager, Community Planning, City of Calgary	City of Calgary – Manager, Community Planning
• Manager, Provincial Environment Department	Province – Manager, Provincial Environment Department
• Policy Staff, Urban Advocacy Group	Urban Advocacy Staff

Table 3-1: List of interviewees familiar with Calgary’s Plan and/or Provincial Policy

3.1.1.2 Semi-Structured Interview Process

Potential interview participants were contacted via email. I attached my research backgrounded and the informed consent form. I set up three in-person interviews. Prior to my interviews I read through my research questions as well as relevant documents. When I interviewed someone from the Province I reviewed the wetland policy factsheets. When I interviewed individuals from the City of Calgary I reviewed the *Calgary WCP*. Because my criteria to be interviewed was quite broad, some questions on my interview schedule were not asked. Some of the people I interviewed had limited knowledge of the context or Calgary’s Plan; however, they had knowledge of provincial policy. The shortest interview lasted 30 minutes the longest lasted one hour and 30 minutes. Five of the interviews were audio recorded and then transcribed. I took notes during one interview.

3.1.1.3 Interview Coding

Gray (2009b) outlined general principles for how to code data in qualitative analysis, they are follows:

1. *“Transcribe the data*
2. *Collect/code/collect*
3. *Familiarization*
4. *Focused reading*
5. *Review/amend codes*
6. *Generate theory” (p. 496).*

Gray (2009b) advised for small data set, 60 pages of transcripts, researcher could use these principles and do a manual analysis. My interview transcripts and notes tallied 59 pages. Hayer (2015) used Microsoft Word and the table function to analyze the qualitative data from his interviews. I also used the table function in Word. First, I transcribed the interviews, amended my coding framework, which includes codes and sub-codes, then I read through all the data to familiarize myself with it. Then I converted my data to tables and I did a more focused reading and made notes.

No	Emergent Code	Data	Memo

Table 3-2: Example of table used for more focused reading Source: (Hayer, 2015, p. 61)

I reviewed all the transcripts to colour code them based on the *a priori* categories. I merged all the *a priori* data, added a column for sub-codes, read through the data again, then coded it based on sub-codes. I made notes about emergent codes as well. After, I wrote up summaries for *a priori* codes.

The coding framework was informed by the literature. I anticipated some outcomes from the *Calgary WCP*, such as: continued wetland loss, avoidance, minimization, compensation and restoration. Further, I anticipated the problems encountered in implementing Alberta's wetland policy would be like those experienced in Ontario. Schulte-Hostedde et al. (2007) concluded "effective implementation of the [2005] PPS [Provincial Policy Statement] [would] be impeded because the policy fail[ed] to adequately address the fundamental problems affecting wetland management in Ontario: fragmented jurisdiction, interagency communication, financial arrangements, enforcement, and promoting informed decision making" (p. 92). I included these in my coding framework (see Appendix C – Coding Framework).

A word about codes, also known as categories. Gaber and Gaber (2007b) stressed the importance of categories and commented they "are the variables that connect the research question to the content analysis" (p. 109). The *a priori* categories that connect the research question to the interview content are: context, outcome, and issues identified through past policy analysis/does provincial policy enable municipal conservation. I used these categories in my interview questionnaire. These codes are *a priori* because they structure my research, I then used subcategories "based upon themes that have emerged from the literature search" (Gray, 2009b, p. 519).

3.2 Framework of Assessment for the *Calgary WCP* (2004)

My research is guided by Baer (1997) and Hoch (2002), my assessment of the *Calgary WCP* seeks answers to the following questions:

1. What was the intention of the *Calgary WCP*?
2. Was the plan implemented? Who used the plan? What were the expected outcomes? What were the unanticipated outcomes?
3. What are the similarities between the plan and reality. What difference did having a plan make?

3.2.1 Intent of the *Calgary WCP*

Hoch (2002) pointed out, “[i]f we imagine planning as a kind of forethought, then the regular act of monitoring achievement means remembering the earlier intention as a framework for assessment. This framework serves not only as a cognitive reference, but an emotional benchmark as well. ‘I made this commitment. I don’t want to break it’” (p. 56). Council approved the *Calgary WCP* on May 14, 2004, the intention of the plan is stated in numerous places. To summarize the stated intent; the *Calgary WCP* was meant to:

- To increase awareness and understanding of wetlands and their functions.
- Achieve no net loss of Calgary Wetlands, through the adoption of a mitigation hierarchy, which was: avoid, minimize and lastly mitigate with compensation being the last priority.
- To use existing legislation to protect high priority wetlands, ER wetlands.
- To integrate wetlands into urban development.
- To enable the restoration of wetlands within the City Calgary or the region.

3.2.2 Was the *Calgary WCP* implemented?

Certain elements of the *Calgary WCP* were implemented. Like the Province, the City adopted a ‘no net loss’ approach to wetland management and the goal of the plan was no net loss of Calgary wetlands. Compensation was the last mitigation priority and a mitigation bank, a revenue account, was set up to collect compensation funds for future wetland restoration. Calgary became a wetland restoration agent (Province – Manager, Provincial Environment Department; personal interview). The only other wetland restoration agent in the Province was Ducks Unlimited.

The four types of Calgary wetlands are described in section 2.7. In brief, only certain types of wetlands were prioritized for protection, Environmental Reserve (ER) wetlands. Further, for the better part of ten years, the larger wetlands that were more connected or had a greater likelihood of remaining connected, were the priority, this was an informal practice the City is now trying to formalize (City of Calgary – Urban Conservation Lead; personal interview). ER wetlands are seasonal, semi-permanent, permanent, and alkali wetlands. Of the roughly 8000 wetlands identified in Calgary’s wetland inventory, approximately 600 were classified as ER wetlands (City of Calgary, 2004, p. 7 and 15). Most of the remainder were identified as ephemeral or temporary wetlands.

After the *Calgary WCP* was adopted and based on the *MGA*'s definition of ER, at the time of subdivision, the City was able to take ER wetlands without having to compensate developers. If a developer wanted to develop the land and not protect the wetland, then they were told they needed an approval to destroy the wetland under the *Water Act* (City of Calgary – Urban Conservation Lead; personal interview). The destruction of that wetland was based on a legal agreement between the City of Calgary and the developer that pointed out the City agreed not to designate a wetland as ER in exchange for certain things, namely compensation (City of Calgary – Urban Conservation Lead; personal interview). The developer would then go to the Province with an application under the *Water Act* and they would bring with them their legal agreement with the City of Calgary. The Province would issue an authorization based on the existence of the legal agreement (City of Calgary – Urban Conservation Lead; personal interview). So, the Province agreed to consider the compensation payment to the City of Calgary as being effective compensation for wetland loss. This was the parallel process developed because of the *Calgary WCP*.

According to an interviewee: “The Province largely deferred or enabled [The City] to make calls that were technically their jurisdiction, but they did not really have a tool with enough teeth. It helped to have The City come along and put in place our conservation plan” (City of Calgary – Manager, Community Planning, personal interview). In the three-years following the adoption of the *Calgary WCP*, the City received two compensations for wetlands losses, and Administration was negotiating more (Manderson, 2008). Early on it became apparent developers had “a strong tendency to go straight to compensation without a thorough evaluation of the feasibility of all mitigation priorities” (Manderson, 2008, p. 1). Calgary identified seven mitigation priorities, see policy 2.2.10 in the *Calgary WCP* or in this document the section entitled *Outline Plans*. However, compensation became the de facto practice.

Manderson (2008) identified two issues affecting the implementation of the *Calgary WCP*. First, there was a lack of large sites within municipal boundaries where compensation could occur and where wetlands would be sustainable (p. 1). Second, the high cost of land resulted in a high cost to developers and potentially a high cost to the City for replacement sites (p. 1). Compensation paid to the City was generally between \$350,000 to \$400,000 per hectare, which included the cost to purchase the land and the cost to do restoration (City of Calgary –

Biologist Environmental Planner; personal interview). Towards the end [2015], compensation was up to \$450,000 per hectare (City of Calgary – Urban Conservation Lead; personal interview).

From 2004 to 2015, the City amassed over \$30 million in compensation funds (City of Calgary – Urban Conservation Lead; personal interview). During that time, no wetlands compensation projects were completed. In 2015, the Province suspended Calgary’s status as a wetland restoration agent, which put an end to their ability to collect compensation (Province – Manager, Provincial Environment Department; personal interview). As a result, wetland compensation is now going to Ducks Unlimited and developers are paying the provincial compensation rates, which are considerably lower than the rates paid to the City of Calgary. The reason the Province suspended Calgary status and ability to collect compensation was because the City had an obligation to restore wetlands but limited opportunity to do so within its municipal boundaries (Province – Manager, Provincial Environment Department; personal interview).

The City of Calgary tried to address its limited ability to do restoration within its boundaries. In 2008, in an update on the implementation of the *Calgary WCP*, Administration requested Council revise the policies of the Wetland Mitigation Framework to consider compensation sites outside the City of Calgary’s municipal boundaries (Manderson, 2008, Attachment 1 p.1). Thereafter, a pilot project in a neighbouring municipality was done, which raised questions around ownership and jurisdiction (Province – Manager, Provincial Environment Department; personal interview). Doing compensation on a regional basis entailed negotiating with neighbouring municipalities, which was difficult to do when there were no structures in place to facilitate a larger plan (City of Calgary – Urban Conservation Lead; personal interview).

3.2.2.1 Who used the plan? Who resisted it?

The work of planning, parks and water resources is now more integrated, a result of the *Calgary WCP*. Shortly after the plan was adopted, a land use planner incorporated it into the planning process, specifically into long range regional planning and then more detailed master planning in the North East (NE). Wetlands were included in regional policy plans, then ASPs, and finally OPs. Planning work in the NE brought corporate focus to the *Calgary WCP* and

Administration had to figure out how to implement the plan (City of Calgary – Manager, Community Planning, personal interview). There were many wetlands in the NE, the land is flat and was pot marked with hundreds of them (City of Calgary – Manager, Community Planning, personal interview). Pre-development, overland drainage provided water to these wetlands. From a planner’s perspective, the question to consider was how wetlands would survive post development, when drainage patterns changed (City of Calgary – Manager, Community Planning, personal interview).

When the *Calgary WCP* was developed, no thought was given to how wetlands would be integrated into development (City of Calgary – Manager, Community Planning, personal interview). This led to conversation with the Province on how to ensure the long-term viability of natural wetlands, the key was how to ensure wetlands were provided with water at a natural rate. The OP stage is when decisions are made on whether to protect previously identified wetlands, Parks reviews the required assessments and makes a recommendation. Their recommendations were influenced by whether wetlands could survive post urban development after overland drainage patterns were altered. It was at the OP stage when negotiations took place with the developers to determine which wetlands were going to require financial contributions (City of Calgary – Manager, Community Planning, personal interview). In practice, smaller wetlands were not protected because post development, the assumption was they would not have water inputs.

An interviewee said the Water Resources group has since taken a much more active role in wetland management and planning, with an equal role to Parks in determining the priorities for wetland protection (City of Calgary – Urban Conservation Lead; personal interview). To this day, Water and Parks work hand and hand. Wetlands have become a piece of stormwater management infrastructure not previously available (City of Calgary – Manager, Community Planning; personal interview). While wetlands are not storm ponds, they provide an opportunity to divert water (City of Calgary – Manager, Community Planning; personal interview). Ryan (2015) maintained the *Calgary WCP* was a catalyst for change.

“Wetland protection is now included in stormwater plans and erosion and sediment control practices, although there is a constant battle between the development industry and the City’s Parks and Water Resources business units regarding the question of

natural wetland protection, especially in areas with a high percent of ephemeral wetland coverage” (pp. 127-128).

Who resisted the *Calgary WCP*? There was and still is pressure from developers and the development industry to remove wetlands to maximize developable land. Developers and the development industry did not support the work of Administration (City of Calgary – Manager, Community Planning; personal interview). This is not surprising. As a result, Administration worked to explain the rationale, the process, and why developers were bound to it. While the *Calgary WCP* adopted a mitigation sequence, and avoidance of wetland impacts was supposed to be practiced, wetlands were not avoided. Instead wetland loss continued at an alarming rate (City of Calgary – Biologist, Environmental Planner; personal interview). This was not expected.

3.2.2.2 Expected outcomes

After the adoption of the *Calgary WCP*, it was expected wetlands would be avoided, or impacts would be minimized, and compensation would only be paid in those cases where wetland loss could not be mitigated. Calgary’s compensation rates were quite high because they included the value of the land and the cost of restoration. It was anticipated the high cost associated with removing wetlands would deter wetlands loss. Further, the compensation paid to the City of Calgary would help restore wetlands in the City and possibly the region. The primary goal of the *Calgary WCP* was no net loss of Calgary wetlands.

Laycock Park Enhancement Project – Calgary’s first wetland compensation project?

Initially, my interest was in wetland restoration in urban centres and I wanted to do a narrower case study on the Laycock Park Wetland Restoration Project in Calgary. The Laycock Park Wetland Restoration Project was identified early on as a wetland compensation site (Manderson, 2008, p. 1). This project was included in the 2012-2014 business plans. *Sans façon*, a Glasgow-based collective, was hired by the Utilities and Environmental Protection (UEP) Department for the Laycock Park/Nose Creek Restoration project (Mellema, 2013). Melleman (2013) highlighted the initial goal was “to create a single project integrated into the wetland’s redesign which would further the public’s understanding of the creek’s history and condition” (p. 2). However, *Sans façon* worked with the team responsible for the park’s design and contributed to a redesign. The concept plan for the project was quite impressive (see Figure 3-1).

When I visited the site in 2015 it was a construction zone (see Figure 3-2). When I visited the website back in 2015, the expected completion date was pushed back. When I visited the website again in 2017, it asserted the following:

“the decision was made to exclude the wetland restoration and Nose Creek realignment from the improvements” (City of Calgary, n.d. B).

The following rational was provided:

“after extensive feasibility testing, it was determined that the concept [was] not feasible. Unforeseen site conditions caused by previous land uses at this site left subsurface conditions which would significantly increase the costs of earth moving required for the creek and wetland restoration” (City of Calgary, n.d. B).

An interviewee provided a different rational, Administration pulled their application [to do restoration at Laycock Park] because they did not have a reliable source of water (City of Calgary – Urban Conservation Lead; personal interview). See the section entitled, *Views from the City of Calgary* for more context on this quote.

Hoch (2002) raised the question, “...if we know after the fact that the plan was not followed, what does it mean to evaluate the plan?” (p. 59). I will now turn my attention to the unanticipated outcomes and what difference having a plan in place made. Then, I will turn my attention to answering the following question: what are the similarities between the plan and reality?



Figure 3-1: Concept Plan for the Laycock Park Enhancement Project, proposed to be Calgary’s first wetland compensation project Source: (City of Calgary, n.d. D)



Figure 3-2: Construction Signage at Laycock Park for the Nose Creek Sanitary Trunk – Laycock Park Siphon and Vanishing Pond Associated Structure Photo credit Lucy Ramirez



Figure 3-3: The Laycock Park Parking Lot Photo credit Lucy Ramirez

3.2.2.3 Views on the unanticipated outcomes

Because plans combine a multiplicity of viewpoints, when evaluating the outcomes of a plan, it is best to use a research method that captures the multiplicity of views. The views this research has captured via semi-structured interviews include views from the Province, municipal practitioners, and staff involved in advocating on behalf of municipalities. Not all my interviewees could address every question I had, as their work experience was diverse. I conducted six interviews with key informants. My ability to generalize theory is limited; however, this research contributes because it is a first attempt to evaluate a municipal wetland policy. Further studies are needed. Particularly ones where developers' views are considered. My hope is future researchers can build on the current work.

Views from the City of Calgary

What were the unanticipated outcomes of the *Calgary WCP*? The following are views from City of Calgary staff. Interviewees included the following:

- Biologist and Environmental Planner
- Biologist, Parks Planner and Urban Conservation Lead
- Manager of Community Planning

In brief, the implementation of the *Calgary WCP* was problematic, and many challenges had to be worked out after the plan was adopted. In practice, it was difficult to protect both 'natural wetlands' and 'environmental reserve wetlands', even though ER wetlands were prioritized for protection. Compensation did not deter the removal of ER wetlands, which was an unanticipated outcome. Development was prioritized, and wetlands were removed, the rational, there were obstacles to the conservation and restoration of wetlands. So, wetland loss continued, an interviewee stressed the need for a true cost accounting of wetlands loss.

According to an interviewee, when the *Calgary WCP* was drafted, the implementation of the plan was not considered (City of Calgary – Manager, Community Planning; personal interview). Many policy plans are similarly flawed, because “For years, we would draft these plans, which have well intentioned goals, but the effort was put into drafting the plan and not as much into implementation” (City of Calgary – Manager, Community Planning; personal interview). For example, when the *Calgary Plan* (City of Calgary, 1998b) was drafted one of the

major concerns was the “lack of a comprehensive implementation plan and monitoring program” (City of Calgary, 1998a, p. 3). Because implementation of the *Calgary WCP* was not adequately considered, many things had to be worked out afterwards, such as what was and was not allowed under Provincial legislation and how to ensure wetlands were functioning the same pre and post development (City of Calgary – Manager, Community Planning; personal interview). The literature highlights the importance of implementation plans:

“Brody and Highfield (2005) summarized a host of studies and concluded that far more effort is put into planning than is accorded to the details of implementation...Following through with effective implementation of land use planning wetland prioritization is as important as the process of planning itself, and requires sufficient allocation of resources...to be successful” (as cited in Clare et al., 2011, p. 172).

According to interviewees in an urban context it is difficult to protect ephemeral and temporary wetlands, the *Calgary WCP* referred to these as natural wetlands, Class I and II wetlands on the Stewart and Kantrud Wetland Classification System. The wetlands prioritized for protection were ER wetlands: seasonal, semi-permanent, permanent and alkali wetlands. Also known as Class III to VI on the Stewart and Kantrud Wetland Classification System. According to a key informant, it was difficult to protect ER wetlands because of development pressures (City of Calgary – Biologist Environmental Planner; personal interview). Compensation did not deter the removal of ER wetlands, which was an unanticipated outcome.

In many instances, development needs were prioritized; however, the rationale given for this was there were constraints on the protection of wetlands. Why was/is wetland protection constrained? The following reasons were provided:

- The Province used to consider stormwater in a wetland to be an appropriate form of compensation. This persisted through much of the 2000s, but eventually the Province decided they would not consider stormwater in a wetland to be an appropriate form of compensation (City of Calgary – Urban Conservation Lead; personal interview). Therefore, developers opted to pay the full compensation cost and remove wetlands (ibid).
- Development alters overland drainage patterns and you end up with isolated basins, ones that are typically cut off from their water supply, either ground or surface (City of Calgary – Urban Conservation Lead; personal interview). As a result, conserved

wetlands will dry out or not function well, a source of water is needed to ensure their viability.

- A water licence is required to release treated stormwater into a wetland and as of 2006 there are no water licences available because Calgary is in the South Saskatchewan basin, a closed basin. Therefore, rarely could/can wetlands be conserved. Creative solutions were proposed to provide wetlands with water; however, they were not pursued.

The City of Calgary has a large water licence; however, the priority for this licence is to supply drinking water, not wetland restoration. Administration looked at the details of the basin closure order and determined that the Minister could permit a water license for conservation; however, when Administration inquired, they did not get a clear answer as to whether it was possible (City of Calgary – Urban Conservation Lead; personal interview). At the time the City had an application to do restoration at Laycock Park. However, Administration pulled their application because they did not have a reliable source of water (City of Calgary – Urban Conservation Lead; personal interview).

- The view is wetlands cannot be meaningfully protected unless their entire catchment or their natural source of water is protected (City of Calgary – Urban Conservation Lead; personal interview). There is a need for more local research to study the viability of integrating wetlands into suburban developments. Water runoff from adjacent development is not considered as a source (City of Calgary – Biologist, Environmental Planner; personal interview).
- There is a desire on the part of consultants to build constructed wetlands (City of Calgary – Biologist, Environmental Planner; personal interview). The interviewee highlighted the long-term benefits of wetlands are not considered, nor are the operational costs of maintaining constructed stormwater infrastructure.

One interviewee highlighted the need for cost-benefit analysis of wetland avoidance versus compensation.

“I would like to see cost benefit analysis of compensation versus avoiding wetlands. When compensation is paid, developers pay to destroy a wetland and then construct stormwater facilities in lieu. However, it costs taxpayers money to maintain constructed storm ponds. For naturally occurring wetlands the ecological benefits of avoiding wetlands outweigh the cost. It would be nice to see studies on the loss of wildlife, native plants, etc. We cannot gain back these species” (City of Calgary – Biologist, Environmental Planner; personal interview).

The literature, Clare et al., (2011), identified the need for true cost accounting of wetlands loss to address:

“the inequitable behavior of societies where a select number of individuals reap the short-term benefits of wetland loss, while the public pays the cost for generations to come” (p. 178).

As previously mentioned the City of Calgary has amassed a considerable amount of wetland compensation funds, upwards of \$30 million (City of Calgary – Urban Conservation Lead; personal interview). The City still holds these compensation funds. To date, they have been underutilized and their worth decreases with time (City of Calgary – Biologist, Environmental Planner; personal interview). Soon, Administration will need to request direction from Council on how to proceed, the City will need to negotiate a way to expend the compensation funds it currently holds (City of Calgary – Urban Conservation Lead; personal interview). According to an interviewee, the Province considers the compensation funds Calgary collected to be theirs and would like access to them (City of Calgary – Urban Conservation Lead; personal interview). However, Administration has taken the position that the funds were collected for a very specific purpose stated in the *Calgary WCP* and that's how they should be spent.

In summary, the *Calgary WCP* has great content; however, there is a gap between the intentions of the plan and the plan's outcomes (City of Calgary – Biologist, Environmental Planner; personal interview). This is not a unique problem. Interviewees felt there are many policies to protect wetlands (*Calgary WCP*), conserve open space (*Open Space Plan*), and environmentally significant area (*MDP*); however, there is insufficient political will or administrative support to use these tools. Further, their use would be challenged by the development industry. As a result, many of the tools in these plans have never been used or are underutilized (City of Calgary – Biologist, Environmental Planner; personal interview).

A Provincial View

From a provincial perspective, what were the unanticipated outcomes and the lessons learned from the *Calgary WCP*? The following points are taken from an interviewee with a Manager from a provincial environment department:

- Avoidance was not practiced by urban housing land developers, it was only practiced in small development applications.
- Despite high compensation rates, compensation was generally not a deterrent, instead housing developers passed costs onto home buyers.
- It is difficult to retain wetlands when there is intense development pressure.
- It is difficult to retain functioning wetlands in an altered landscape because wetlands' water supply is overland drainage, further post development there is the need to ensure the quality of water is appropriate to retain the functionality of wetlands. [*What was being alluded to here is the appropriateness of releasing stormwater into natural occurring wetlands*].
- It is difficult to restore wetlands in a growing urban municipality because of the limited spatial context of municipal boundaries.
- Intermunicipal cooperation is needed for wetland restoration to occur outside of municipal boundaries. How to implement restoration in a regional context was not considered during policy development; therefore, mechanisms to enable it were not in place.
- There is a legacy of compensation obligations that cannot be fulfilled within Calgary's municipal boundary.
- Wetland restoration in Calgary was impeded because it is in a closed basin, which means there are no water licenses available, and water is required to restore wetlands. Calgary has a large water licence; however, they are not interested in using it for wetland restoration.
- Restoring historically drained wetlands has downstream consequences, which impede wetland restoration because it would change existing hydrology.

Researcher's perspective

An unanticipated outcome of the *Calgary WCP* is the Watershed + program. This program “embeds artists and artistic practices within Utilities and Environmental Protection (UEP) department core activities and the Calgary watershed... Watershed+ is hosted by The City of Calgary's UEP department with the Public Art Program” (City of Calgary, n.d. F). The Laycock Park Enhancement Project was supposed to be Calgary's first wetland compensation project; however, “the decision was made to exclude the wetland restoration and Nose Creek realignment from the improvements” (City of Calgary, n.d. B). The project was the reason *Sans façon* went to Calgary. The Glasgow-based collective consisted of Tristan Surtees and Charles Blanc, the former is a British artist, the latter a French architect (Mellema, 2013). The pair

worked with Utilities and Environmental Protection (UEP) department and helped develop the Watershed+ program (Mellema, 2013).

3.2.2.4 What difference did the plan make?

Depending on whom you ask, you get different answers to the question, what difference did the *Calgary WCP* make? According to staff at the City of Calgary, the plan raised awareness about the value of wetlands and how they contribute to ecology in an urban context (City of Calgary – Manager, Community Planning, personal interview). The plan also informed the 2009 *MDP*, the Parks strategic plan and the biodiversity policy (City of Calgary – Urban Conservation Lead; personal interview). According to an interviewee, select new communities, particularly in the North-East, planned and developed after the adoption of the *Calgary WCP*, integrate wetlands into their built form. In some communities in the far east, such as Cornerstone, wetlands will be central features. Wetlands were also preserved in the Cityscape community. Conserved wetlands in suburban developments have been used as a marketing tool. One can hypothesize in the absence of the *Calgary WCP*, wetlands would not have been conserved and wetland loss would have been greater.

Also, an interviewee suggested the *Calgary WCP* contributed to the development of Provincial practices around wetland protection, “I think the work from the City and the wetland plan helped raise up the importance of wetlands. They [the Province] are much more focused now on wetlands and the public lands around them” (City of Calgary – Manager, Community Planning, personal interview). Furthermore, in their opinion, “if the City had not brought in its wetland plan, it would have taken longer for the Province to put in place what they are now largely doing with the *Water Act* and the *Public Lands Act*” (City of Calgary – Manager, Community Planning, personal interview). How does someone who works for the Province view the plan? In their opinion, The *Calgary WCP* did not make a big difference, they believed the plan failed because avoidance was generally not practiced, and no wetlands were restored within Calgary’s municipal boundaries. Further, now there are compensation obligations that cannot be fulfilled within the City’s boundaries. They did acknowledge the plan increased awareness of wetland loss.

The interviewees from the City and Province both agreed protecting Prairie Pothole wetlands within suburban development is challenging when there is intense development pressure. Interviewees highlighted the value of developable land, hence the desire to drain wetlands. Wetland compensation did/does not deter wetland loss, instead this was/is perceived as the cost of doing business, costs were/are passed onto homeowners. Often, the rationale given for not protecting wetlands is it is challenging to retain functioning wetlands in an altered landscape because wetlands' water supply is overland drainage. Therefore, for wetlands to function in the landscape post development, their water source must be protected or treated stormwater must supply wetlands with water at a natural rate. To divert treated stormwater into a wetland a water licence is required, the 2006 South Saskatchewan basin closure means no new water licences are available. According to an interviewee, the South Saskatchewan basin closure has effectively shut down wetland conservation and restoration. As a result, the City of Calgary has acquired a considerable amount of wetland compensation funds. The City cannot expend these funds in their existing boundaries. A regional pilot project was done; however, mechanisms were not in place to facilitate a larger regional wetland management plan. In 2015, the Province suspended Calgary's status as a wetland restoration agent, now known as third party providers for wetland offset, because it could not fulfill its wetland restoration obligations.

The *Calgary WCP* has great content; however, there is a gap between the intentions of the plan and the plan's outcomes (City of Calgary – Biologist, Environmental Planner; personal interview). All this brings me back to Hoch's question, if a plan was not implemented, then how do you evaluate it. Hoch (2002) suggested looking for similarities between the plan and reality, in this case wetland communities.

3.2.2.5 What are the similarities between the plan and reality?

In this research, wetland communities are “the similarity binding plan and product” (Hoch, 2002, p. 70). Bridlewood was Calgary's first wetland community while Cornerstone is a more recent example. The Bridlewood community predates the *Calgary WCP*. The land developer was Lamont Development, whom is credited with being the first in Calgary to

incorporate natural wetlands into a residential development. This was done in the Bridle Creek portion of Bridlewood, in Southwest Calgary (McCormick, 2001).

“Created by Lamont Realty Corp., Southwest Bridlewood Creek sits on the north side of Highway 22X and is considered the city's first fully integrated wetland community. Started in the spring of 1997, it comprises 40 acres and 225 single-family homes, and among its natural characteristics are a 14-acre wetland area and several large boulders. Gerry Lamont says the wetland was seen as a strong marketing tool as both a natural park and a stormwater feature while the city had always wanted to preserve the wetland area -- home to at least 14 species of ducks and various other birds -- and possibly incorporate it into a residential development” (Hope, 2000).

The Midnapore III Community Plan was the policy plan [ASP] for the Evergreen and Bridlewood communities. This policy plan was “extensively influenced by the 1999 SSS [Sustainable Suburbs Study]” (Damianil, 2008, p. 22).

The Bridlewood wetland was unfavourably portrayed in the media leading up to the public hearing on the *Southwest Community “A” and Employment Centre Areas Structure Plan*. Spruce Meadows submitted comments to the Calgary Herald and wrote, “One has to only look north [of Spruce Meadows] to Calgary’s first ‘wetland’ community of Bridlewood to see how a plan doesn’t always stick to plan. It has been a tragedy for the wetland, sad for residents, and the city just continues to move on” (Spruce Meadows, 2004, p. A15). The Bridlewood Creek project was also “cited by city officials as an example of how easily wetlands can function in an urban setting” (Hope, 2002a, p. HS05). Recently, the wetland was in the news because of a strong smell in peoples’ basements likely originating from the wetland (Franklin, 2018). An interviewee stressed residents need more education on wetlands because when “it dries up periodically, as a natural wetland should, people get upset because they do not understand that wetlands are cyclical and dry up seasonally or annually” (City of Calgary – Biologist, Environmental Planner; personal interview).

As previously mentioned, after the *Calgary WCP* was adopted, a planner started to use the plan and incorporated it into the land use planning process, specifically into long range regional planning in the North East and then more detailed master planning, Area Structure Plans (ASPs). There was one regional policy plan worked on when the *Calgary WCP* was being developed, most of the regional policy plans and regional context studies were done after Council adopted the plan. Many of these regional plans and studies refer to wetland protection

and to the *Calgary WCP*. Many identified wetlands through preliminary environmental assessments. Below, I have summarized the contents of the plans and studies in relation to the protection of wetlands.

Regional Policy Plans and/or Context Studies:

The City's Planning and Development online resource library website, eight regional policy plans and/or context studies are listed, I have ordered them chronologically:

1. Southeast Planning Area Regional Policy Plan (2004)
2. Northeast Residual Area Policy Plan (2005)
3. Southwest Regional Policy Plan (2006)
4. Northeast Regional Policy Plan (2006)
5. South Macleod Trail Regional Policy Plan (2007)
6. East Regional Context Study (2009)
7. West Regional Context Study (2010)
8. North-Regional Context Study (2010)

Below is a summary of the content relevant to this research:

- Regional plans and context studies were created to provide the policy framework for detailed planning. Starting in 2007, Council approved sustainability principles are included in the regional documents.
- Preliminary ESA assessment were done for many plan areas and wetlands were among the features identified. Wetlands were first classified according to the Stewart and Kantrud Wetland Classification System and then according to the *Calgary WCP*.
- Many plans stressed the conservation of ESAs and wetlands was to be “*refined through the ASP preparation process and at the Outline Plan/Land Use Amendment application stage*” (City of Calgary. Land Use Planning and Policy: Planning, Development and Assessment, 2006b, p. 31).
- In most of the plans, the *Calgary WCP* was referenced, except in the *Southeast Planning Area Regional Policy Plan* (City of Calgary. Land Use Planning and Policy: Planning, Development and Assessment, 2004) and the West Regional Context Study (City of Calgary. Land Use Planning and Policy: Planning, Development and Assessment, 2010a).

- Ensuring the long-term viability of conserved wetlands in the landscape is a reoccurring theme. Documents note the sustainability of natural wetlands was to be ensured via stormwater engineering solutions proposed in the Master Stormwater Drainage Plan.

Next, I turn my attention to the regional policy plan with “*the greatest concentration of natural wetlands within the City of Calgary*” (City of Calgary, 2006, p. 11).

Northeast Regional Policy Plan (2006)

The Northeast Regional Policy Plan Area (2006)

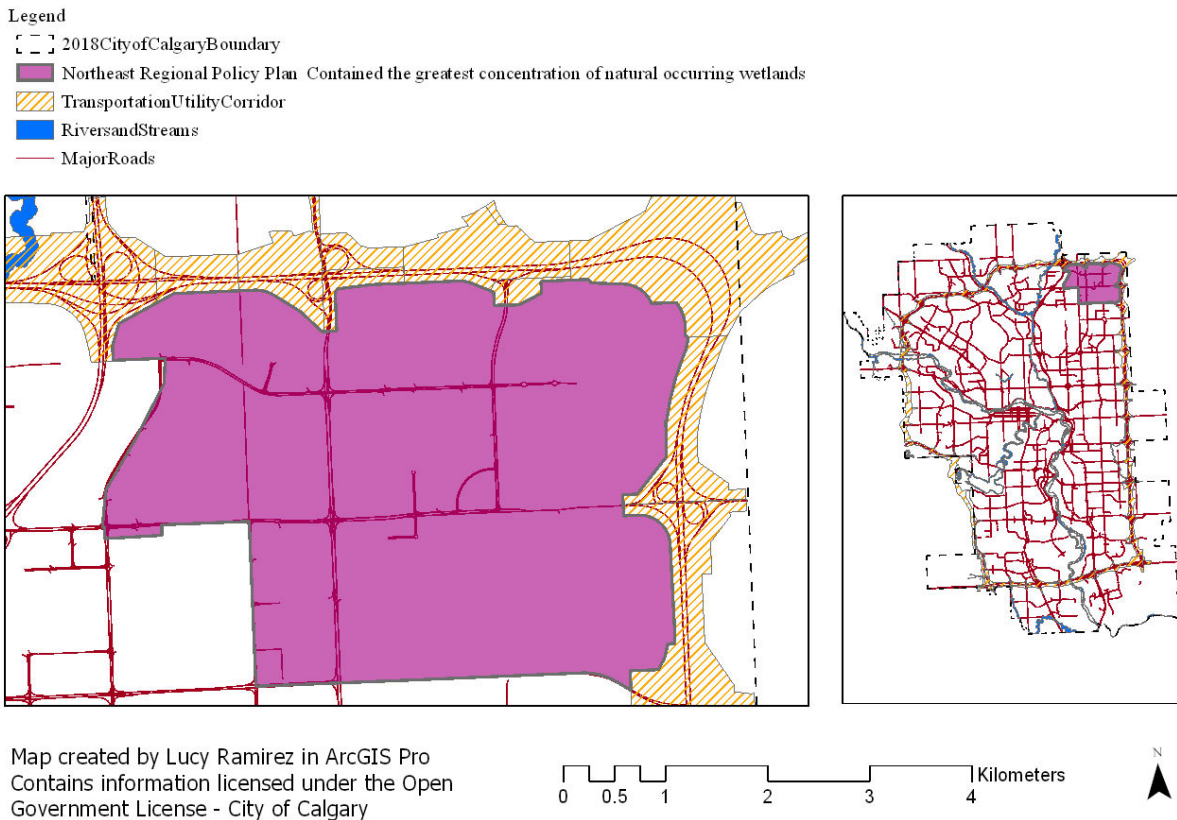


Figure 3-4: Map of the Northeast Regional Policy Plan Area Source: City of Calgary (2019)

The *Northeast Regional Policy Plan* (City of Calgary, 2006) was meant to identify “key land use, transportation and environmental components that need[ed] to be dealt with in a coordinated manner as detailed planning proceed[ed] through the ASP preparation process” (p. 3).

Wetland protection was a stated goal, specifically “to provide for the protection and long-term viability of significant natural wetlands and associated upland grassland habitat within the area following urban development” (City of Calgary, 2006, p. 12). Parks did a preliminary ESA and identified wetlands, there were many.

“The Northeast Regional Policy Plan area contain[ed] the greatest concentration of natural wetlands within the City of Calgary. Wetlands [were] conserved and integrated into the overall design and development of the Plan areas, including both the residential and industrial areas. The natural wetlands, along with the associated upland grassland habitat, combine[d] to create larger ecological systems, unique to the Plan area. A focal point for these natural features [was] established, conserving the largest wetland areas and grassland habitats, which provide[d] for a unique, regional scale natural area in this quadrant of Calgary” (City of Calgary, 2006, p. 11).

The *Northeast Regional Policy Plan* included a section entitled Wetland Conservation, which noted, “In combination with the Wetland Conservation Plan, the approach to conserving significant natural wetlands [would] be further refined through the ASP preparation process and at the Outline Plan/Land Use Amendment application stage” (City of Calgary, 2006, p. 43). The *Northeast Regional Policy Plan* included the following policies on wetland conservation:

“12.1.2 (1) Wetland Conservation

- (a) The natural wetlands within the Plan area shall be subject to the Wetland Conservation Plan as approved by Council.*
- (b) An Area Structure Plan should provide policy that*
 - i. identifies wetlands that are to be dedicated, acquired or otherwise protected within the Plan area, and*
 - ii. establishes measures and a process for the dedication, acquisition and/or protection of those wetlands in accordance with the Wetland Conservation Plan”* (p. 43).

The wetlands subject to further review and analysis at the ASP preparation stage, are identified on Map E of the regional policy plan, included in this research as Figure 3-7. However, before turning my attention to the wetlands prioritized for protection - seasonal, semi-permanent, permanent, and alkali wetlands (class III to VI of the Stewart and Kantrud Wetland Classification System) - I want to highlight Map D of the Regional Policy Plan which features a more comprehensive inventory of the natural features in this area prior to development.

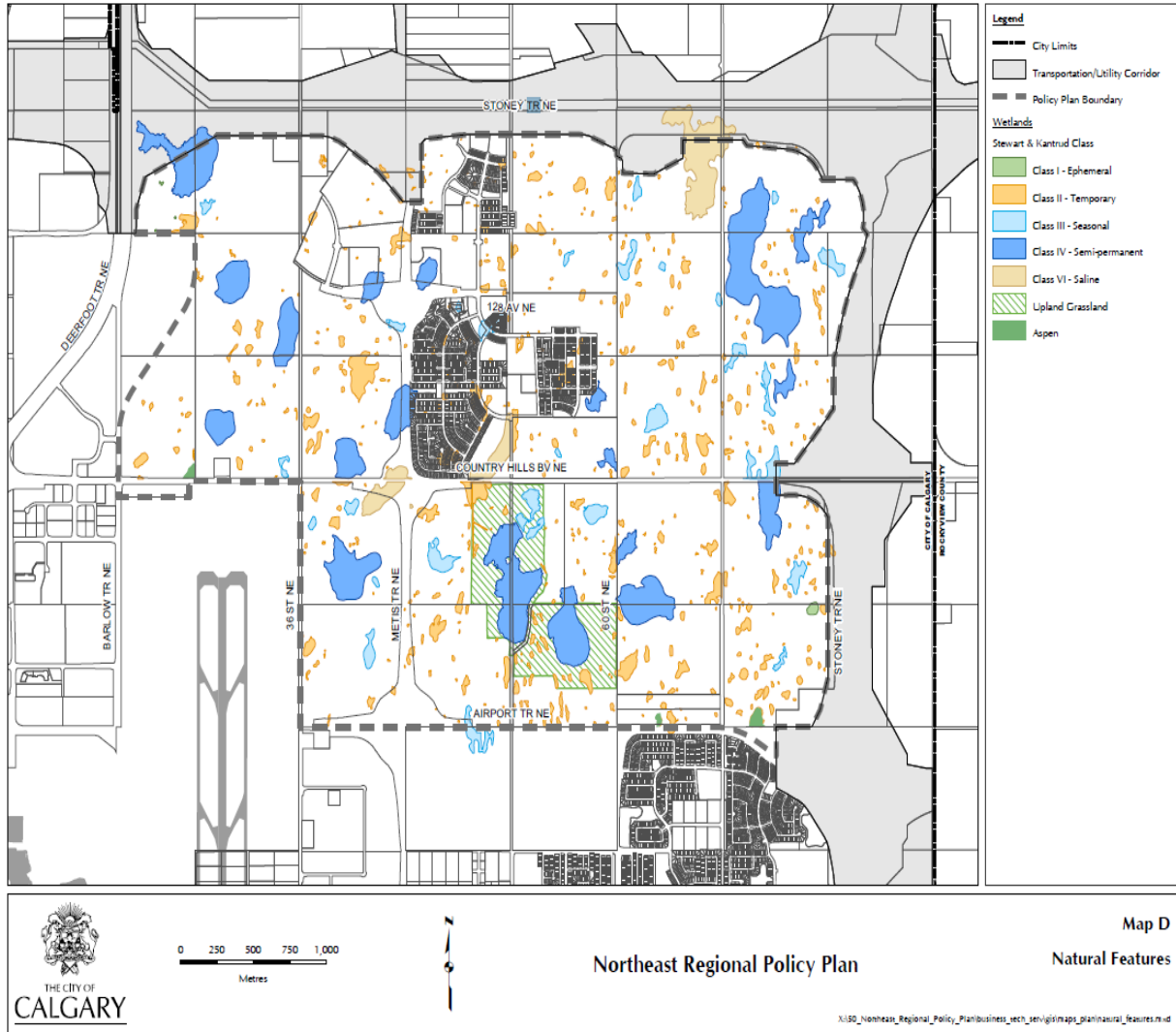


Figure 3-5: Northeast Regional Policy Plan (2006) Map D Natural Features Source: (City of Calgary, 2006, Part 2 p. 8, one of 34 images or figures/tables)

Map D of the *Northeast Regional Policy Plan*, titled Natural Features, showed all wetland classes, including ephemeral wetlands. Cuthbert and Tyler (2016) argued “[r]ecognizing the value and function of slow flow ephemeral systems and drainage networks ha[d] the potential to change land use development and practice” (p. 17). One of my interviewees also stressed the importance of ephemeral wetlands:

“As a municipality and as an operator of stormwater management facilities, doing flood control and all that, our biggest issues come from ephemeral wetlands. Because if you are not planning for those, and you are just looking at higher classification of wetlands you are totally missing the overall landscape hydrology” (Specialized Alberta municipality – Biologist, Environmental Planner; personal interview).

Area Structure Plans flowing out of the *Northeast Regional Policy Plan*

The interviews revealed the timing of the *Calgary WCP* was fortuitous because long range regional planning and detailed master planning, ASP planning, were taking place in an area with the highest concentration of wetlands per square kilometre (City of Calgary – Manager, Community Planning, personal interview). The long-range plan was the, *Northeast Regional Policy Plan*, which included 1,814 hectares (4,482 acres) in NE Calgary. The plan addressed “the sequencing of the ASP’s to be prepared within the Plan area and identifie[d] regional-level land use, transportation and environmental components that need[ed] to be considered comprehensively with the preparation of each subsequent ASP” (City of Calgary, 2006, p. 1).

The Northeast Regional Policy Plan Area and the Planning Areas, Areas Structure Plans (ASPs)

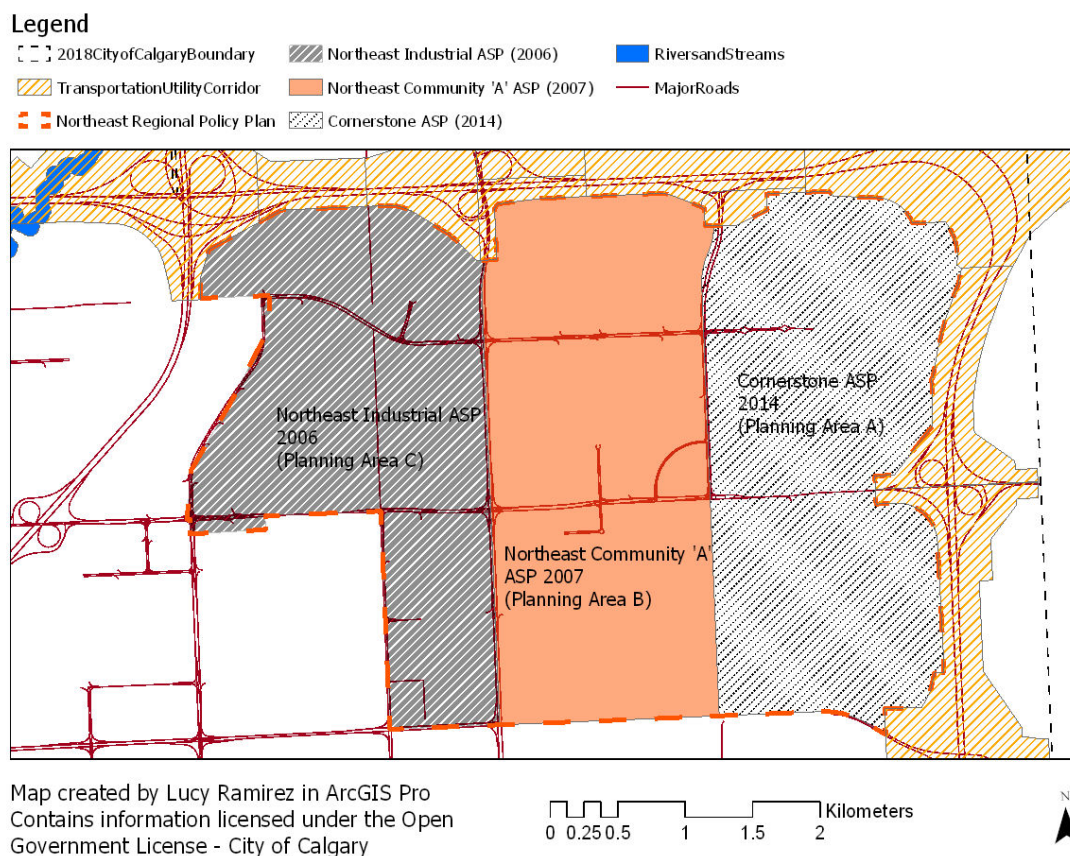


Figure 3-6: *Northeast Regional Policy Plan* Area and Planning Areas, Area Source: (City of Calgary, 2019)

Three ASPs flow out of the *Northeast Regional Policy Plan*, Council adopted the first in 2006, the second in 2007 and the third in 2014. The communities in these ASPs are not completely built out.

A preliminary ESA was done for the plan area and the environmental reserve wetlands “subject to further review and analysis at the ASP preparation stage, [were] identified on Map E, Wetland Conservation Inventory, Part 2 of the Plan, Supporting Information” (p.44).

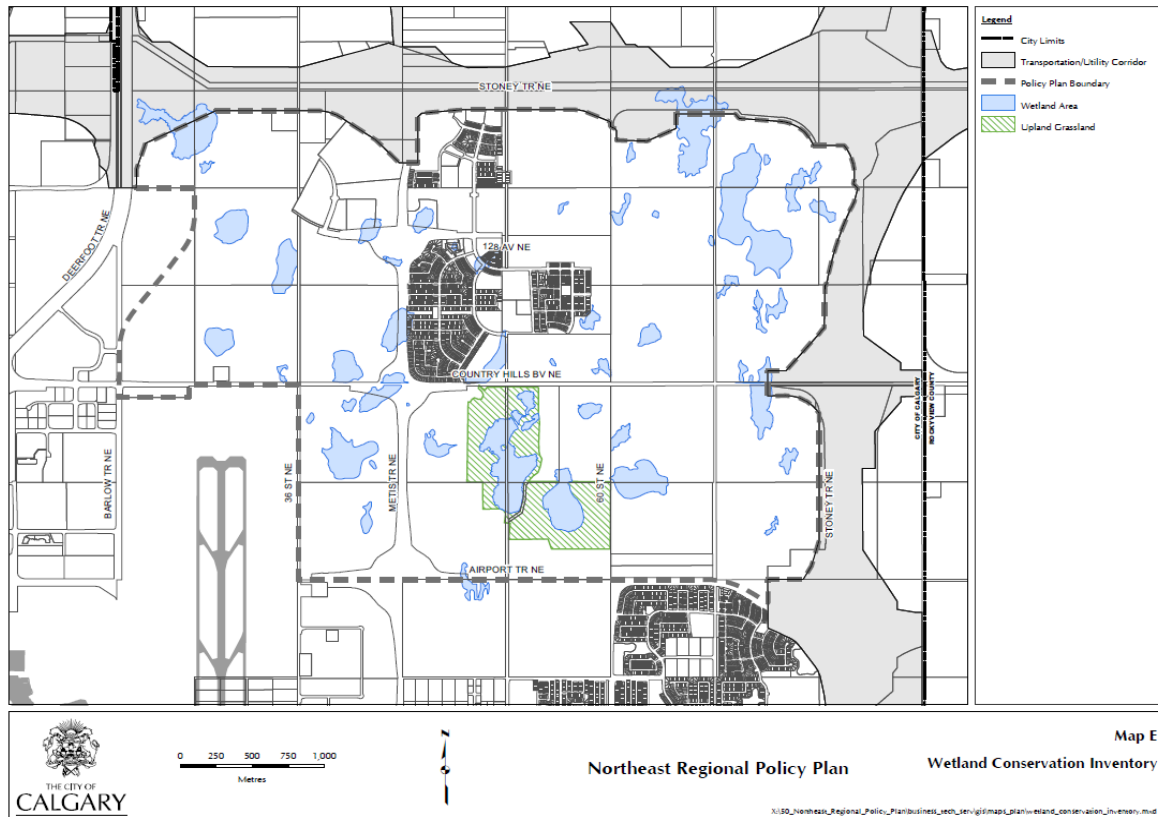


Figure 3-7: Northeast Regional Policy Plan (2006) Map E Wetland Conservation Inventory Source: (City of Calgary, 2006, p. 8 Part 2, one of 34 images or figures/tables)

Wetlands included in Map E are classified as Class III to VI on the Stewart and Kantrud Classification system. Ephemeral and temporary wetlands were not included in Map E, even though they are an important part of ‘flow network’ (Cuthbert & Tyler, 2016). The first two ASPs flowing from the regional plan were created under the old ASP process, whereby “ASPs [were] developed by a cross corporate team of policy planners, parks planners, transportation engineers, water services engineers, and representatives from Fire, Corporate Properties & Buildings and other business units as required” (Chan, 2013, p. 17). The Cornerstone ASP was part of the pilot project for developer funded ASPs. The goal of this project was “to create shorter, more streamlined Area Structure Plans” (Calgary Planning Commission, 2014). The adoption of the New Community Planning Guidebook (NCPG) enabled this. The rational

supporting the guidebook was when Administration reviewed the most recent ASPs, they found up to 70 percent of the content was similar (Chan, 2013).

North East Industrial Area Structure Plan (ASP) (2006)

A goal of the *North East Industrial Area Structure Plan* (City of Calgary. Land Use Planning and Policy: Planning, Development and Assessment, 2006a) was “To provide for the conservation and enhancement of natural wetlands and its related floodway, escarpment and ravines” (p. v). A wetland study area map was included identifying ER Wetlands within the plan area.

The ASP noted “further analysis at the Outline Plan/Land Use Amendment stage [was] need[ed]....to determine the viability of acquiring and protecting these wetlands” (p. 20). The ASP included wetland conservation policies to help evaluate and decide whether to conserve identified wetlands. Several concerns needed to be addressed if the wetlands were to be conserved, such as:

- *“the method of acquiring the wetlands,*
- *the engineering measures to be introduced to ensure that the wetlands remain[ed] sustainable,*
- *the impact of the wetlands on airport safety,*
- *the financial obligations of the developer and the City for the improvements and operation of the wetlands”* (City of Calgary. Land Use Planning and Policy: Planning, Development and Assessment, 2006a p. 22).

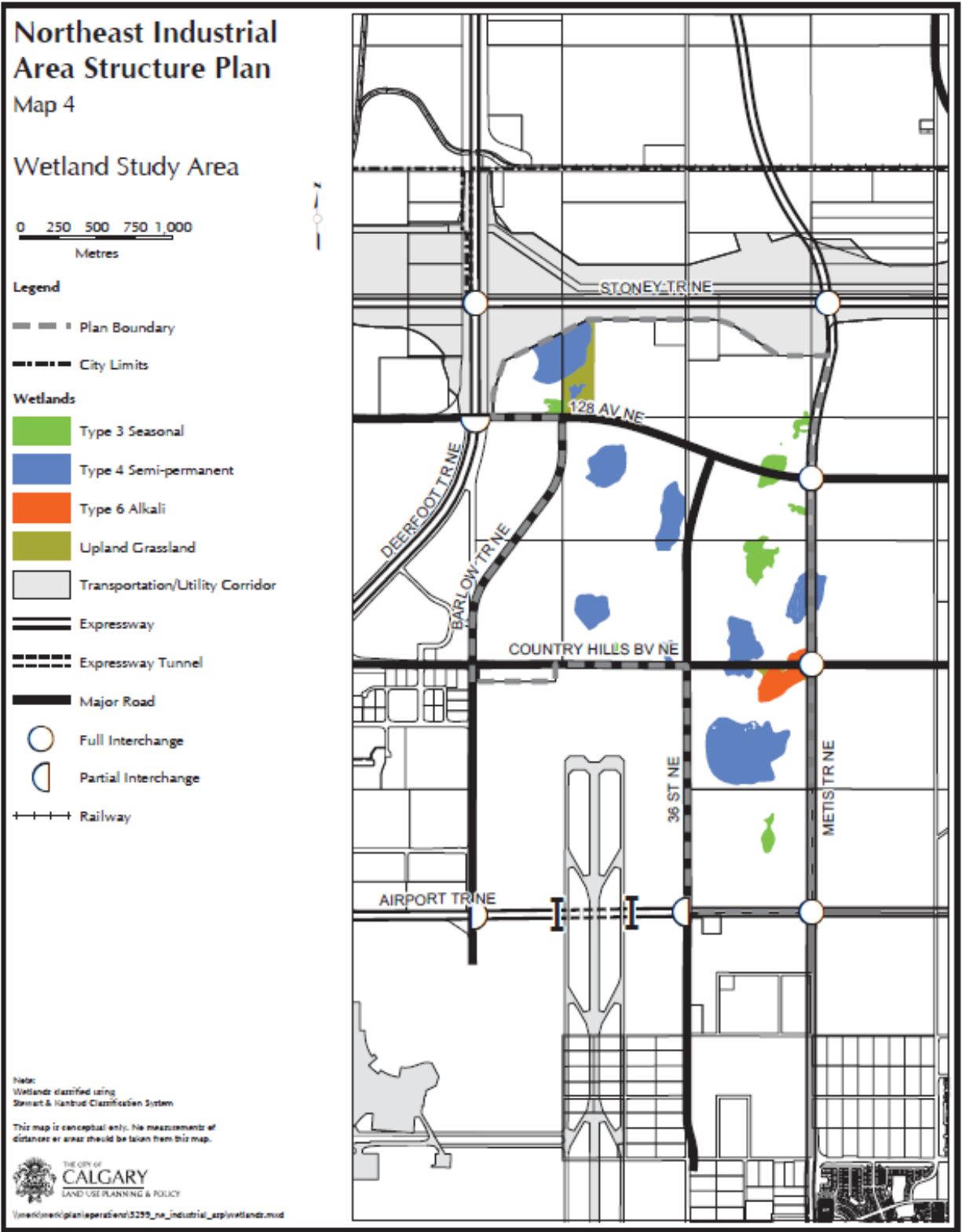
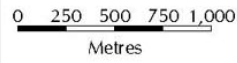


Figure 3-8: Northeast Industrial Area Structure Plan Map 4 Wetland Study Area Source: (City of Calgary. Land Use Planning and Policy: Planning, Development and Assessment, 2006a, p. 21, one of 10 images or figures/tables)






Northeast Industrial Area Structure Plan

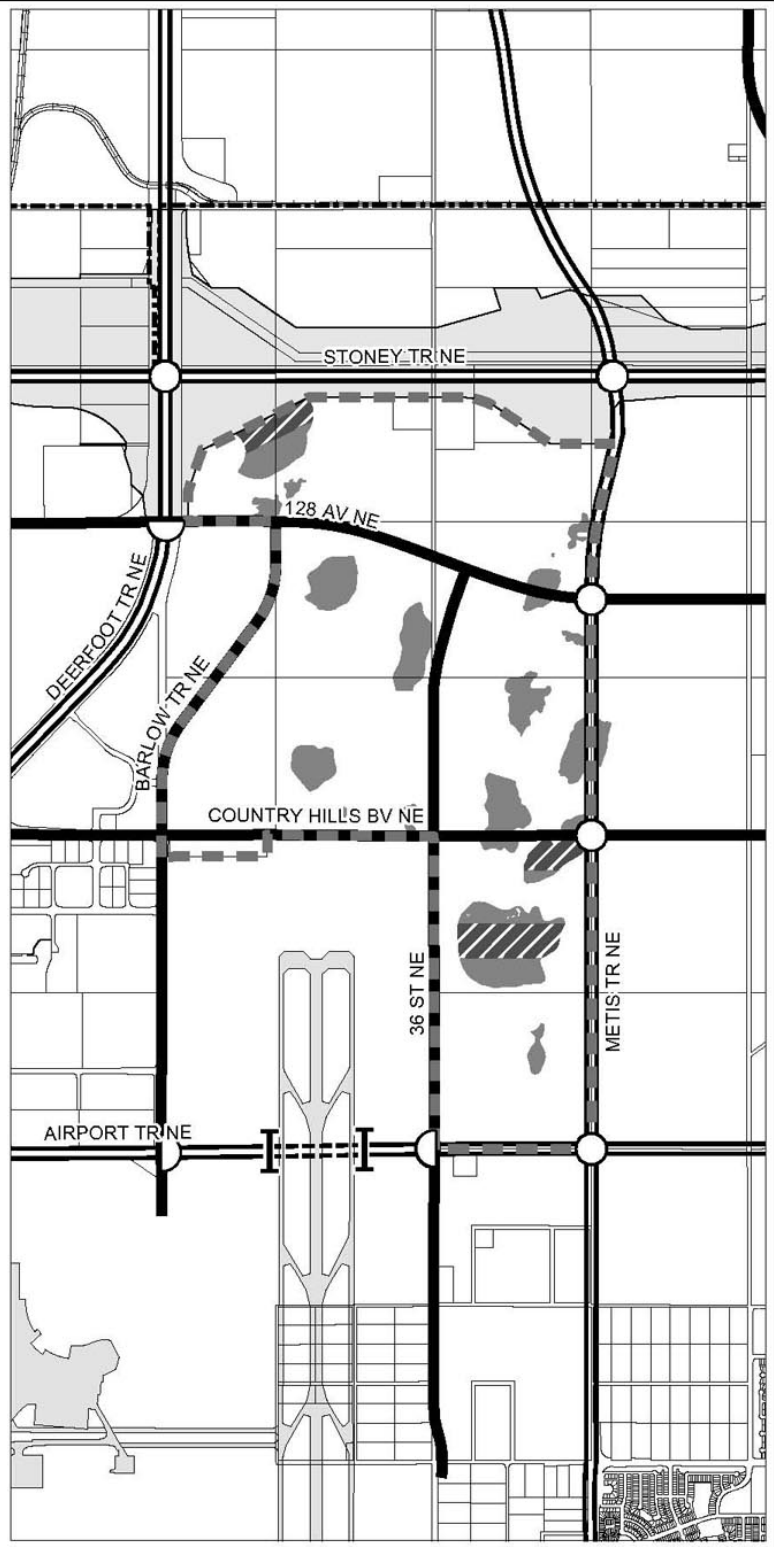
Appendix 1

Environmental Reserve Analysis



Legend

-  Plan Boundary
-  City Limits
-  Transportation/Utility Corridor
-  Wetland Qualifying as Environmental Reserve to be dedicated to The City at time of Subdivision
-  Wetland Qualifying as Environmental Reserve to be developed at the option of the developer subject to monetary compensation being provided to The City



This map is conceptual only. No measurements of distances or areas should be taken from this map.



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Figure 3-9: Environmental Reserve Analysis for Northeast Industrial Area Structure Plan Source: (Calgary Planning Commission, 2007b, p. 1 Appendix VI Attachment 2)

Initially, two Outline Plans were submitted for the area covered by the Northeast Industrial ASP: LOC 2008-0089 and LOC 2008-0090. According to these outline plans, three of the wetlands identified in the wetland study area were to be preserved. The following disclaimer was provided in both reports:

“Given the nature of these wetlands, the need for stormwater storage and the possible bird/airport conflicts that could arise, it was determined that some wetlands would be conserved, and some could be developed with voluntary compensation provided for them by the land owner. A wetland has been protected if the integrity of the wetland can be maintained. If the integrity of the wetland can not be maintained due to lack of sustainable water, bird/airport mitigation measures, or the sole functioning of a storm pond, then voluntary compensation will be provided to The City” (Calgary Planning Commission, 2007c, Attachment 3, p. 7).

In the OP with the file number LOC2006-0090, one wetland was to be preserved. Other wetlands in the area were to be developed with compensation paid to the City of Calgary to be “solely dedicated to wetlands compensation and trackable to specific wetland projects” (Calgary Planning Commission, 2007c, Attachment 3, p. 7). In this OP, the PE designation was for wetlands that could be classified at ER, approximately, 4.21 ha± (10.40 ac±) was classified PE Public Park, School and Recreation District (Calgary Planning Commission, 2007c, Attachment 3, pp. 4 & 7).

In the OP with the file number LOC2008-0089, two wetlands were to be preserved, a large wetland in the middle and one in the NE part of the outline plan. The applicants’ submission outlined:

“Approximately 19.41 hectares or 47.96 acres (15% total area) of this outline plan [was] proposed to be dedicated for natural areas, open space, and recreational uses, including:

- *10.52 hectares or 25.99 acres as ER for wetland conservation*
- *7.22 hectares or 17.84 acres (7.1% gross developable area) as creditable MR for the regional athletic park, regional pathways, and open space to sustain wetland functions*
- *1.67 hectares or 4.13 acres (1.6% gross developable area) as non-credit MR for wetland mitigation to sustain wetland functions”* (Calgary Planning Commission, 2007b, Appendix III Attachment 2, p. 1).

Further the submission stated:

“The natural and reconstructed wetlands within this proposed outline plan [were] consistent with the “no net loss” principle in the City of Calgary Wetlands Conservation

Plan. The conservation and engineering techniques to be utilized [would] sustain the functionality of these wetlands over the long term. In addition to the physical rehabilitation of the wetlands, their value to the City [would] be evident through their many socioeconomic benefits (Calgary Planning Commission, 2007b, Appendix III Attachment 2, p. 2).

According to the initial OPs submitted for the Northeast Industrial ASP (LOC 2008-0089 and LOC 2008-0090), the total amount of ER intended to be dedicated for wetland conservation in this area was 14.73 hectares, or 36.39 acres. Additional land were to be taken to sustain wetland function.

Northeast Community 'A' Area Structure Plan (ASP) (2007)

The *Northeast Community 'A' Area Structure Plan* (City of Calgary Land Use Planning and Policy: Planning, Development, and Assessment, 2007b) included wetland conservation policies to “provide for the protection of wetlands and their related upland and native grasslands, where determined practical and appropriate” (p. 60). A Wetland Conservation Area was identified as a major component in this ASP, which “encompass[e] two large wetlands and smaller supportive wetlands which [were] to be conserved” (p 48). According to the ASP, the conservation area also consisted of upland grassland habitat. The Wetland Conservation Area was “*the most environmentally significant wetland area within the Plan area*” (p. 62).

Northeast Community 'A' Area Structure Plan

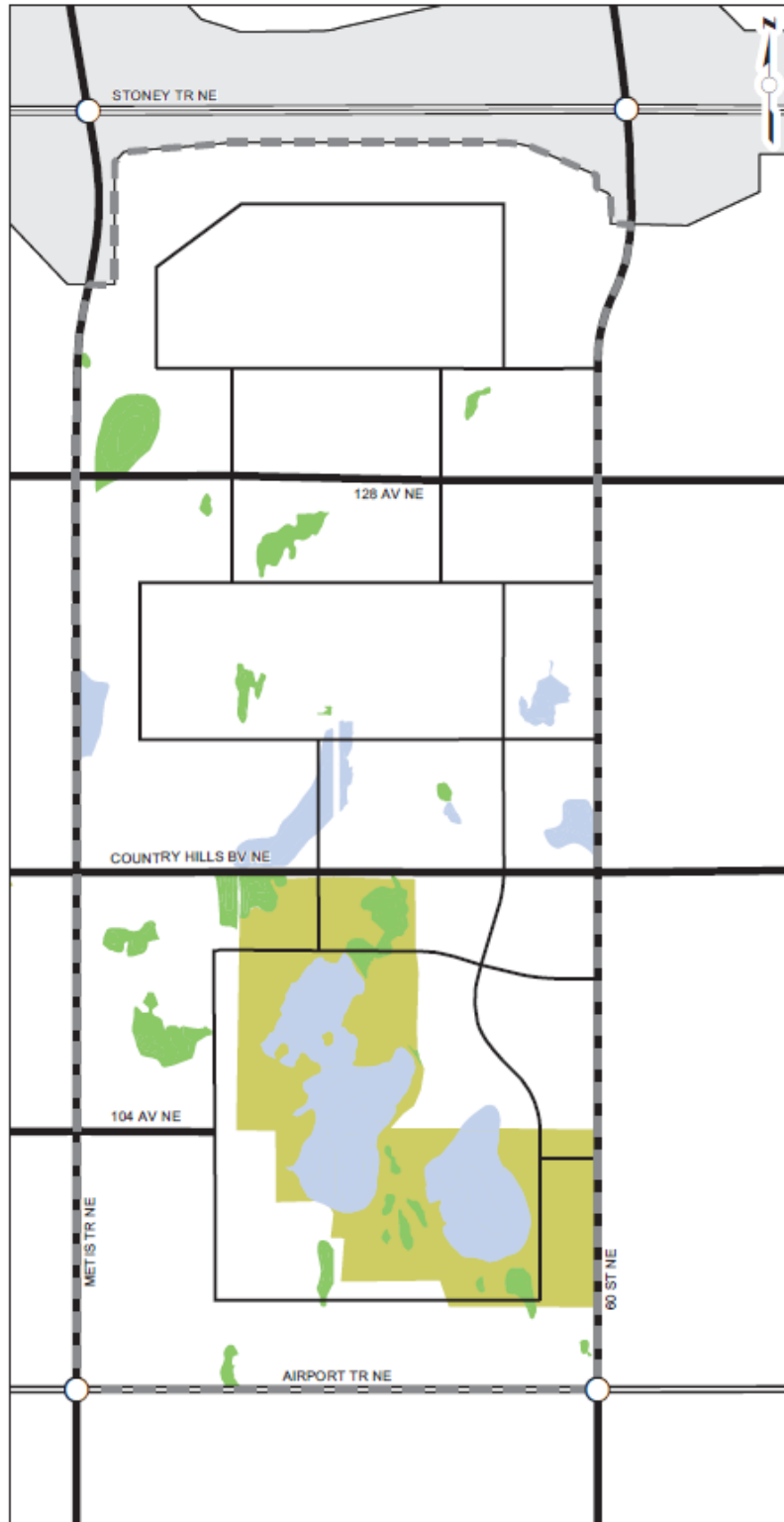
Map 6

Environmentally Significant Areas



Legend

- Plan Boundary
- Transportation/Utility Corridor
- Freeway (Skeletal Road)
- Expressway (Skeletal Road)
- Major Road (Arterial Street)
- Collector Road
- Interchange
- Upland Grassland
- Wetlands**
- Type 3 Seasonal
- Type 4 Semi-permanent



This map is conceptual only. No measurements of distances or areas should be taken from this map.

Figure 3-10: Northeast Community 'A' ASP and Environmentally Significant Areas Source: (City of Calgary Land Use Planning and Policy: Planning, Development, and Assessment, 2007b, p. 61, one of 13 images or figures/tables)

The tool used to protect wetlands in this ASP was the ER definition from the *MGA*, which is applicable at the time of subdivision. The wetland conservation policies in this ASP stated ER wetlands were to be protected as per the *Calgary WCP* and acknowledged certain wetlands would be lost to development. The OP application (LOC2006-0156) included an ER Analysis map in the appendix showing all ER wetlands and whether they would be conserved or lost, the map also showed the proposed upland grassland habitat meant to compensate for wetland loss in the plan area.

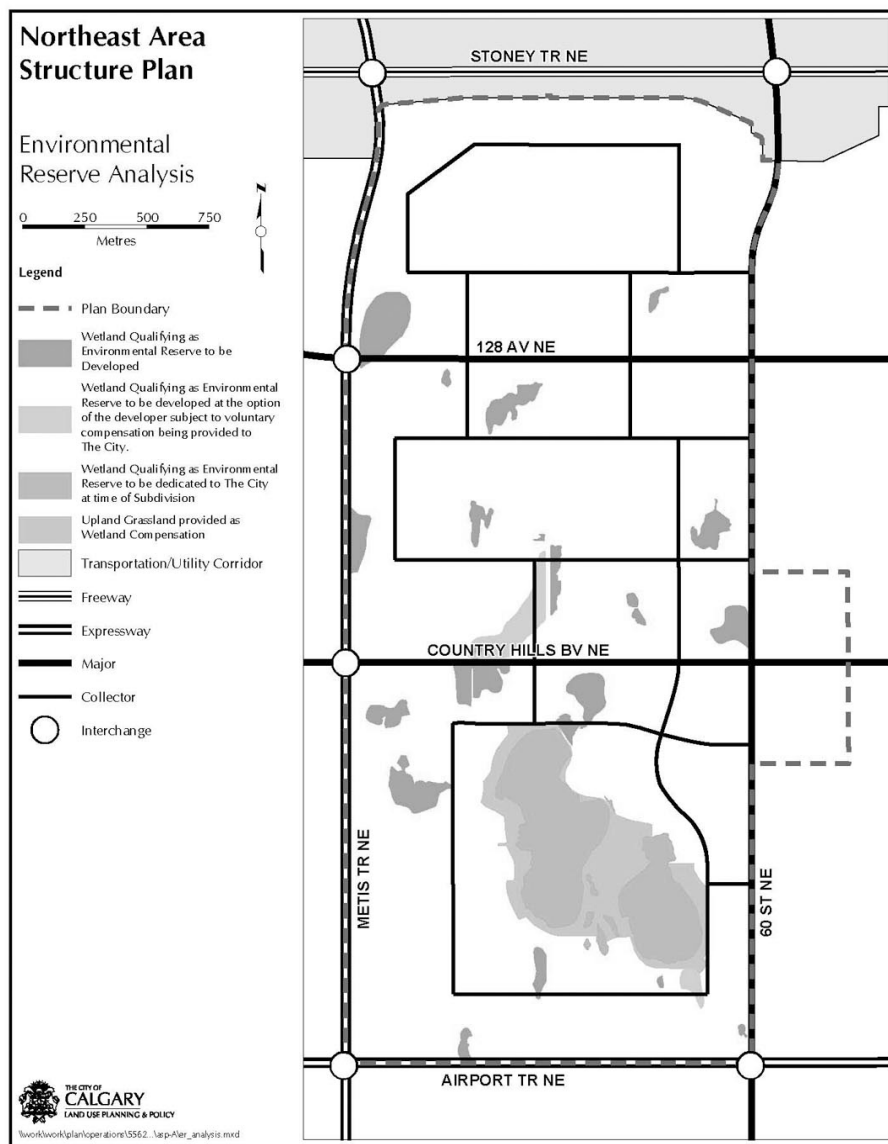


Figure 3-11: Environmental Reserve Analysis for Northeast Area Structure Plan
Source: (Calgary Planning Commission, 2007a, p. Appendix X.X Attachment 7)

The OP application (LOC2006-0156), provided more details on the Wetland Conservation Area identified in the regional policy plan and the ASP. This Wetland Conservation Area was to be approximately 45 hectares (111 acres). Approximately 27 hectares (67 acres) was dedicated as Environmental Reserve (ER), the associated upland grassland habitat was “provided to the City as part of compensation for the loss of wetlands elsewhere within the application area (Calgary Planning Commission, 2007a, Attachment 7, p. 10). The uplands were provided because the *Calgary WCP* enabled the City to take ER wetlands without compensation. These uplands contributed to a larger functioning ecological system.

A reoccurring theme in the regional policy plans and context studies was the need to ensure the long-term viability of conserved wetlands in the landscape. These documents state the sustainability of natural wetlands was to be ensured via stormwater engineering solutions proposed in the Master Stormwater Drainage Plan. The OP application (LOC2006-0156) noted portions of the conserved wetlands would be used for stormwater and thus registered at Public Utility Lots (PUL). This reduced the amount of stormwater entering Nose Creek and provided treated stormwater to wetlands, thus ensuring their sustainability post development. Stormwater was to be “treated and cleaned, and through a bioswale filtering system, [and would] enter wetlands at a natural rate” (Calgary Planning Commission, 2007a, of Attachment 7, pp. 9-10).



Figure 3-12: Cityscape Interpretive Wetland during a dry cycle: Photo credit Alex Ramirez

Cornerstone Area Structure Plan (ASP) (2014)

It was anticipated the majority of the Northeast Community ‘A’ ASP would be built out before the Cornerstone ASP was initiated (Calgary Planning Commission, 2007a, Attachment 7). The Cornerstone ASP was part of the pilot project for developer funded ASPs. In 2013, Council directed Administration to amend the *MDP* to include a New Community Planning Guidebook (NCPG), and to launch a pilot project for two developer funded ASPs (Calgary Planning

Commission, 2014). In early 2014, the City adopted the NCPG to “provide the core policies necessary for a condensed format of Area Structure Plan (ASP)...The NCPG contains policy that is applied in conjunction with the policies of new ASP’s. It provides the basic building blocks for neighbourhood development” (Galoska, 2015, p. 1). After the adoption of the NCPG, ASPs were to provide “any supplemental policies required in a particular plan area” (Calgary Planning Commission, 2014, p. 1). The Cornerstone ASP was adopted on September 8, 2014 (City of Calgary. Office of the City Clerk, 2014b). Wetland Preservation is a core idea. The report to Council highlighted “the wetlands contained within the area provide[d] the opportunity to design communities that integrate[d] and enhance[d] existing ecological networks” (Sonogo, 2014, p. 1). The Cornerstone ASP proposed including a network of preserved and enhanced wetlands. The largest wetland, Anderson, was to be a focal point for a 120-acre wetland / regional park (Ramjohn, 2015a). A lot of development was going on around Cornerstone, particularly in Redstone and Skyview Ranch (Ramjohn, 2015a).

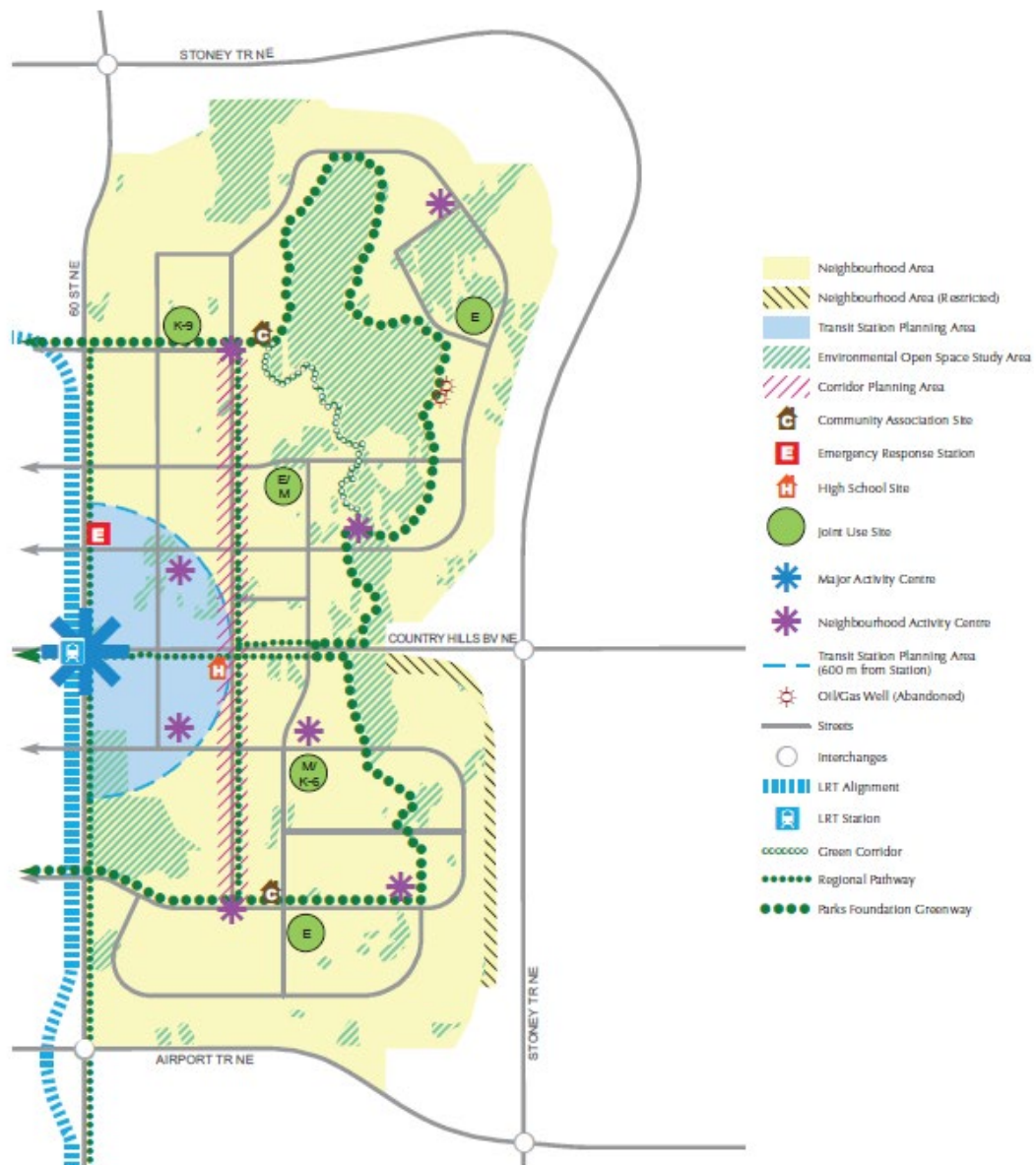


Figure 3-13: Land Use Concept from Cornerstone ASP Source: (City of Calgary Local Area Planning and Implementation: Planning, Development & Assessment, 2014, p. 8, one of 91 images or figures/tables).

The EOS Study Area identified environmentally significant lands that could “qualify as Environmental Reserve and ha[d] the potential to be incorporated into an urban context... further study [was] required to determine which [would] be preserved at Outline Plan/Land Use Amendment stage” (Sonogo, 2014, p. 9). Further, it was noted several of the wetlands had “regional significance and they [would] play an important role in capturing and treating stormwater in the future communities” (p. 11). It was anticipated that less significant wetlands

would be removed to accommodate development, further past farming operations were noted to have modified portions of the wetlands (Ramjohn, 2015a). The Stormwater Management section of the Cornerstone ASP, included a map identifying the four wetlands to be conserved in their natural state and managed as part of the stormwater management system.

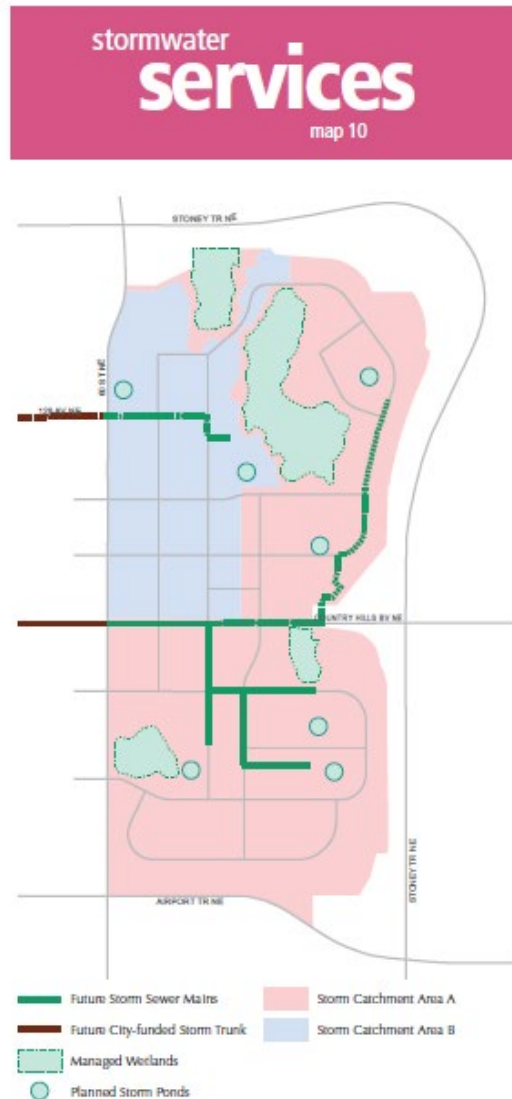


Figure 3-14: Cornerstone ASP, Stormwater Services Map 10

Source: (City of Calgary Local Area Planning and Implementation: Planning, Development & Assessment, 2014, p. 38, one of 91 images or figures/tables).

Outline Plan

The Calgary Planning Commission approved the Outline Plan for the Walton lands in 2015 [LOC2014-0173 (OP)]; however, the land use amendments, which are approved by Council, were phased (Kassa, 2017). According to Kassa (2017), this “was an atypical approach for a staged outline plan / land use amendment application processing, as usually the land use amendment application boundaries follow those of the outline plan” (p. 5).

Environmental Reserves wetlands feature prominently in the Outline Plan (LOC 2014-0173(OP)), approximately 74.22 hectares \pm (180 acres \pm) of wetlands were proposed to be conserved in their natural state. This represented four wetlands, which would “be connected by green corridor pathways to enhance the natural sustainability of the area” (Ramjohn, 2015a, p. 14). Further the conserved wetlands were to be “enhanced with restored plantings and a 30-metre visual setback” (Ramjohn, 2015a, p. 10).

To date, four land use amendments have been sought for phases 1 to 5 of the Cornerstone Outline Plan (OP), these phases coincide with the following neighbourhoods identified in the area structure plan: one, three, part of five, and six. The Cornerstone OP for Walton lands does not include the area for neighbourhoods four or eight. Land Use amendments have not been sought for neighbourhood two, part of five, or seven. Neighbourhood two will feature the largest of the four wetlands to be conserved in its natural state. Part of neighbourhood five and seven will also features a wetland to be conserved in its natural state.

communities and
neighbourhoods
map 4

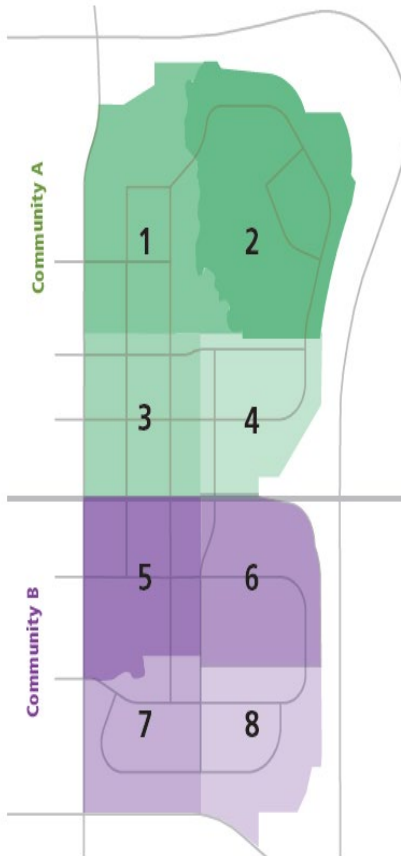


Figure 3-15: Cornerstone Area Structure Plan, Community and neighbourhoods Map 4 Source: (City of Calgary Local Area Planning and Implementation: Planning, Development & Assessment, 2014, p. 12, one of 91 images or figures/tables).

Summary of similarities between the plan and reality

In this research, wetland communities are “the similarity binding plan and product” (Hoch, 2002, p. 70). Calgary’s first wetland community predates the *Calgary WCP*. After the *Calgary WCP* was adopted, planners started to integrate it into the land use planning process, specifically into long range regional planning in the Northeast and then into more detailed master planning. I’ve chosen to focus my research on the three ASPs flowing out of the *Northeast*

Regional Policy Plan (City of Calgary, 2006), because it “contain[ed] the greatest concentration of natural wetlands within the City of Calgary” (p. 11).

Cuthbert and Tyler (2016) highlighted ASPs are “the largest unit of municipal development planning, [and] landscape systems are routinely restructured and replaced by municipal infrastructure to create drainage and conveyance systems which ‘mimic’ some of the specific landscape processes lost in the development process” (p. 5). This occurred in the three ASPs flowing out of the *Northeast Regional Policy Plan*. Wetlands were removed, and stormwater management systems were created to replace their function. However, select wetlands were conserved or are planned to be conserved, not all the communities included in the *Northeast Regional Policy Plan* (2006) are built out.

Based on the ASPs and OPs that flow out of the *Northeast Regional Policy Plan* (2006), I created a layer on Map E, Wetland Conservation Inventory from the regional plan to highlights which wetlands were to be conserved (see Figure 3-16). This is a conceptual layer and boundaries are not accurate. According to an interviewee:

“In East Calgary we have smaller basins and it's a challenge to protect[wetlands]. In the west side of the City there are fewer wetlands, but we've had more success, as it's topically controlled. So, where we have wetlands they are usually affiliated with a riparian system, a stream system of some sort. We are going to have better luck protecting that than a basin on a flat field” (City of Calgary – Urban Conservation Lead; personal interview).

Select wetlands were conserved in the NE as were their associated uplands, the *Calgary WCP*, enabled this. The Wetland Conservation Area identified in the Northeast Community ‘A’ ASP was conserved and is a feature in the Cityscape neighbourhood, the interpretive wetland is integrated into the Rotary/Mattamy Greenway and was featured as a pathway highlight (Olafson, 2017).

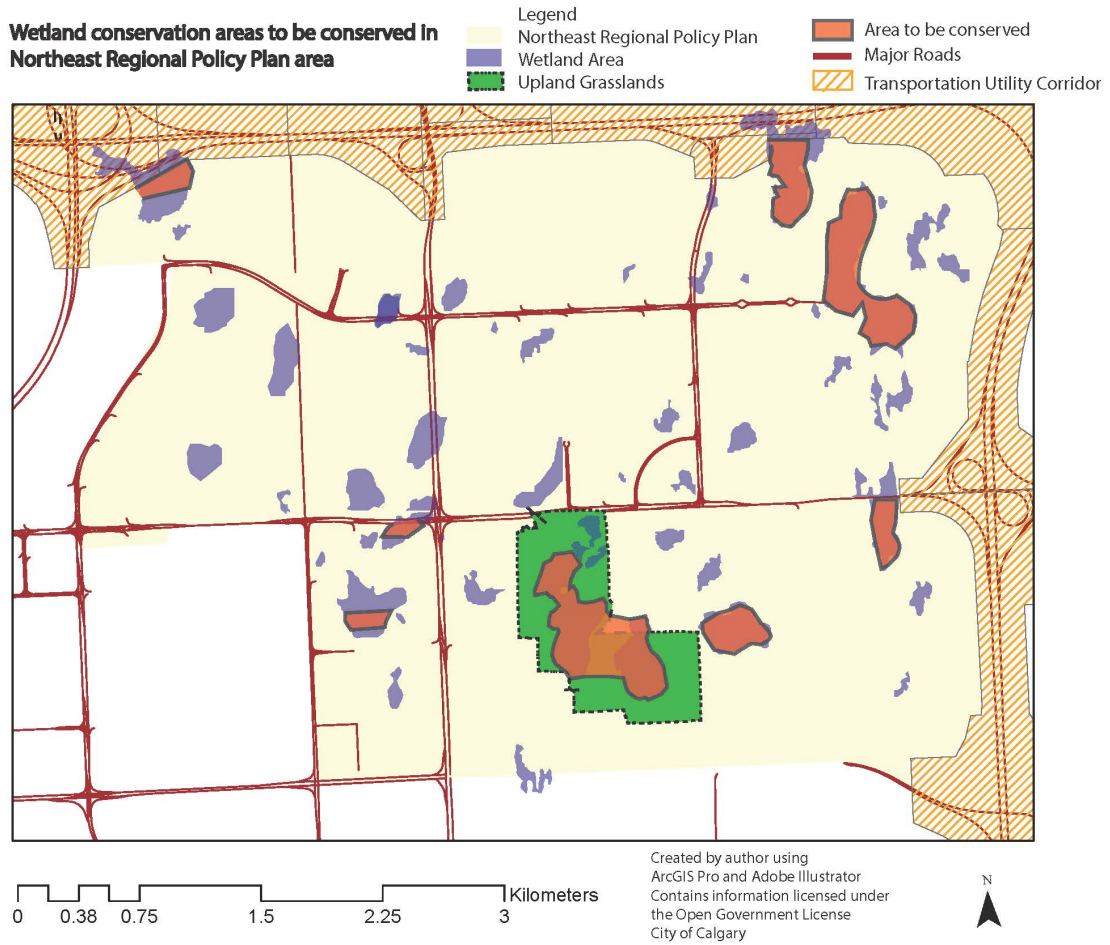


Figure 3-16: Northeast Regional Policy Plan (2006) Map E Wetland Conservation Inventory with layer to indicate which wetlands were to be conserved. Source: Created by author using information from City of Calgary 2006; Calgary Planning Commission, 2007b, p. 1 Appendix VI Attachment 2; Calgary Planning Commission, 2007a, Appendix X.X Attachment 7; City of Calgary Local Area Planning and Implementation: Planning, Development & Assessment, 2014, p. 38.

Note: Map is conceptual, and no measurements should be taken from it.



Figure 3-17: Rotary/Mattamy Greenway Signage at Cityscape Photo credit Alex Ramirez

The *Calgary WCP* has great content; however, there is a gap between the intentions of the plan and the plan's outcomes (City of Calgary – Biologist, Environmental Planner; personal interview). Not all wetlands prioritized for protection were or will be protected. Some wetlands were conserved, and the stormwater management systems provides or will provide them with water at a natural rate, thereby ensuring they are sustainable in the urban context. The sustainability of conserved wetlands was a concern and is often given as a reason why wetlands cannot be conserved. The reason, wetlands will be cut off from their water source and to divert treated stormwater into a naturally occurring wetland a water licence is required, none are available because the South Saskatchewan Basin was closed in 2006.

3.3 Lessons Learned from Case Study – Evaluation

Howlett and Ramesh (2003) state policy evaluation entails policy learning because past experiences are assessed to inform future policy. Adopting a learning perspective means evaluation is “an iterative process of active learning on the part of policy actors about the nature

of policy problems and the solutions to them” (Rist, 1994; Levitt and March, 1988 as cited in Howlett and Ramesh, 2003, p. 230). So, what can be learned about wetland conservation in an urban setting from the case study on the *Calgary WCP*?

3.3.1 The *Calgary WCP* (2004) tried to address the failure to prioritize wetland avoidance; however, wetland conservation was constrained

Clare’s (2013) review of wetland management literature from 1989 to 2010 identified five reasons why decision makers – in jurisdictions where a mitigation sequence is adopted – fail to prioritize wetland avoidance and minimization (see section 2.3.2.2 for the full list). I will discuss two reasons the *Calgary WCP* tried to address:

- Failure to identify and prioritize wetlands in advance of development
- Economic undervaluation of wetlands.

I can say with confidence in Calgary wetlands were identified in advance of development. They were identified via a city-wide wetlands inventory, then via planning documents such as: regional policy plans and/or regional context studies; area structure plans; and lastly outline plans and land use amendment applications. Preliminary assessments were done first and then Biophysical Impact Assessment (BIA) were done to determine the significance of wetlands, these were generally submitted at the OP stage.

The *Calgary WCP* gave the City a tool to protect ER wetlands and their uplands. Prior to this, “the City ha[d] few legislative options for protecting natural features on developable private land” (City of Calgary. Parks, 2002, p. 43). However, The City of Calgary did not and will not meet its goal of no net loss of Calgary wetlands. There is agreement between the Province and City that avoidance, the first step in the mitigation sequence was not commonly practiced. It was/is rare that wetlands were/are protected in place. In the *Northeast Regional Policy Plan* (City of Calgary, 2006), which had the largest concentration of natural wetlands in the City of Calgary, most environmental reserve wetlands were lost (see Figure 3-16). Only the most significant, larger wetlands were or will be conserved. The rationale given, wetland conservation was/is constrained, and restoration of wetlands is similarly constrained.

Wetland loss persisted despite high compensation costs. The rationale given for wetland removal was wetlands would not be sustainability post urban development. For wetlands to

function in the landscape post development, their water source must be protected or treated stormwater must supply wetlands with water at a natural rate. The first is difficult to achieve in an urban context if pre-development hydrology is not mapped, the second is hindered by two things: the appropriateness of releasing stormwater into a natural wetland and Calgary is in the South Saskatchewan Basin, which is closed. This means no new water licences are available and a water license is required to divert stormwater into a wetland and to do wetland restoration. Therefore, wetland conservation and restoration are hindered in the South Saskatchewan Basin.

In summary, wetland loss persisted despite the identification and prioritization of wetlands in advance of urban development and despite the high cost associated with wetland removal. Hoch (2002) raised the question, "...if we know after the fact that the plan was not followed, what does it mean to evaluate the plan?" (p. 59). He encouraged planners to look for similarities between the plan and reality.

3.3.1.1 Wetland Communities

In this research, wetland communities are "the similarity binding plan and product" (Hoch, 2002, p. 70). Calgary's first wetland community predates the *Calgary WCP*. In Bridlewood a 14-acre wetland area and several large boulders were preserved. After the *Calgary WCP* was adopted, planning started to integrate it into the land use planning process, specifically into long range regional planning in the NE. The *Northeast Regional Policy Plan* "contain[ed] the greatest concentration of natural wetlands within the City of Calgary" (City of Calgary, 2006, p. 11). Three ASPs flow out of this regional policy plan and wetlands are to be conserved in all three.

According to the initial outline plans submitted for the Northeast Industrial ASP (LOC 2008-0089 and LOC 2008-0090), the total amount of ER to be dedicated for wetland conservation was 14.73 hectares, or 36.39 acres. Additional land was also to be taken to sustain wetland function. This intended wetland area was significantly larger than what was included in Calgary's first wetland community, Bridlewood.

The subsequent ASP, Northeast Community 'A', conserved a much larger wetland area. According to the outline plan, the Wetland Conservation Areas was to be approximately 45 hectares (111 acres). Approximately 27 hectares (67 acres) was to be dedicated as Environmental

Reserve, the associated uplands, grassland habitat, was “provided to the City as part of compensation for the loss of wetlands elsewhere within the application area (Calgary Planning Commission, 2007a, Attachment 7, p. 10). These uplands created a larger functional ecological system.

The last ASP to flow out of this area was Cornerstone. In the outline plan for the Walton lands, approximately 74.22 hectares ± (180 acres ±) of wetlands were identified to be conserved in their natural state. This represents four wetlands, which would “be connected by green corridor pathways to enhance the natural sustainability of the area” (Ramjohn, 2015a, p. 14). Further the conserved wetlands were to be “enhanced with restored plantings and a 30-metre visual setback” (Ramjohn, 2015a, p. 10). The largest wetland, Anderson, is to be a focal point for a 120-acre wetland / regional park (Ramjohn, 2015a). In sum, overtime the size of conserved wetlands and uplands has increased; however, conserving wetland area does not necessarily mean conserving wetland function, more studies are needed to investigate if wetland function is conserved.

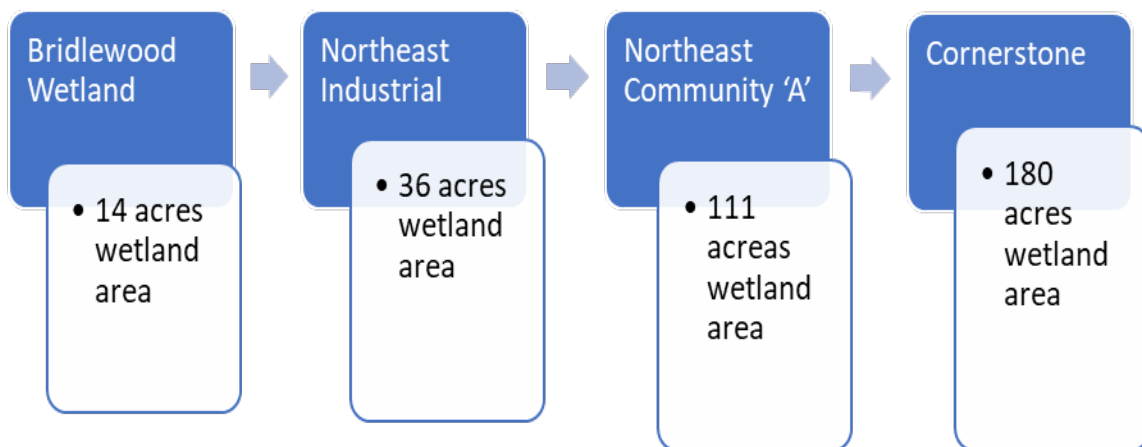


Figure 3-18: Wetland area conserved in Calgary’s first wetland community compared to wetland area conserved in the Area Structure Plans (ASPs) flowing out of the Northeast Regional Policy Plan (2006) Source: (Hope, 2000; Calgary Planning Commission, 2007a, 2007b, and 2007c; Ramjohn, 2015a)

3.3.2 Flawed assumptions underlie no net loss approach

Based on the literature, I expected wetland loss to continue despite the adoption of the *Calgary WCP*. Clare (2013) found “many jurisdictions in North America use a ‘mitigation sequence to protect wetlands’” (p. 37). The sequence is as follows: avoid, minimize, and lastly

compensate. However, there is broad agreement “avoidance, is ignored more often than it is implemented” (Burgin 2008; Environmental Law Institute 2009; Hough & Robertson 2009; Murphy et al. 2009a as cited in Clare, 2013, p. 37). Calgary’s experience confirms when a mitigation sequence is adopted, compensation becomes the de facto practice.

There are a few flawed assumptions that underlie the ‘no net loss’ policy approach to wetland management, namely compensation is a deterrent and wetlands and their functions can be traded off and replaced. The Calgary case study highlights the ‘no net loss’ approach to wetland management does not address the problem of wetland loss, particularly in an urban context. However, I am unable to disregard similar municipal wetland policies because through this research I learned about a specialized Alberta municipality that has done urban and rural wetland mitigation and has achieved their goal of ‘no net loss’ of wetlands. This leads me to conclude more comparative case studies are required.

3.3.3 More case studies are needed, especially comparative studies

One of the people I interviewed was a Biologist and Environmental Planner with a specialized municipality, a unique type of municipality in Alberta (Municipal Government Act, Revised Statutes of Alberta, 2000 c. M-26, s. 77). Typically, specialized municipalities are made up of both urban and rural communities that “coexist in a single municipal government” (Alberta. Municipal Affairs, 2018b). According to Alberta Municipal Affairs, there are five specialized municipalities in Alberta. The interviewee from the specialized municipality was on the team that developed the mitigation piece of the Alberta Wetland Policy (Alberta, 2013). Of note, this specialized municipality also adopted a municipal wetland policy, five years after Calgary in 2009. Their policy adopted a ‘no net loss’ approach to wetland management, a mitigation sequence, and a 3:1 compensation ratio.

Between 2009 to 2015, this specialized municipality tracked wetland loss due to urban and other types of development such as industrial development. The interviewee reported their municipality did urban and rural mitigation and exceeded their 3:1 mitigation ratio (Specialized Alberta municipality – Biologist, Environmental Planner; personal interview). This municipality was not a wetland restoration agent; however, Administration worked directly with Ducks Unlimited and the funds they knew were being provided to them from project within their

municipal boundaries. As a result, restoration took place within their municipality or adjacent to their municipality, within their sub-watershed.

The experience of this specialized municipality was very different than Calgary's. More research on municipal wetlands policies is needed to investigate why their experience was so different. I can hypothesize this municipality's wetland policy was successful because:

- they were not located in a closed basin,
- they stretched the definition to Environmental Reserve (ER) and applied it to ephemeral wetlands and wetland complexes in their entirety, and
- their municipal boundaries include a mix of urban and rural landscapes to do wetland mitigation,

Further, the research highlights another factor that could have contributed to the difference, the approval process to drain wetlands “is characterized by inconsistent decision-making and uncertainty within and between jurisdictions” (Clare et al., 2011, p. 170).

With the implementation of the 2013 wetland policy this specialized municipality now has two distinct processes, provincial and municipal (Specialized Alberta municipality – Biologist, Environmental Planner; personal interview). The municipality still works with developers to meet municipal policy, which includes no net loss of wetlands, including ephemeral wetlands, and a 3:1 compensation ratio. The 3:1 compensation ratio acknowledges a constructed stormwater management facility is not the same as a natural wetland. The interviewee stressed the importance of keeping the form and function on the land via constructed stormwater management facilities (Specialized Alberta municipality – Biologist, Environmental Planner; personal interview). There was an acknowledgement wetland restoration rarely happens, typically stormwater management facilities are constructed.

3.3.4 The Parallel Process for Wetland Approvals with the Provincial regulator was short lived.

Manderson (2016) maintained the *Calgary WPC* resulted in the City setting up a parallel process for wetland approvals with AEP [Alberta Environmental Protection]. At first glance, this resembled a new collaborative governance process. Upon investigation, I learned it was not.

Keivinsen et al. (2013) provided a good summary of what enabled the City to require compensation:

“When developers are subdividing municipal land with wetlands present, the city of Calgary has the right to take that land as an environmental reserve through the Municipal Government Act. The developers are given the option to retain the land by paying compensation to the city for the cost of the land plus what it would take to construct a new wetland in another location” (p. 121).

How could the City require compensation when it is the provinces whom have the “water legislation setting out a permitting process for those wishing to drain wetlands” (Scarth, 1998, p. 170)? Through my interviews, I gained a better understanding of the parallel process established as a result of the *Calgary WCP* (City of Calgary – Urban Conservation Lead; personal interview). Essentially the City of Calgary and a developer would enter into a legal agreement, destruction of ER wetlands was based on that agreement. The City agreed not to designate a wetland as ER in exchange for certain things, namely compensation but also uplands. The developer would then go to the Province with an application under the *Water Act* and they would bring with them their legal agreement with the City of Calgary. For more information on the parallel process see section 3.2.2.

The parallel process for wetland approvals was short lived, ending in 2015. The Province suspended Calgary’s status as a wetland restoration agent the same year it started to implement the 2013 wetland policy. Other municipalities with municipal policies were also affected:

“the Province shifted gears, it brought in new ratios, a new classification system, and a very rigid way to pay out the compensation dollars to Ducks Unlimited. I understand why they are doing it, being involved in the development of the policy and the mitigation process, I understand. But it did really tie our hands as a municipality because we could not then direct compensation activities within our landscape” (Specialized Alberta municipality – Biologist, Environmental Planner; personal interview).

This brings me to a discussion of Alberta’s New Wetland Policy (Alberta, 2013).

3.4 Provincial Wetland Policy

Municipalities are governed by provincial legislation, they are ‘creatures of the province’ (East York (Borough) v. Ontario (Attorney General), 1997). Therefore, when looking at municipal wetland policy and local implementations gaps, researchers and practitioners need to also familiarize themselves with provincial policy. Cuthbert and Tyler (2016) highlighted

“...wetlands within municipal boundaries have minimum protection under the provincial policy, and there is no requirement for municipal wetland management plans” (Clare and Creed, 2013 in Cuthbert & Tyler, 2016, p. 7). The Province of Alberta released a new wetland policy in 2013. This section will review this policy, problems with wetland management, and perceptions of the new provincial wetland policy.

3.4.1 Alberta Wetland Policy (2013)

In this section I highlight the goals, desired policy outcomes, and lastly the concepts and mechanisms that underlie Alberta’s new wetland policy, I highlight concepts such as relative wetland value and the mitigation sequence as well wetland restoration policies. Through my interviews I learned the Province is hoping to enable municipal ownership of wetland restoration by moving to a centralized wetland replacement account [a mitigation bank].

The stated goal of the Alberta Wetland Policy (Alberta, 2013) is to: “conserve, restore, protect and manage Alberta’s wetlands to sustain the benefit they provide to the environment, society and economy” (p. 2). Four desired policy outcomes are identified:

1. *“Wetlands of the highest value are protected for the long-term benefit of Albertans.*
2. *Wetlands and their benefits are conserved and restored in areas where losses have been high.*
3. *Wetlands are managed by avoiding, minimizing and if necessary, replacing lost wetland value.*
4. *Wetland management considers regional context” (p. 2).*

Alberta’s new wetland policy assumes not all wetlands are the same. This echoes the assumption of the ‘no loss’ approach to wetland management, not every wetland is valuable.

The following concepts and mechanisms are identified as key requirements of the provincial wetland management system:

1. *“Relative Wetland Value*
2. *Wetland mitigation: avoidance, minimization, and replacement*
3. *Knowledge and information systems*
4. *Performance measures, monitoring and reporting*
5. *Wetland stewardship” (Alberta, 2013, p. 11).*

Under the Alberta Wetland Policy (Alberta, 2013), “wetland value is assessed according to specific criteria and assigned an overall wetland value to inform management decisions” (p. 2). This addresses a problem identified with the previous Interim Wetland Policy (Alberta, Water Resources Commission, 1993):

“In Alberta, all of the government regulators we interviewed indicated that the most common metric used for comparability or equivalency between impacted and compensatory wetlands is area, with very little consideration given to wetland functions or services. Wetlands have thus become a commodity in a market where the measure of comparability between the items being exchanged disregards ecological and social values and functions” (Clare et al., 2011, p. 173).

Now, wetland value is assessed based on criteria (see Figure 3-19).

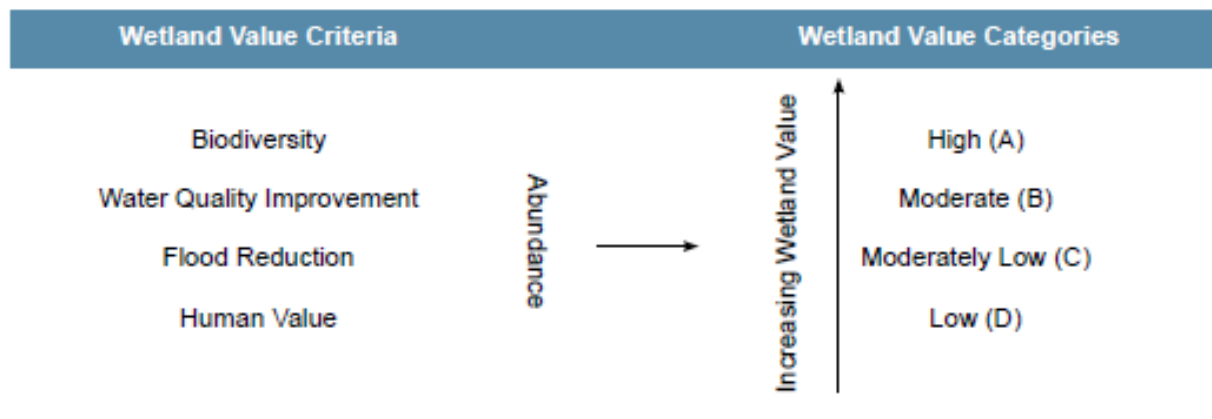


Figure 3-19: Relative Wetland Value Approach Source: (Alberta, 2013, p. 13, one of 10 images or figures/tables)

The Alberta Wetland Policy (2013), shifts towards a ‘no loss’ approach based on the value of the wetland. While the 2013 policy no longer includes ‘no net loss’ goal, a mitigation sequence is retained. This raises the question, under the interim wetland policy, was it the ‘no net loss’ approach that was problematic or was it the adoption of the mitigation sequence? Based on the literature, the adoption of the mitigation sequence was the principle reason the interim wetland policy did not achieve its goals. This researcher believes that a ‘no loss’ approach, based on relative wetland value, is undermined by retaining a mitigation sequence that still allows for compensation. Under the old interim provincial policy, avoidance of wetland impacts was not practiced (Clare, 2013). According to an interviewee the same thing is happening with the new Alberta Wetland Policy (City of Calgary – Biologist, Environmental Planner; personal interview).

For an evaluation of the interim wetland policy, see Clare (2013). She evaluated outcomes of the 1993 wetland policy. Clare's (2013) research: "Quantif[ie]d] key policy outcomes, including wetland avoidance and compensation, and evaluate[d] these outcomes relative to stated management objectives and guidelines" (p. 4). Among her findings, avoidance was not practiced, and wetland removal was concentrated around the Edmonton and Calgary areas. Wetlands were removed from these urban regions and restored elsewhere. Clare (2013) highlighted "[t]he vast majority of compensation occur[ed] outside of the watershed of impact (80%), which has lead to a spatial reorganization of wetlands across the landscape" (p. 79). Is this something the 2013 policy addresses? The abundance of wetlands is part of the criteria to determine wetland value. In theory, removing wetlands in areas where losses have been high would be discouraged. Further, wetland restoration would be encouraged in areas with high wetland loss. This is a departure from the previous policy and has yet to be implemented (Province – Manager, Provincial Environment Department; personal interview).

The Provincial Wetland Restoration/Compensation Guide (Alberta. Environment, 2007) stressed "compensation **should** take place within the same watershed as the impacted wetland, or in a watershed close by" [emphasis added] (p. 1). Now, "Prioritization for wetland replacement **will encourage** replacement in or near the area where a wetland was lost [emphasis added]" (Alberta. Environment and Parks, 2014, p. 2). Perhaps the shift in language is an acknowledgement that in Alberta, wetland compensation rarely took place in the impacted watershed (Clare, 2013, p. 78). The Provincial Wetland Restoration/Compensation Guide stressed:

"Wetlands should not be restored within the projected 30-year expansion limits of urban areas unless it can be incorporated into a secure or protected system, such as a park or flood plain" (Alberta. Environment, 2007, p. 1).

This is problematic because contemporary wetland loss in Alberta is due to urbanization and wetlands are not typically restored in highly impacted watershed.

Perhaps this explain why, in the new wetland policy replacement can be "restorative" or "non-restorative" and replacement is divided into two categories, "in lieu payment" and "wetland offset". The latter are for permittee-responsible or third-party replacement [Wetland Replacement Agents] (Alberta. Environment and Parks, 2014). Why does all this matter?

Through my interviews I learned the Province is looking to open the door for municipalities to take ownership of where wetland restoration happens, without requiring municipalities to do the restoration themselves (Province – Manager, Provincial Environment Department; personal interview).

The Province is hoping to enable municipal ownership of wetland restoration by moving to a centralized wetland replacement account [a mitigation bank] (Province – Manager, Provincial Environment Department; personal interview). To get a centralized account in place a ministerial order is required. Once in place, an account can be activated. The desired outcome, the Province accrues compensation funds and allocates funds on a contractual basis to individual projects (Province – Manager, Provincial Environment Department; personal interview). Then anyone who can demonstrate an appropriate level of oversight can do wetland restoration. This would enable municipalities, and others, to restore wetlands and deliver wetland ecosystem services to Albertans in a more direct manner that transcends municipal boundaries (Province – Manager, Provincial Environment Department; personal interview). A centralized provincial account may also address the challenge of having to find wetland restoration and conservation opportunities. Instead of having to go out and find those opportunities, there is a desire to shift to a system where opportunities are presented to the Province. Then the pressure will be on municipalities to identify their priorities for wetland restoration; further, to engage landowners in identifying those opportunities.

3.4.1.1 Alberta Urban Municipalities Association (AUMA) Water Policy on Wetlands (2013)

In section 2.3.2.2, I highlighted AUMA’s water policy on wetlands, which consisted of fourteen municipal wetland policies (AUMA, 2013). These municipal policies were developed as a response to the province’s new wetland policy. AUMA’s municipal wetland policies were explained as “part of a broader initiative to develop a set of comprehensive water policies ...to effectively respond to provincial and federal policies and programs and to build municipal capacity to respond to water related challenges and opportunities” (Aquality Environmental Consulting, 2016, p. 117). According to an interviewee, a lot of the policy statements articulated in 2013 are still valid (Urban Advocacy Staff; personal interview). They noted the exception was with respect to the *MGA*, it has since been modernized, and the ER definition was updated.

3.4.2 Problems with wetland management

Does Alberta's 2013 Provincial Wetland Policy respond to issues identified through research and past policy analysis? In Ontario, Schulte-Hostedde et al. (2007) concluded "effective implementation of the [2005] PPS [Provincial Policy Statement] [would] be impeded because the policy fail[ed] to adequately address the fundamental problems affecting wetland management in Ontario: fragmented jurisdiction, interagency communication, financial arrangements, enforcement, and promoting informed decision making" (p. 92). These issues are also seen in Alberta. Clare et al. (2011) argued "fragmentation of decision-making and general failure to better integrate planning at multiple scales ha[d] contributed to the ineffectiveness of the wetland policy in Alberta" (p. 171). Below, are interviewees' perspectives on the issues identified by Schulte-Hostedde et al. (2007).

3.4.2.1 Fragmented jurisdiction:

Since the Alberta Wetland Policy (Alberta, 2013) came into effect, existing municipal wetland policies are being implemented along side the Provincial one, in tandem. Calgary still has the discretion to determine which wetlands to protect; however, if the City does not protect the wetlands, compensation funds go to Ducks Unlimited (DU). The priority for DU is compensation away from urban area. So, if the City does not protect wetlands within its boundaries those wetlands will not be replaced in the local landscape (City of Calgary – Urban Conservation Lead; personal interview).

All interviewees affirmed municipalities want to be involved in conservation and restoration, the ones with capacity feel like their "hands are tied" (Specialized Alberta municipality – Biologist, Environmental Planner; personal interview). Further, this interviewee maintained the 2013 wetland policy does not directly recognize the role municipalities can play in protecting wetlands. The Province is trying to respond to the municipal desire to keep compensation funds and ecosystems services in the municipalities impacted by wetland loss (Province – Manager, Provincial Environment Department; personal interview). The provincial wetland mitigation directive identifies the need to ensure wetlands are retained within the municipal boundary, to the fullest-extent possible (Province – Manager, Provincial Environment Department; personal interview).

In part, this is a response to a desire expressed by the association of rural municipalities in 2012 to enable all its members to become wetland restoration agents, now known as third-party providers for wetland offsets. The interviewee from the Province shared this is not manageable administratively, because then every municipality would need a memorandum of agreement with the Province. The interviewee also underscored the level of expertise and investment needed to take on the role of a third-party provider for wetland offsets and highlighted not every municipality has the capacity to do this. Municipalities' desire to become third party providers for wetland offset is an outcome of not wanting current the third-party provider, Ducks Unlimited, to move compensation funds and affiliated ecosystem services outside of the jurisdiction where wetland losses are incurred. Ducks Unlimited has difficulty moving outside of their own priority areas, providing habitat for ducks.

However, it is not just about conserving wetland in the larger landscape, conserving wetlands in municipalities is important. An interviewee with the City of Calgary stressed municipalities often make decisions that impact the Province's desired outcomes on issues such as conservation of certain land uses, open space, and wetlands (City of Calgary – Urban Conservation Lead; personal interview). This interviewee also noted that in the past the City decided “about a wetland existing or not existing before they [the Province] even saw the application”. Barss' (2003) research supports this, he wrote “the essence of the Act [*Municipal Government Act*], other provincial policies, and ministerial statements [was] to treat municipalities as independent sectors who [were] allowed to make unilateral land use decisions of regional, provincial and national consequence with minimal outside input” (pp. x-xi). Barss was critical of this and advocated for regional planning and asserted, “municipalities should be the primary participants in the design, operation and outcome of any regional governance system” (p. xv).

Since Barss (2003) published his thesis, a new regional planning system has been established (see section 5.3.1 paragraph three). However, according to an interviewee, The *South Saskatchewan Regional Plan* (SSRP), a by-product of the new regional planning system and the regional plan applicable to Calgary, does not seem to acknowledge the importance of the municipal role (City of Calgary – Urban Conservation Lead; personal interview). Further, there is no basin wide conservation direction for wetlands included in the SSRP, it does not get down

to that level. However, regional planning does offer an opportunity to address wetland conservation on a larger scale, if the opportunity is seized then perhaps the 2013 Alberta Wetland Policy will be more effective. Clare et al. (2011) alleged the reasons the 'interim' wetland policy was ineffective was because it failed to integrate planning at multiple scales and address fragmented decision making.

An interviewee with the City of Calgary expressed concern about the biases exhibited by decision makers responsible for approving impacts to wetlands (City of Calgary – Urban Conservation Lead; personal interview). Specifically, a bias against conserving wetlands in cities and a tendency to devalue wetlands in an urban context, because they could never be that good. This raises an interesting question, what are the assumptions of approval writer and how are they factoring into compensation decisions? An interviewee highlighted there are not enough local people to make decisions, which decreases the effectiveness of those decisions (City of Calgary – Biologist, Environmental Planner).

Wang et al. (2011) elaborated on a pilot project done by the Province to explore incorporating ecosystem services in a 274 km² area, which included an area east of the City of Calgary, an area in Rocky View County and the Town of Chestermere (p. 6). Wang et al. explained how “new information about wetland ES [Ecosystem Services] armed them [provincial decision makers] with a broader awareness and understanding of the functions, services and benefits wetlands provide to people” (p. 67). This pilot project highlighted that ecosystem services and urban ecology are concepts that are starting to be applied in Alberta, both municipal and provincial capacity needs to be built up for these concepts to be implemented.

3.4.2.2 Interagency communication:

Stewart (2008) called on the Province “to examine its department silos of laws, policies and provincial agencies to ensure that cross-cutting issues, such as protection of wetlands and riparian lands are priority matters for the Government of Alberta, and not just isolated departments” (p. 250). According to an interviewee, the Province is trying to stream line the *Water Act* and *Public Lands Act* processes (City of Calgary – Biologist, Environmental Planner; personal interview). This is to address previous communication breakdowns between Provincial departments. It is also to increase consistency and set up communications in real time.

The Province is trying to communicate not only the importance of wetlands but also the regulatory and legislative requirements (Province – Manager, Provincial Environment Department; personal interview). There was an acknowledgement that the Province has not been good at communicating the *Water Act* and *Public Lands Act* to the public. Generally, the public's reaction to regulatory and legislative requirements is twofold. On the one hand there is support from the environmentally conscious, on the other hand you have those who see it as government interference with private property rights. Wetlands and agriculture remain one of the Province's focal points. As is making sure the regulatory process is reasonable. Among other things the Province is focused on how to engage landowners in the regulatory process and what mechanisms need to be in place to ensure appropriate wetland replacement on the ground.

From a provincial perspective, the municipal role is acknowledged in the 2013 Alberta Wetland Policy (Province – Manager, Provincial Environment Department; personal interview). The interviewee from the Province acknowledged the need for enhanced connection between municipal objectives, needs, outcomes and provincial wetland management. This entails better communication. Further, the interviewee stressed it was about improving communication and not about collaboration. Because the regulatory processes are different, the interviewee from the Province believed it was not reasonable to expect collaboration on regulatory applications (Province – Manager, Provincial Environment Department; personal interview).

An interviewee from Calgary highlighted the importance of communication to increase the Province's knowledge of local features (City of Calgary – Manager, Community Planning, personal interview). The interviewee emphasized Calgary staff are the ones with the on the ground knowledge, knowledge of drainage and the features themselves; therefore, there needs to be a close tie between the City and the Province. City staff can help address the question, how do we continue wetlands in an urban context (City of Calgary – Manager, Community Planning, personal interview)? The interviewee stressed continuing wetland in an urban context differs greatly from a more suburban or purely rural context.

The interviewee from the Province acknowledged they tend to focus on their legislation and jurisdiction and not pay as much attention to municipal planning (Province – Manager, Provincial Environment Department; personal interview). However, the interviewee noted if the Province has a better understanding of what a municipality intends around a water body; then the

likelihood of redirecting an applicant prior to provincial authorization to remove a wetland is increased. The interviewee from the Province stressed the *Municipal Government Act* (MGA) is a very powerful piece of legislation and statutory plans supersedes a decision a regulatory approval writer under the *Water Act* may make, the interviewee stressed people do not know this.

Policy staff from the urban advocacy association stressed provincial leadership was required to coordinate among provincial departments and to build knowledge in the municipal sector. The North American Waterfowl Management Program (NAWMP) is sponsoring working groups and based on this an interviewee felt interagency communication was fairly consistent (Specialized Alberta municipality – Biologist, Environmental Planner, personal interview). Alberta NAWMP Partnerhsip brings different stakeholders together to discuss wetland education and wetland policy, an interviewee believed this was the best way to keep municipalities connected with the Province, and with other municipalities trying to build capacity (Specialized Alberta municipality – Biologist, Environmental Planner; personal interview). This interviewee also identified an information gap with respect to timelines for directives associated with the Alberta Wetland Policy, stressing that when there is a new directive or a new process it is generally solid but waiting for updates was frustrating.

3.4.2.3 Financial arrangements:

The municipal sector wants wetland compensation funds to be used in the jurisdiction in which they originate. This desire was acknowledged by Provincial, municipal and advocacy staff. Municipalities do not want the current third-party provider, Ducks Unlimited, to move compensation funds outside of the jurisdiction where they originate from (Province – Manager, Provincial Environment Department; personal interview). To date, implementation of the new wetland policy means practically the only way to compensate for wetland loss is a direct payment to Ducks Unlimited (Specialized Alberta municipality – Biologist, Environmental Planner, personal interview). Unless Ducks Unlimited has a project within the boundaries of the originating municipality, compensation funds are applied to whatever project they have in the larger landscape (Specialized Alberta municipality – Biologist, Environmental Planner, personal interview). To enable municipalities and others to do wetland restoration, the Province is moving towards implementing a centralized wetland replacement account (Province – Manager, Provincial Environment Department, personal interview). Then the Province would then accrue

compensation funds and manage contracts for wetland restoration projects. It is believed this is one of the mechanisms needed to enable appropriate replacement on the ground.

3.4.2.4 Enforcement:

From the Province's perspective, the outstanding challenge is always going to be the unmitigated loss of wetlands (Province – Manager, Provincial Environment Department; personal interview). Unmitigated losses are when wetlands are impacted or destroyed outside of the permitting process, the very nature of them makes it difficult to quantify. The quantified losses are the losses due to development, particularly urban development. Clare et al. (2011) provided some insight into unmitigated losses:

“in Alberta, an environmental consultant we interviewed estimated that up to twenty percent of their clients had impacted a wetland prior to securing an approval (Sr. Environmental Scientist as cited in Clare et al., 2011, p. 174).

Municipalities are constrained in their ability to do anything about unmitigated losses, except report disturbance and losses to the Province:

“If you have a wetland on your property, we defer to Alberta Environment, so we deal with their compliance officers on any disturbances because they have the authority to stop the work, require remediation, and require an authorization” (City of Calgary – Urban Conservation Lead; personal interview).

An interviewee highlighted the Province has limited capacity to deal with unmitigated losses:

“Municipalities do not have any jurisdiction under the Water Act or Public Lands Act, we have our enforcement people at the Province on speed dial, but they have a capacity issue. So that is normally our biggest concern. You know obviously we want to be the first in line but that sometimes does not happen, but I think that is a capacity issue on the province's side” (Specialized Alberta municipality – Biologist, Environmental Planner; personal interview).

Under Calgary's stripping and grading bylaw, if a disturbance is more than 1000 m² then a small fine can be issued as well as a stop work order (City of Calgary – Urban Conservation Lead; personal interview). The City does not have a wetland bylaw; however, this could change. Recent legislative changes acknowledge the role of municipalities with respect to environmental matters and municipalities now have a new municipal purpose, to “foster the well-being of environment (s.3)” (Powell, 2017, para. 5).

Stewart (2008) argued municipalities already had the statutory authority to enact municipal water management by-laws via section 60 of *MGA (2000)*. She argued this section could be used to “manage human activities that affect[ed] wetlands” (p. 12). Section 60 of the *MGA R.S.A, 2000 c. M-26* is as follows:

“Water bodies

60(1) Subject to any other enactment, a municipality has the direction, control and management of the rivers, streams, watercourses, lakes and other natural bodies of water within the municipality, including the air space above and the ground below.

(2) Nothing in this section gives a municipality the direction, control and management of mines and minerals” (Municipal Government Act, Revised Statutes of Alberta, 2000 c. M-26).

However, to date, a non-regulatory approach to wetland conservation has been taken. Perhaps more of a regulatory approach is needed, because currently the City is not meeting targets for environmental protection, despite the abundance of plans and policies (City of Calgary – Biologist, Environmental Planner; personal interview). Calgary’s non-regulatory approach mirrors early provincial and national approaches. Lynch-Stewart et al. (1993) explained “Canada’s focus [was] a non-regulatory policy approach to wetland conservation” (p. 20). Further, “This approach remain[ed] globally unique as no other nation has pursued wetland programs so actively from this perspective” (p. 20).

An interviewee stressed the Province needs to be more stringent (City of Calgary – Biologist, Environmental Planner; personal interview). The *Water Act* gives the Province the ability to not grant approvals to drain wetlands. However, an interviewee held the view the Province does not have an administrative way of saying no (City of Calgary – Urban Conservation Lead; personal interview). This is in line with Clare’s (2013) findings, “qualitative data from interviews suggest that the government rarely (if ever) denies an approval for an wetland impact” (p. 75). Clare’s research was done in the context of the interim wetland policy; however, some interviewees said this persists under the new wetland policy.

3.4.2.5 Promoting informed decision making:

The Alberta Wetland Policy (Alberta, 2013) introduced a new way to classify wetlands, the Alberta Wetland Classification System. This new system is a combination of two classifications systems, the Stewart and Kantrud System and the Canadian Wetland System. The

new classification was introduced to facilitate consistency and comparability across the province (Province – Manager, Provincial Environment Department; personal interview). Calgary’s wetland inventory is dated and classifies wetlands using the Stewart and Kantrud Wetland Classification System. Further, the *Calgary WCP* refers to these classes in its definitions of Natural Wetland and Environmental Reserve wetlands. Calgary’s wetland inventory and the *Calgary WCP* will need to be updated to reflect the new classification system. Furthermore, it will need to be updated to reflect the fact the City is no longer involved in compensation.

As previously mentioned, the Province is moving towards implementing a centralized wetland replacement account whereby the Province accrues compensation funds and manages contracts for wetland restoration projects. This would not only enable municipalities but others to do wetland restoration. As a result, municipal capacity will need to be built-up, because there will be pressure on municipalities to start identifying their management priorities and where they want wetland restoration to occur (Province – Manager, Provincial Environment Department; personal interview). In 2016, NAWMP released a *Municipal Guidebook for Wetland Conservation*. It is a great resource to build municipal capacity. A number of interviewees stressed only those municipalities who have the capacity, the knowledge of provincial policy, their land base, and their development pressures should be given more responsibilities, such as becoming third-party providers for wetland offsets.

3.4.3 Shortcomings of the New Wetland Policy and what is Calgary doing to address them?

Through the literature I learned about the characteristics and functions of wetlands in this region (see section 2.2.1.1). There are a couple of characteristics that stand out to me: wetlands are part of complexes and there is a relationship between the water and the land (Galatowitsch et al., 1998). Why is this important? This means complexes, which consist of different classes of wetlands, need to be conserved, not just individual wetlands. Further lower class wetlands are important and have value. The *Alberta Wetland Policy* (Alberta, 2013) did not recognize the importance of lower class wetlands, such as ephemeral wetlands.

Another problem I see is the *Alberta Wetland Policy* only recognized the relationship between wetlands and riparian areas at a high level (Province – Manager, Provincial Environment Department; personal interview). Wetlands in the region have an “interrelationship

with the surrounding environment” (Lynch-Stewart et al., 1999, p. 1). The water and land are connected, which means, wetlands conservation entails conservation of riparian areas, also known as uplands (Stewart, 2008). The uplands are needed to ensure the survivability and functionality of wetlands (McElfish, Jr., Kihlslinger & Nichols, 2008 as cited in Stewart, 2008). Calgary has developed a program and a strategy to protect riparian areas (Posada & Frigo, 2012).

The City of Calgary is seeking to conserve ecologically sensitive areas, such as wetlands. However, policies do not always translate well on the ground. To address this, the City is currently working on the issue of connectivity, in greenfield communities but also in the existing urban fabric (City of Calgary – Urban Conservation Lead; personal interview). Work is underway to determine where the important connections are and how to re-establish them; the goal is to prioritize wetland protection in those areas, because they will likely have greater viability post development (City of Calgary – Urban Conservation Lead; personal interview).

This brings me to the concept of urban ecology and the need for more urban ecology research to further our understanding of how wetlands and cities can coexist and the cost/benefit or avoiding versus removing wetlands. I believe wetland and cities can and should coexist and local knowledge is needed to enable this, which is where municipalities come in. Several interviewees highlighted the Province’s limited capacity, not only for enforcement but also lack of knowledge specific to municipalities, the areas within them and what’s being done there. Municipalities have local knowledge and an interviewee stressed the need to provide this knowledge to the Province, they said this is where their input can be most useful and where municipalities can make a difference (City of Calgary – Manager, Community Planning, personal interview).

3.4.4 Summary of new Alberta Wetland Policy (2013) and opinions on whether it enables municipalities to conserve wetlands

There were mixed views as to whether the new provincial wetland policy recognizes the role municipalities can play in protecting wetlands in the landscape. All interviewees recognized the desire to retain compensation funds and ecological function in the municipalities where wetland losses are incurred. The interviewee from the Province acknowledged this desire and the need to accommodate it. To enable municipal ownership of wetland replacement, the Province is moving to a centralized wetland replacement account [a mitigation bank]. It is hoped this will

also address the issue of municipal capacity, the issue of provincial capacity was brought up as well.

Through the interviews, insight was provided on the power of the *MGA*, the interviewee from the Province said statutory plans supersede a decision a regulatory approval writer under the *Water Act* may make. The interviewee stressed generally, people do not know this. Perhaps because of the conditions prevail section (s620) of the MGA R.S.A, 2000 c. M-26, which states:

“620 A condition of a licence, permit, approval or other authorization granted pursuant to an enactment by the Lieutenant Governor in Council, a Minister, a Provincial agency or Crown-controlled organization as defined in the Financial Administration Act or a delegated person as defined in Schedule 10 to the Government Organization Act prevails over any condition of a development permit that conflicts with it”.

This sub-section refers to a development permit, not statutory plans. Therefore, if municipalities identify the wetlands to be conserved in their statutory plans their authority supersedes the decision of a regulatory approval writer under the *Water Act*. This seems to encourage municipalities to adopt of a ‘no loss’ approach to wetland management in their statutory plans.

Chapter 4. Conclusion

4.1 Answering the Research Question

The phenomena I am interested in is, *how are urban municipalities using context-based policy to conserve and restore wetlands in the Prairie Pothole region?* Most jurisdictions in this region have adopted a ‘no net loss’ approach to wetland management. To investigate this phenomenon, an inquiry of the *Calgary WCP* (City of Calgary, 2004) is done, the research is informed by a review of the grey literature, interviews with individuals familiar with the *Calgary WCP* and/or Provincial policy, and a focused review of the Area Structure Plans and then the Outline Plans flowing out from the *Northeast Regional Policy Plan* (City of Calgary, 2006). The central question this study sought to answer was what are the outcomes of the *Calgary WCP*? To answer this question an understanding of the context was needed. So first I investigated the context. Then I investigated the outcomes. Lastly, because the new wetland *Alberta Wetland Policy* (Alberta, 2013) impacted the *Calgary WCP*, the new provincial policy was reviewed.

4.1.1 What was the context of the *Calgary WCP*?

An understanding of the context is needed before a post hoc evaluation of plan outcomes can be done (Baer, 1997). In Chapter three, I provided the following:

- *Summary of Environmental, Economic, Social and Political Contexts*
- *Summary of Planning Context*
- *Summary of Wetland Management*

In the section entitled, *Summary of Context*, I provided a general overview.

In summary, the City of Calgary experienced strong economic growth and rapid population growth. Managing this growth challenged the City, the suburbs have accommodated most of the population growth. This put considerable development pressure on the landscape. As a result, protecting the environment emerged as a Council priority. Wetlands were featured under the protect the environmental priority; however, over time wetlands were placed under Council priorities focused on place.

Municipalities are increasingly developing wetland policies to address wetland loss, these policies are context-based approaches and they are a reaction to aspatial provincial policies, which have resulted in wetlands being removed from Alberta’s large urban areas, Calgary and

Edmonton, and restored elsewhere (Clare, 2013). Planning tools are being used in municipal wetland policies. In Alberta, municipalities are given considerable autonomy as planning authorities. The *Calgary WCP* was adopted prior to many of Calgary's current planning documents, such as *imagineCALGARY* and the 2009 *MDP*.

The *Calgary Plan* (City of Calgary, 1998b) was in place when the *Calgary WCP* was adopted. The *Calgary Plan* was a response to a legislative requirement, a new *MGA*. The *Calgary Plan* consolidated existing Council approved policies and new ones were only developed if required by the *MGA*, such as the case for dedication of reserve land. Wetlands were scarcely mentioned in the *Calgary Plan*. The dedication of environmental reserve was only mentioned when referring to undevelopable lands and in the definition of a floodway. Seen in this context the *Calgary WCP* was quite innovative.

There was a recognition that wetlands and their shores qualified as Environmental Reserve (ER) per the *MGA* (City of Calgary. Park, Development and Operations, 2001). However, prior to the *Calgary WCP*, "the City ha[d] few legislative options for protecting natural features on developable private land" (City of Calgary Parks, 2002, p. 43). The *Calgary WCP* utilized the ER definition in a novel way, to secure priority wetlands for conservation. Approximately 600 of the 8000 wetlands identified in Calgary's wetland inventory qualified as ER wetlands and were prioritized for protection (City of Calgary, 2004, p. 7 and 15).

Calgary's municipal policy was in many ways a reflection of the 1993 provincial wetland policy, which adopted a no net loss approach to wetland management and a mitigation sequence. There were many stakeholders involved in developing the *Calgary WCP*. When the plan went to committee and Council, letters of support were submitted from the Province, Ducks Unlimited, and Urban Development Institute - Calgary. The plan truly did combine a multiplicity of voices. The letters reflected different perspectives on matters such as engineered stormwater wetlands and the need to protect the uplands surrounding wetlands. When the *Calgary WCP* went to committee they added a recommendation that Administration be directed to investigate appropriate tools for upland protection. Council carried this recommendation along with the others, the result of the committee additional recommendation was the *Environmental Reserves Setback Guidelines* (2007).

Adoption of the *Calgary WCP* was timely because a few months earlier, during the public hearing for the *Southwest Community "A" and Employment Centre Area Structure Plan*, Council heard from many members of the public about the importance of protecting wetlands. It was expected the implementation of the *Calgary WCP* would occur via planning documents. The implementation of the *Calgary WCP* was not thought out during policy development. The regional policy plans/or regional context statements refer to wetland protection; however, it was expected that their protection would occur when more detailed planning took place such as Area Structure Plans (ASPs) and Outline Plans (OP). Often the Environmentally Significant Areas (ESA) were identified at the ASP level; however, it is at the OP level when decisions are made to conserve of natural features. Ensuring the long-term viability of conserved wetlands in the landscape post development was a reoccurring concern.

4.1.2 What were the plan outcomes of the *Calgary WCP*?

In the section 3.2 I reviewed:

- The intent of the *Calgary WCP*.
- Whether the plan was implemented.
- Who used the plan? Who resisted the plan?
- The expected outcomes and the unanticipated outcomes.
- What difference the plan made?
- The similarities between the plan and reality.

The outcomes I expected were:

- The *Environmental Reserve Setback Guidelines* are an outcome of the *Calgary WCP*.
- Wetland conservation and restoration needs to happen at the city-region scale.
- Context-based approaches are response to aspatial provincial policies, which have resulted in wetlands being removed from Alberta's large urban areas, Calgary and Edmonton, and restored elsewhere (Clare, 2013, p.78).
- Urban ecological studies are needed to focus on the implementation gap. It is important to recognize "ecological patterns and processes differ in cities as compared with other environments" (Grimm et al., 2000; Wu, 2008 as cited in Niemelä, et al., 2011).

4.1.2.1 Calgary's Environmental Reserve Setback Guidelines are an outcome of the Wetland Conservation Plan;

Rick Harland submitted a letter on behalf of Ducks Unlimited when the *Calgary WCP* went to Committee and then Council. He encouraged the City "to conserve priority wetlands [ER

wetlands] and their ecological function” (LaFreniere, 2004, Attachment 5, p. 2). To retain wetland function, he stressed the need to incorporate appropriate upland areas with natural wetland. Perhaps this is the origin of the S.P.C on Utilities and Environment’s extra recommendation to Council that directed administration to investigate environmental reserve designation for uplands. For a summary of how the Environmental Reserve Setback Guidelines were developed see section 2.7.1.

4.1.2.2 Cities need to work with rural neighbours;

Nicol (2013) highlighted the fact that city-regions are increasingly focusing on ecological issues because “...the city-region scale had become a principle site for advancing sustainability” (Wheeler, 2002 as cited in Nicol, 2013, p. 3). Manderson (2008) recommended two additional priorities be added to the *Calgary WCP’s* wetland mitigation framework (policy 2.2.10):

“Priority 8 – Compensation Banking for the enhancement or creation of wetlands outside the Corporate Limits of the City of Calgary, within a watershed local to Calgary

Priority 9 - Compensation Banking for the enhancement or creation of wetlands outside the Corporate Limits of the City of Calgary, outside of a Calgary watershed (Attachment, p. 1).

It was noted:

Note: Consideration of compensation sites outside of the City of Calgary [would] only be considered when all feasible options ha[d] been evaluated and in partnership with a Land Trust or Conservation Agency to facilitate acquisition and long-term management of the site. (Manderson, 2008, Attachment 1, p. 1).

Council adopted these recommendations, see section entitled *Outline Plans* for the full mitigation framework.

Manderson (2008) noted “[t]he [Calgary Wetland Conservation] Plan recognize[d] the need to consider ecological boundaries, rather than strictly jurisdictional boundaries. A regional wetland inventory [was] nearing completion, and it [was] anticipated that numerous regional compensation sites [would] be identified” (p. 2). A pilot project in a neighbouring municipality was done, which raised questions around ownership and jurisdiction (Province – Manager, Provincial Environment Department; personal interview). Doing compensation on a regional basis entailed negotiating with neighbouring municipalities, which was difficult to do when there

were no structures in place to facilitate a larger plan (City of Calgary – Urban Conservation Lead; personal interview). This was not doubt further complicated by intermunicipal conflict between Calgary and its rural neighbours.

Nicol (2013) highlighted, “Inter-municipal disputes are common in the Calgary region. Bursts of growth of the city of Calgary and the resultant infringement on bordering rural municipalities have resulted in a history of animosity, grounded largely in controversies over land and more recently, water” (p. 9). The Calgary Regional Partnership attempted to plan regionally considering the ecology of the landscape; however, the rural municipalities ended up leaving the partnership. In recent years, regional planning has gained more traction in Alberta, in part because the province has exercised its authority (see section 5.3.1 paragraph three).

4.1.2.3 Context-based approaches are needed

The *Calgary WCP* was a context-based approach to address wetland loss within the City of Calgary. The plan adopted a no net loss approach for Environmental Reserve (ER) wetlands, these were prioritized for protection. No all ER wetlands were protected, that was not the goal. The goal was ‘no net loss’ of Calgary wetlands. The City did not meet this goal. However, some wetlands were preserved or will be preserved and integrated into Calgary’s neighbourhoods (see Figure 3-16)

For example, a wetland conservation area was conserved in Cityscape, the neighbourhood falls within the boundaries of the *Northeast Community ‘A’ ASP* (City of Calgary. Land Use Planning and Policy: Planning, Development, and Assessment. (2007b). In Cityscape, two large wetlands and upland grasslands were conserved, the grasslands were acquired as compensation for wetland loss within the wider plan area. The *Calgary WCP* plan enabled this, I am uncertain whether this would happen now, given the City is no longer a wetland restoration agent and no longer has a parallel process to handle wetland approvals. This parallel process resembled a new collaborative governance process, it was not. Instead, an interviewee said the Province largely deferred or enabled Calgary’s Administration to make decision regarding wetland loss (City of Calgary – Manager, Community Planning, personal interview). Since the implementation of the 2013 Alberta Wetland Policy, the relationship between the City and the Province has changed. According to interviewees one thing has not

changed, development continues to take precedence over wetland conservation because the latter is constrained.

For wetlands to function in the landscape post development, their water source must be protected or treated stormwater must supply wetlands with water at a natural rate. To ensure the sustainability of natural wetlands, stormwater engineering solutions were often proposed in the Master Stormwater Drainage Plan. However, a water licence is required to divert treated stormwater into a wetland, the 2006 South Saskatchewan basin closure means no new water licences are available. Therefore, wetland conservation and restoration are hindered in the South Saskatchewan basin. One of the interviewee's highlighted wetlands cannot be meaningfully protected unless their entire catchment or their natural source of water is protected (City of Calgary – Urban Conservation Lead; personal interview). These constraints will need to be resolved, Council recently approved 14 new communities be included in the portfolio of new communities for the next four-year service plan and budget (Smith M., 2018).

Fourteen communities included in portfolio of new communities for *One Calgary 2019-2022*

Land use decisions are now integrated with the City's business plans and budgets. This is a result of 2009 *MDP*, which "directed The City to develop a framework for growth and change to enable land use decisions to be integrated with The City's financial and infrastructure decisions" (Chan, 2013, p. 4). The City is preparing its next budget and Administration recommended a "portfolio of new communities for One Calgary 2019-2022 four-year service plan and budget" (Davies Murphy, 2018b, p. 4). Initially eight communities were recommended for the portfolio, three were added by Administration bringing the total to eleven communities. Council approved 14 be included in the portfolio of new communities for *One Calgary*. A new process was used to prioritize which communities to include in the next four-year service plan and budget, proponents submitted business cases (Davies Murphy, 2018b). Administration then made recommendations to Council based on these submissions.

In 2013, there was a discussion about "where the 'gate' for new development should be in the development process and how to implement it under the Growth Management Framework" (Chan, 2013, p. 7). Chan (2013) explained Calgary's City Council identified the

need to shift the gate from ASP approval to the submission of an application (p. 8). Therefore, when ASPs are approved, a Growth Management Overlay is applied to the area.

“pieces of the Overlay are removed by Council when it is determined that growth management issues have been resolved, through an ASP amendment that requires a public hearing of Council. As such, the Overlay serves to direct development in the plan area strategically to lands determined to be ready for development” (Chan, 2013, p. 8).

On July 30, Council removed pieces of the Growth Management Overlay. In conjunction with the reports containing investment recommendations for new communities (PCF2018-0678 and C2018-0858), a report went to Council recommending the Growth Overlay on the original eight communities be lifted. These eight communities are in five ASPs. One of the ASPs was adopted before the New Community Planning Guidebook (NCPG) was adopted (Belvedere), one was part of the pilot project for developer funded ASPs (Rangeview) and the rest (Glacier Ridge, Providence, Haskayne) were adopted after Council adopted the NCPG. The NCPG enabled the development of shorter more streamlined ASPs (Calgary Planning Commission, 2014)

Before the Growth Management Overlay could be removed for the additional communities, an Area Structure Plan amendment (ASP) to remove the overlay had to be prepared and a public hearing held. Administration was directed to prepare bylaws and advertise the ASP amendments, the public hearing was scheduled for the Combined Meeting of Council on September 10, 2018 (City of Calgary. Office of the City Clerk, 2018). The additional six communities added are either in the previously mentioned ASPs or one of the following: The East Stoney ASP (City of Calgary, 2017c), Keystone Hills ASP (City of Calgary. Land Use Planning and Policy: Planning, Development and Assessment, 2012), and South Shepard ASP (City of Calgary. Land Use Planning and Policy: Planning, Development and Assessment, 2013b).

Regional Policy Plan or Context Study	ASP Area	ASP Year	Proponent (s)	# of Communities	City Sector
<i>North Regional Context Study (2010)</i>	Glacier Ridge ASP	2015	Ronmor/ Wenzel	2	North
<i>North Regional Context Study (2010)</i>	Glacier Ridge ASP - Symons Valley Ranch	2015	Capexco Inc.	1 Community Activity centre	North
<i>East Regional Context Study (2009)</i>	Belvedere ASP – West Belvedere	2013	Tristar/Truman / Landsdowne/ Others	1	East
N/A	Rangeview ASP	2014	Brookfield/ Genstar/ Section 23/Others	2	Southeast
<i>Southwest Regional Policy Plan (2006)</i>	Providence ASP	2015	Dream/ Qualico	1	South
<i>West Regional Context Study (2010)</i>	Haskayne ASP	2015	Brookfield/ Marquis	1	Northwest
N/A	Addition: East Stoney ASP	2017	Pacific	1	Northeast
N/A	Addition: Keystone Hills ASP	2012	Melcor/ Genstar/Pacific	2 1 residential, 1 commercial/ industrial	North
<i>East Regional Context Study (2009)</i>	Belvedere – Twin Hills ASP	2013	OpenGate	1* Added by Council	East
<i>North Regional Context Study (2010)</i>	Glacier Ridge	2015	Qualico	1* Added by Council	North
<i>East Regional Context Study (2009)</i>	South Shepard ASP	2013	Hopewell/ Melcor	1* Added by Council	Southeast

Table 4-1: Approved Portfolio of new communities for *One Calgary 2019-2022*, 14 communities across 11 business case adapted by author Source: (Davies Murphy, 2018b, attachment 2 and attachment 4, p 1; CBC News, 2018).

Next, for the 14 communities included in the portfolio of new communities for *One Calgary 2019-2022*, I include the maps of environmental significant areas, natural features, environmental open space from applicable Regional Policy Plan or Context Study and ASPs. I have also included the land use concepts from the ASPs. Generally, the features identified as ESA or as part of the Open Space Study are included in the ASP with the caveat, refinements can

be made at the Outline Plan and Land Use Amendment Application stage. It is at the Outline Plan stage where decisions are made whether to conserve natural features. I have ordered the communities based on the chronological order of the Regional Policy Plan or Context Study. Those without regional plans are listed at the end in chronological order of when they were adopted.

Map of 14 communities included in portfolio of new communities for *One Calgary 2019-2022*

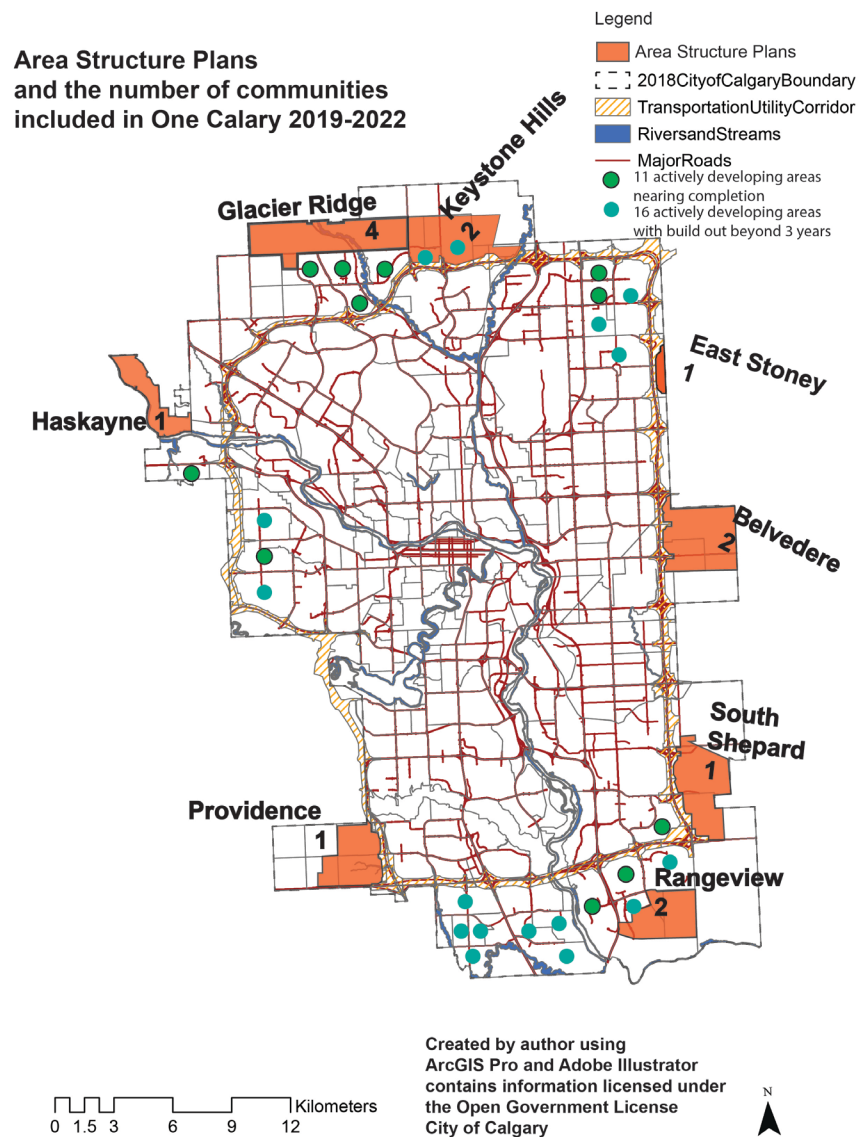


Figure 4-1: Location of Portfolio Communities for One Calgary (2019-2022), revised by author based on Davies Murphy, 2018b and CBC News, 2018 Source: Created by author based on Davies Murphy (2018a, Attachment 1 p. 5, Attachment 2, and Attachment 4 p. 1); Davies Murphy (2018b); CBC News (2018).

The Providence ASP (City of Calgary. Local Area Planning and Implementation, Planning, Development and Assessment, 2015) falls within the *Southwest Regional Policy Plan*, Environmental Conservation was a key principle in the regional plan and the environmentally significant features highlighted were ravines, wetlands, and major tree stands (see Figure 4-2).

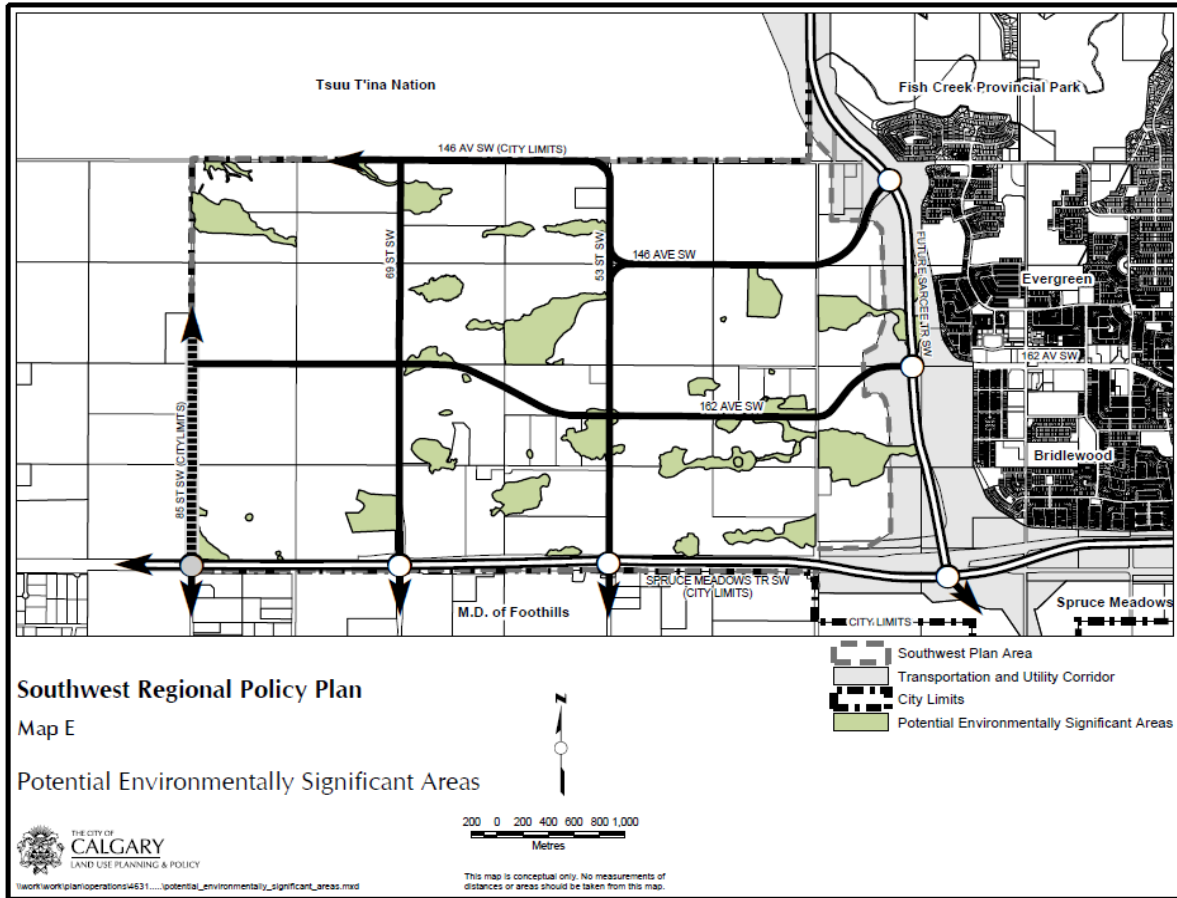
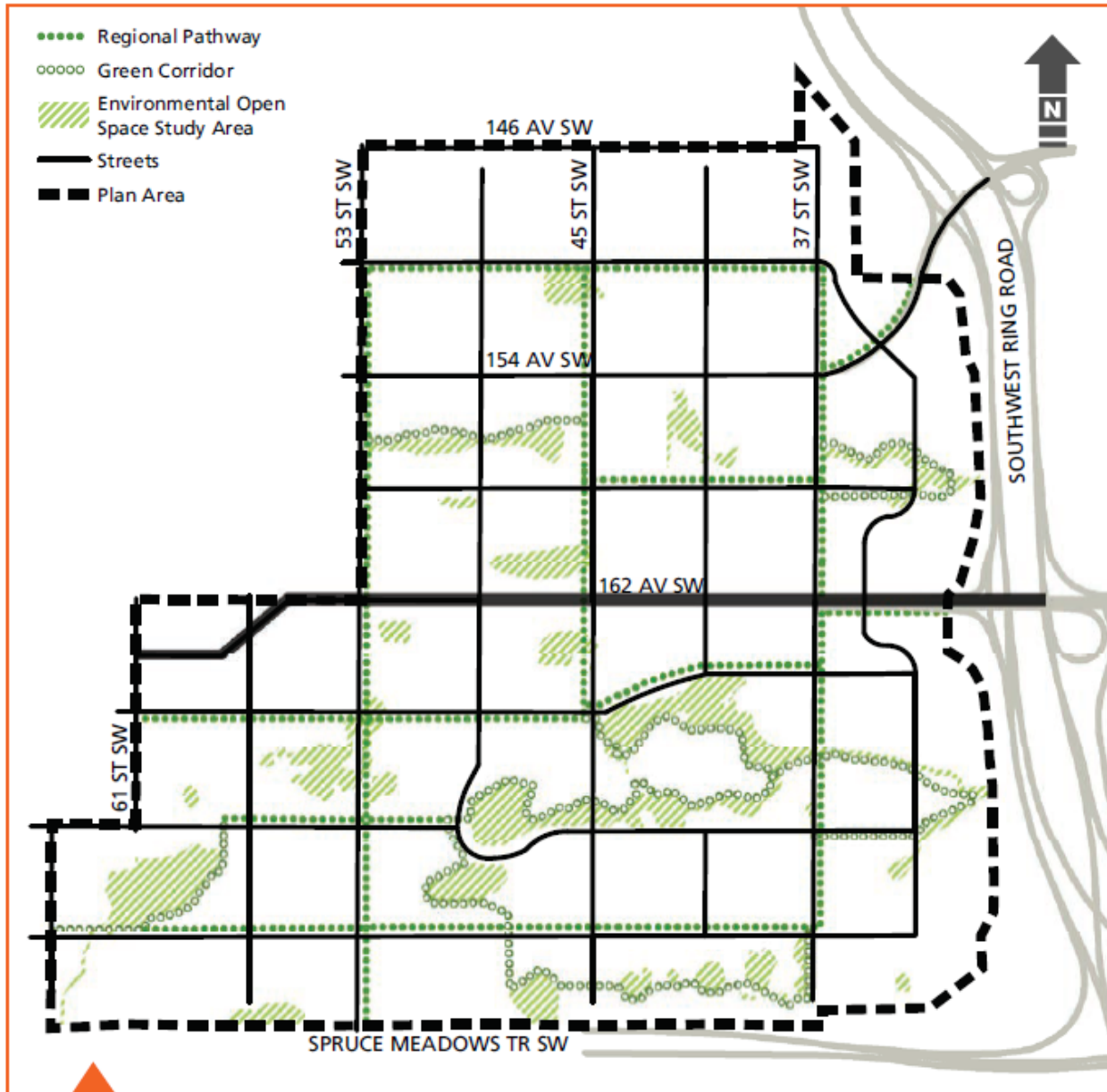


Figure 4-2: Southwest Regional Policy Plan (2006), Map E Potential Environmental Significant Areas
Source: (City of Calgary Land Use Planning and Policy: Planning, Development and Assessment, 2006b, p. 51, one of 34 images or figures/tables).



Map 5: Environmental Open Space Study Area

Figure 4-3: Providence Areas Structure Plan (2015) Map 5: Environmental Open Space Study Source: (City of Calgary Local Area Planning and Implementation; Planning, Development & Assessment, 2015, p. 21, one of 73 images or figures/tables).

3.1 LAND USE CONCEPT

The Land Use Concept is shown on **Map 2: Land Use Concept** and depicts the general location of proposed land uses throughout the plan and the general location of major streets. **Table 1: Land Use Concept Elements** provides a more detailed description of the land use areas and other elements on the Land Use Concept.

POLICIES

1. Land uses should be generally located as shown on **Map 2: Land Use Concept**.
2. Opportunities for civic uses to be co-located with each other should be explored.



Figure 4-4: Providence Areas Structure Plan (2015) Map 2: Land Use Concept Source: (City of Calgary Local Area Planning and Implementation; Planning, Development & Assessment, 2015, p. 5, one of 73 images or figures/tables).

In the business case for the Providence ASP under the section Greening the City it explained “A 13-acre park will retain existing trees and will anchor the community. Other open spaces provided” (Davies Murphy, 2018b, Attachment 2 pp. 35-36)

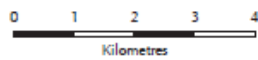
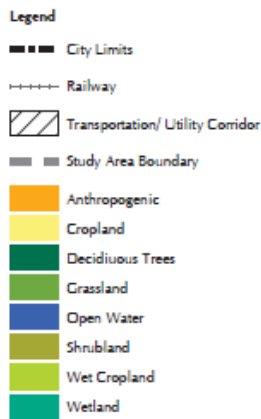
Belvedere and South Shepard ASPs in East Regional Context Study

The Belvedere ASP (City of Calgary. Land Use Planning and Policy; Planning, Development & Assessment 2013a) and South Shepard ASP (City of Calgary. Land Use Planning and Policy; Planning, Development & Assessment, 2013b) fall with the *East Regional Context Study*. A preliminary natural inventory and biophysical analysis was done for the area and found “the predominant features in the study area [were] wetlands, including the Shepard wetland complex” (City of Calgary Land Use Planning and Policy: Planning, Development and Assessment, 2009, p. A2).

East Regional Context Study

Map A

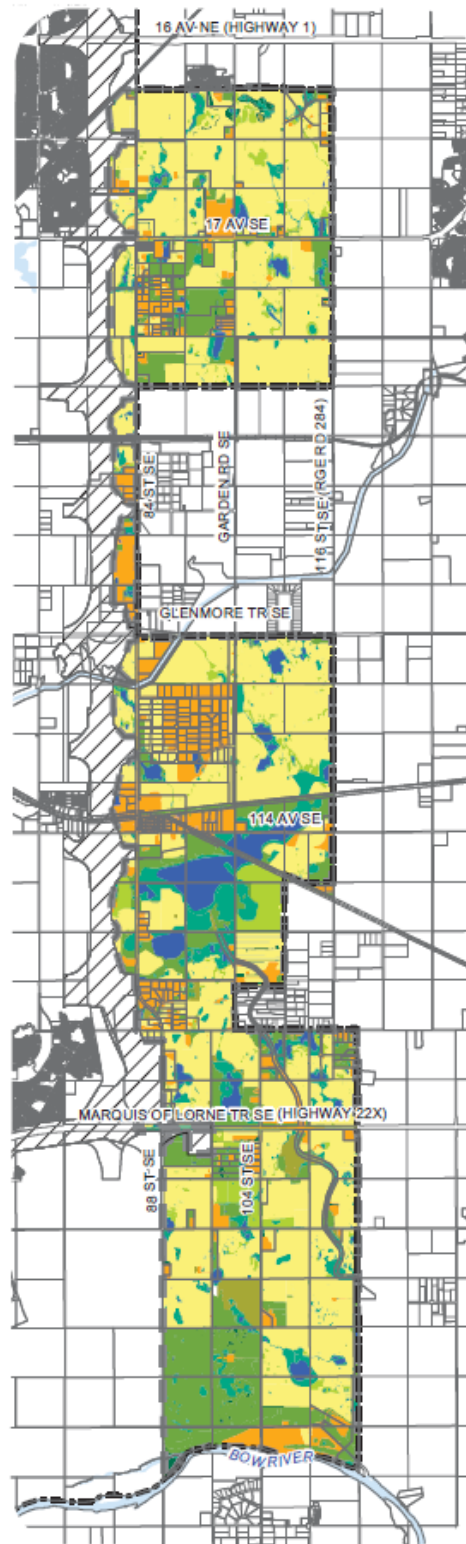
Natural Features



This map is conceptual only. No measurements of distances or areas should be taken from this map.

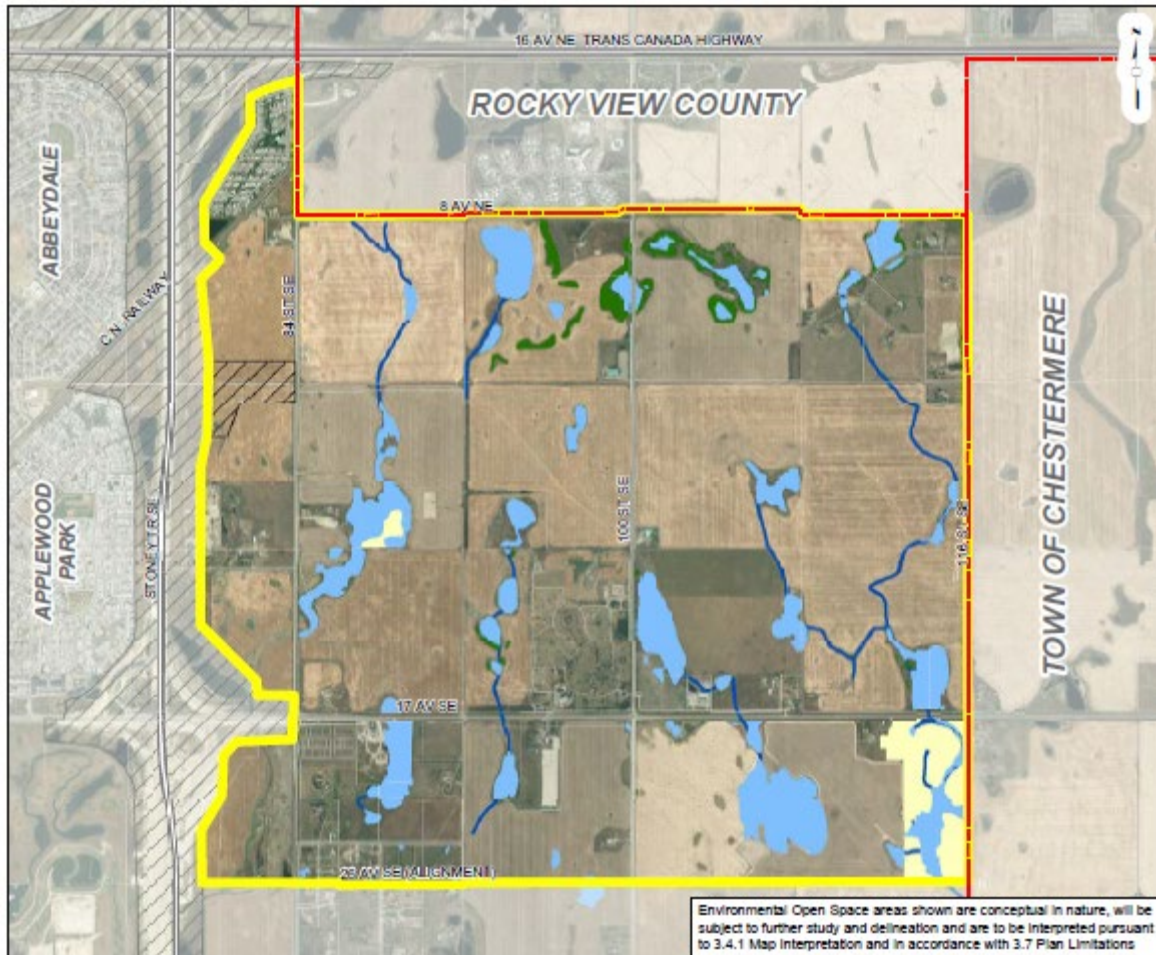


K:\1111_East_Annexation_Regional_Context_Study\Business_Tech_Serv\GIS\document_map\natural_features.mxd



Approved:
2009/04/06
Amended:

Figure 4-5: East Regional Context Study (2009) Map A Natural Features Source: (City of Calgary Land Use Planning and Policy: Planning, Development and Assessment, 2009, p. A3, one of 44 images or figures/tables).



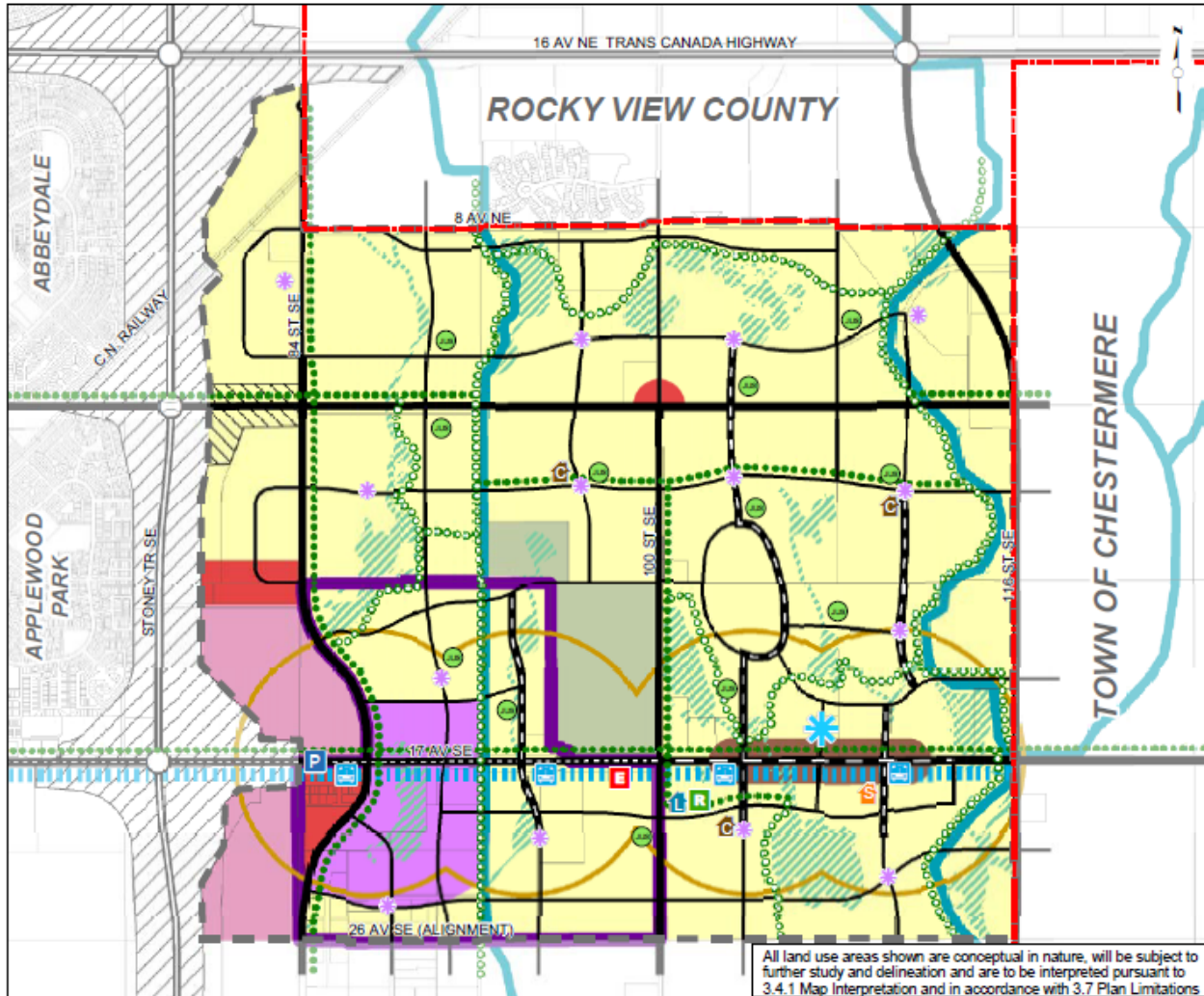
Map 11

Environmental
Open Space
Study Area

- Legend**
- City / Town / County Limits
 - Transportation / Utility Corridor
 - Plan Area Boundary
 - Potential Water Body
 - Wetlands
 - Non-Native Grassland
 - Native Trees / Tall Shrubs

0 200 400 600 800 1,000
Metres

Figure 4-6: Belvedere Area Structure Plan Map 11: Environmental Open Space Study Area Source: (City of Calgary. Land Use Planning and Policy: Planning, Development and Assessment, 2013a, p. 75, one of 138 images or figures/tables).



Map 5
Land Use
Concept

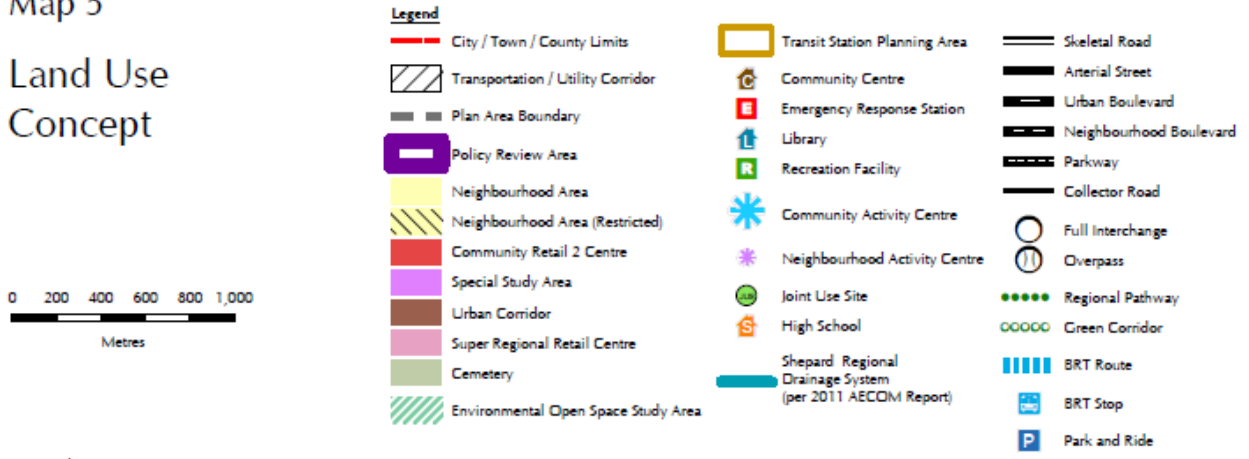


Figure 4-7: Belvedere Area Structure Plan Map 5: Land Use Concept Source: (City of Calgary. Land Use Planning and Policy: Planning, Development and Assessment, 2013a, p. 23, one of 138 images or figures/tables).

In the business case for the *Belvedere ASP – West Belvedere* under the section Greening the City it noted:

“The West Belvedere Landowner Group outlined plans to preserve and enhance the environmental reserve lands by integrating them into the comprehensive Open Space network for the enjoyment of future residents” (Davies Murphy, 2018b, p. 17 of Attachment 2).

In the business case for the *Belvedere ASP – OpenGate* under the section Greening the City it noted:

The business case proposes open space which includes civic plazas, public and performing art spaces, pocket parks, courtyards, activity spaces and outdoor recreational fields, as well as places to exercise, bike, gather, and play around a kayaking freshwater lake (Davies Murphy, 2018b, p. 21 of Attachment 2).

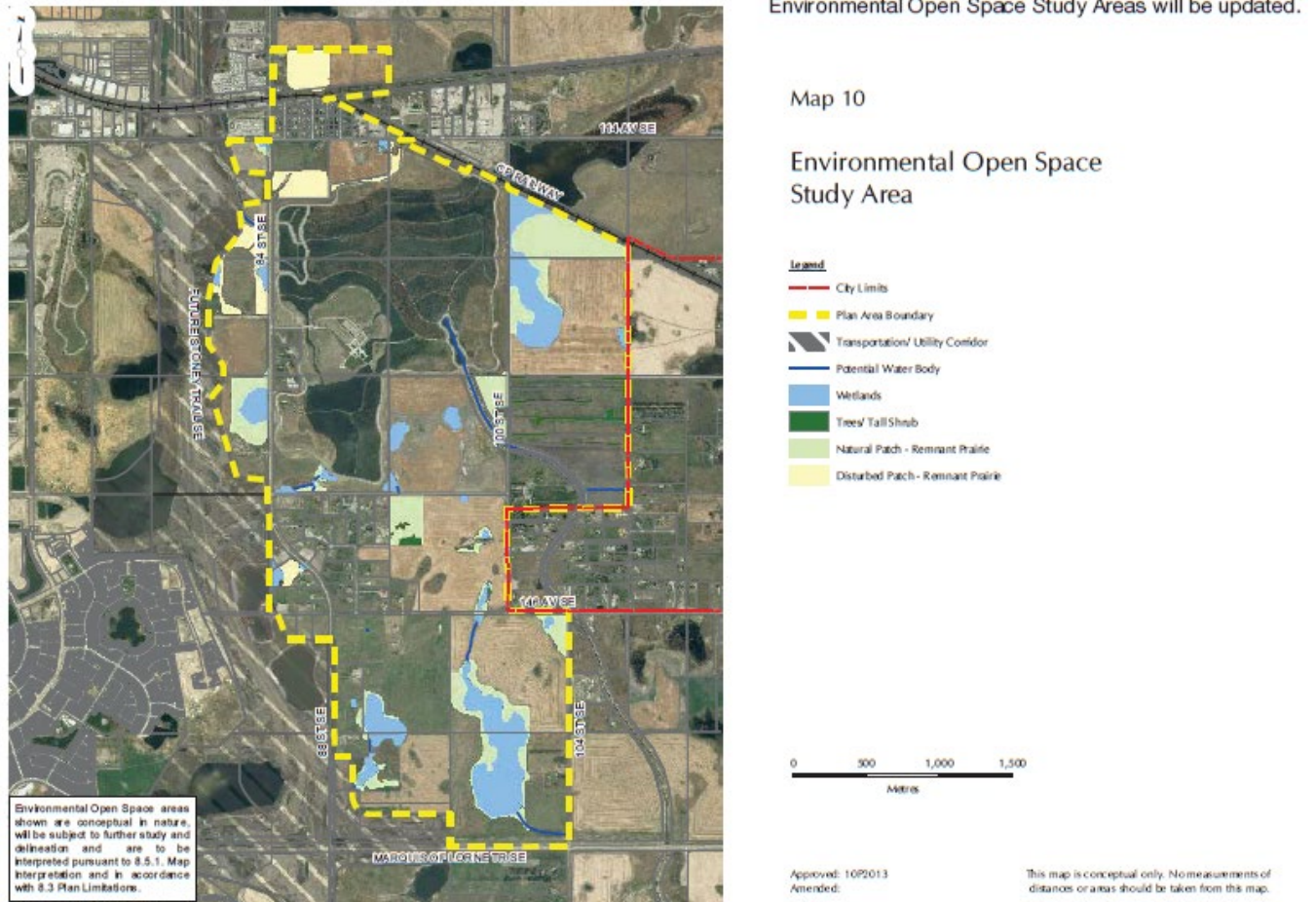


Figure 4-8: South Shepard Area Structure Plan, Map 10: Environmental Open Space Study Area. Source: (City of Calgary Land Use Planning and Policy: Planning, Development and Assessment, 2013b, p. 56, one of 181 images or figures/tables).

In these communities Open Space, including ER lands are seen as amenities.

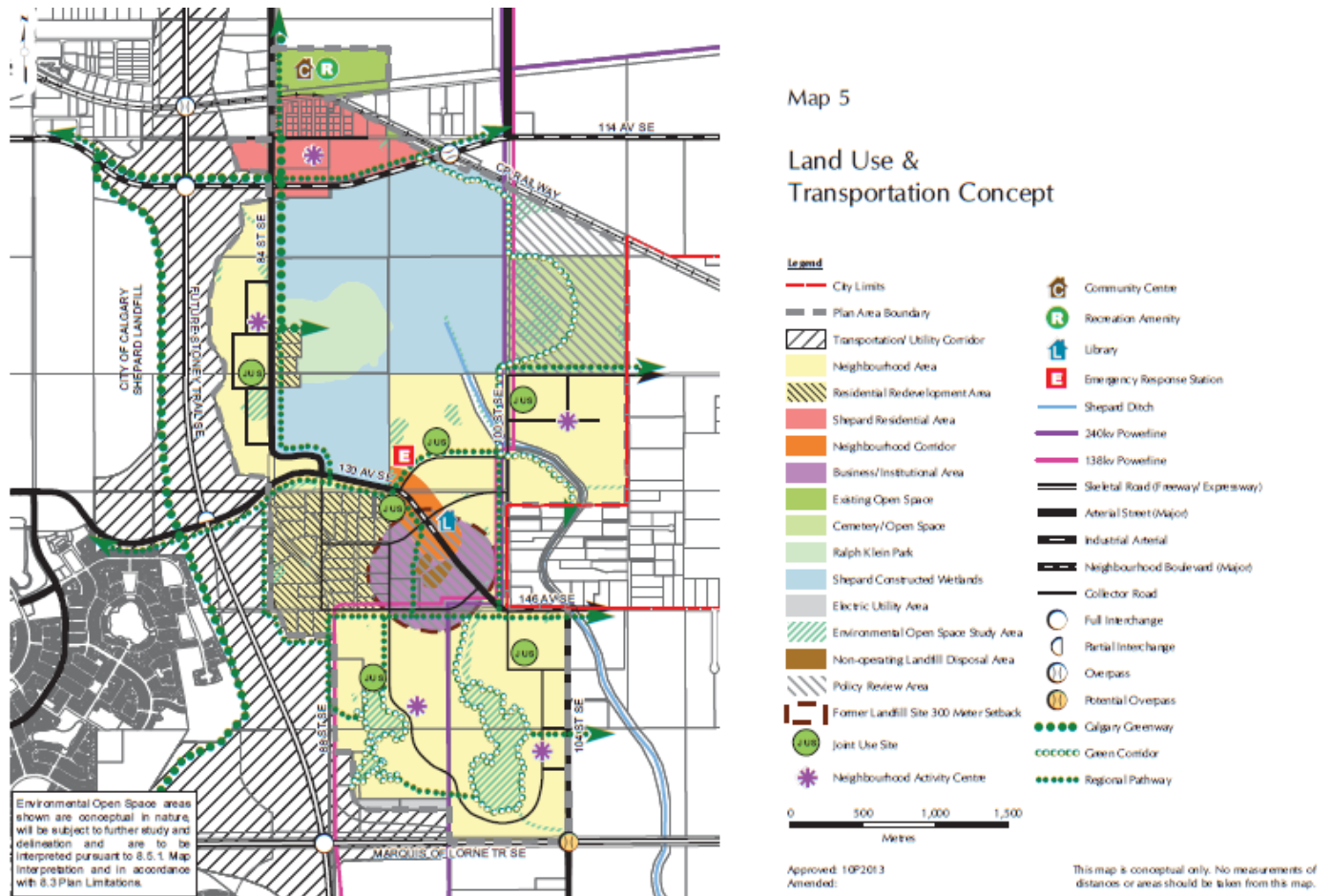


Figure 4-9: South Shepard Area Structure Plan, Map 5: Land Use and Transportation Concept Source: (City of Calgary Land Use Planning and Policy: Planning, Development and Assessment, 2013b, p. 15, one of 181 images or figures/tables).

In the business case for the South Shepard ASP under the section Greening the City it noted “Open space and environmental reserve provided, including retention and naturalization of biologically significant wetlands” (Davies Murphy, 2018b, p. 27 of Attachment 2). Under the project readiness section of the business case it emphasized “All required studies have been completed. Proponent has applied to purchase crown claimed wetlands from the Province, is seeking confirmation from Province” (Davies Murphy, 2018b, p. 27 of Attachment 2).

The Haskayne ASP (City of Calgary Local Area Planning and Implementation - North: Planning, Development and Assessment, 2015a) falls within the *West Regional Context Study* (City of Calgary Land Use Planning and Policy: Planning, Development and Assessment, 2010a), which emphasized “The area is rich with natural features including the Bow River, ravines and escarpments, wetlands and native prairie fescue that are valued for their natural function” (p. 8). Wetlands are visible in the Natural Features map; however, they are not described in the plan. Of note, Haskayne Legacy Park is in this area (see 2.2.4, paragraph three for more information on the Legacy Park Fun and Enmax Legacy Parks Program).

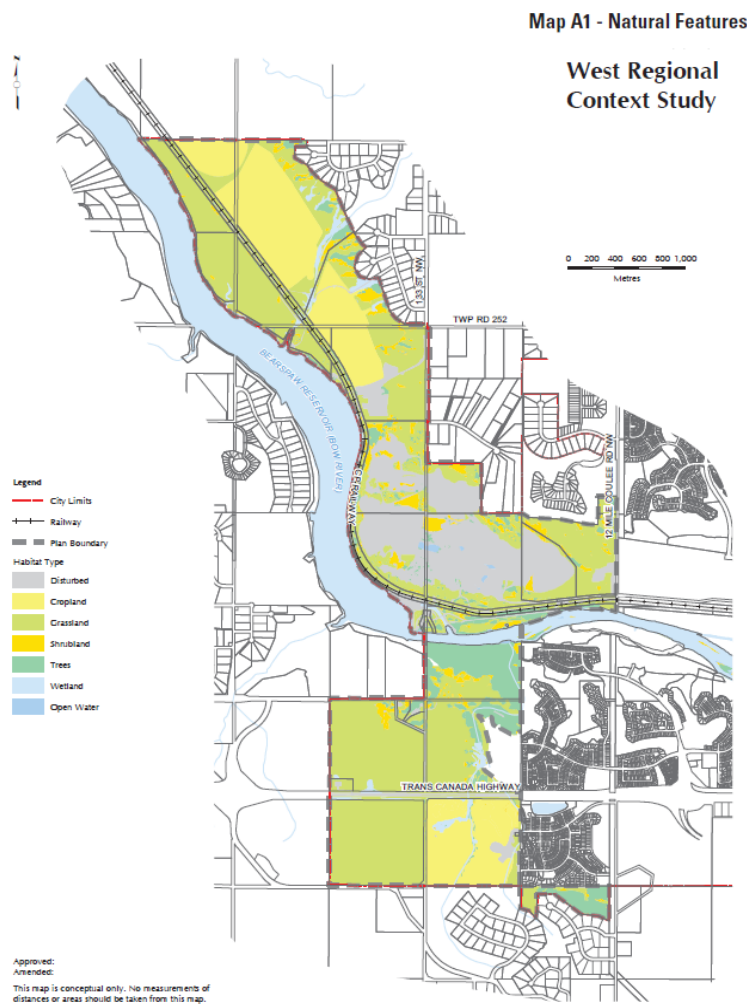


Figure 4-10: *West Regional Context Study (2010) Map A1 – Natural Features* Source: (City of Calgary Land Use Planning and Policy: Planning, Development and Assessment, 2010a, p. 23, one of 33 images or figures/tables).

MAP 6: ENVIRONMENTAL OPEN SPACE STUDY AREA

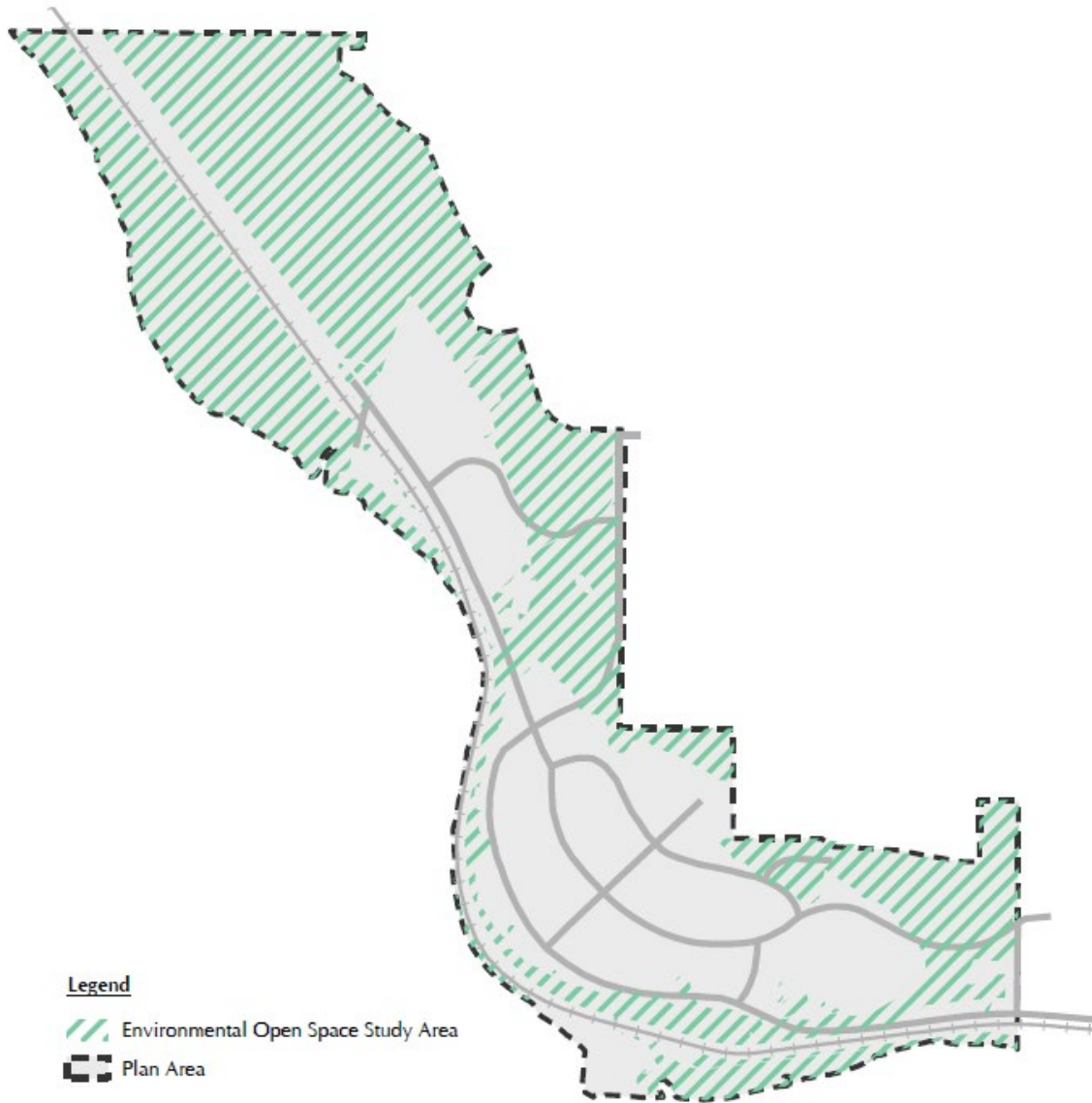


Figure 4-11: Haskayne Area Structure Plan, Map 6: Environmental Open Space Study Area Source: (City of Calgary Local Area Planning and Implementation - North: Planning, Development and Assessment, 2015a, p. 25, one of 82 images or figures/tables).

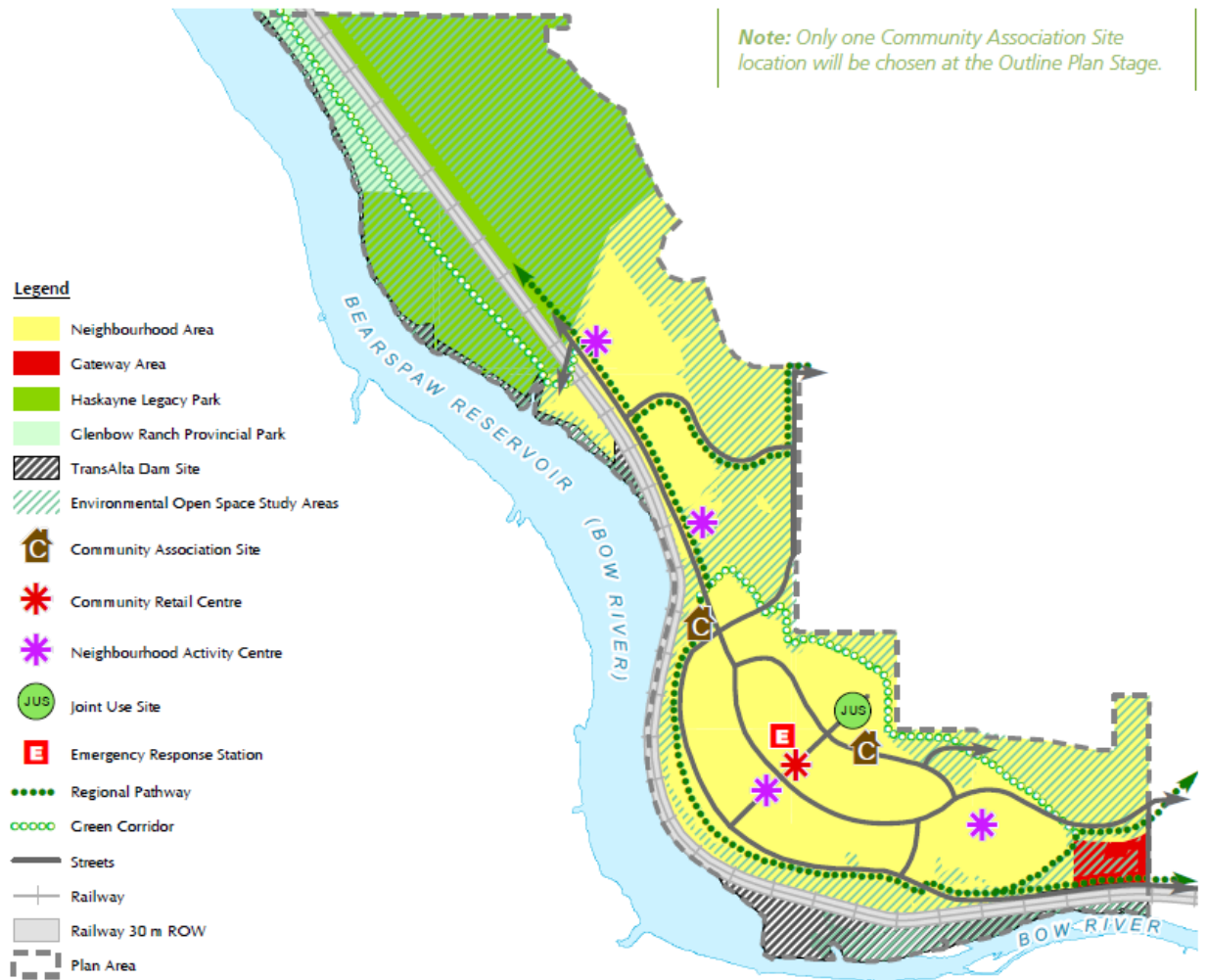


Figure 4-12: Haskayne Area Structure Plan, Map 6: Environmental Open Space Study Area Source: (City of Calgary Local Area Planning and Implementation - North: Planning, Development and Assessment, 2015a, p. 25, one of 82 images or figures/tables).

Aside from the already disturbed area, virtually the entirety of the ASP area is included in the Environmental Open Space Study Area. In the business case for the Haskayne ASP under the section Greening the City it noted the “open space networks with connections to the river and trails” (Davies Murphy, 2018b, Attachment 2, p. 40).

Glacier Ridge ASP in North Regional Context Study

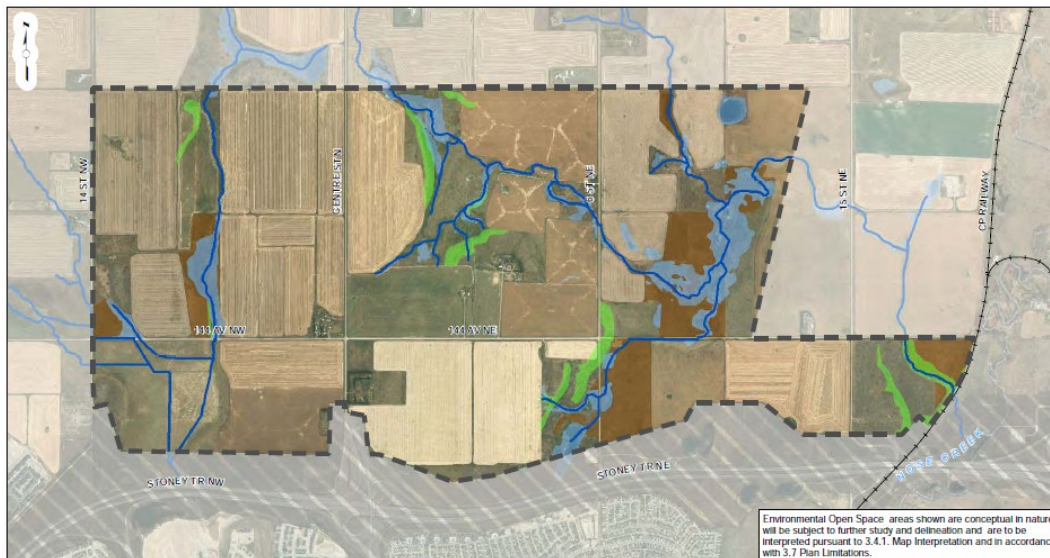
The Glacier Ridge ASP (City of Calgary Local Area Planning and Implementation - North; Planning, Development and Assessment, 2015b) falls within the *North Regional Context Study* (City of Calgary Land Use Planning and Policy; Planning, Development and Assessment, 2010b). The following significant natural features were highlighted in the regional context study:

approximately 90 ha of open space in playgrounds, sports fields, and natural areas.” (Davies Murphy, 2018b, Attachment 2, p. 44).

In the business case for the Glacier Ridge ASP (Capexco), see Figure 4-1, under the section Greening the City it noted, “The business case proposes two municipal parks, one programmed for residents and visitors, the other more passive with local natural landscape assets” (Davies Murphy, 2018b, Attachment 2, p. 49).

In the business case for the Glacier Ridge ASP (Qualico), see Figure 4-1, under the section Greening the City it indicated, “natural features are retained and enhanced with the stormwater pond as a focal feature in the NAC [Neighbourhood Activity Centre]. 25% of the business case area is proposed as reserve/open space (including PULs [Public Utility Lots] and other lands not suitable for residential construction).” (Davies Murphy, 2018b, p. 55 of Attachment 2).

Keystone ASP

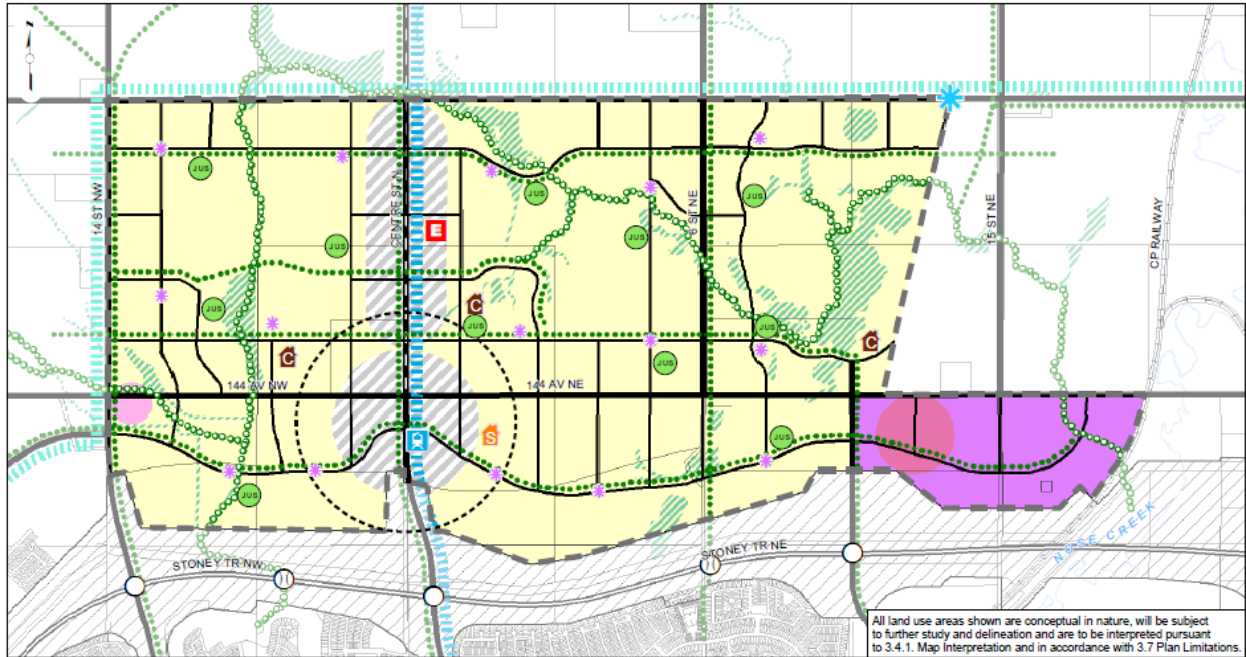


Map 10

Environmental Open Space Study Area



Figure 4-16: Keystone Hills ASP, Map 10 Environmental Open Space Study Area Source: (City of Calgary Land Use Planning and Policy: Planning, Development and Assessment, 2012, p. 10-4, one of 102 images or figures/tables).



Map 5

Land Use Concept

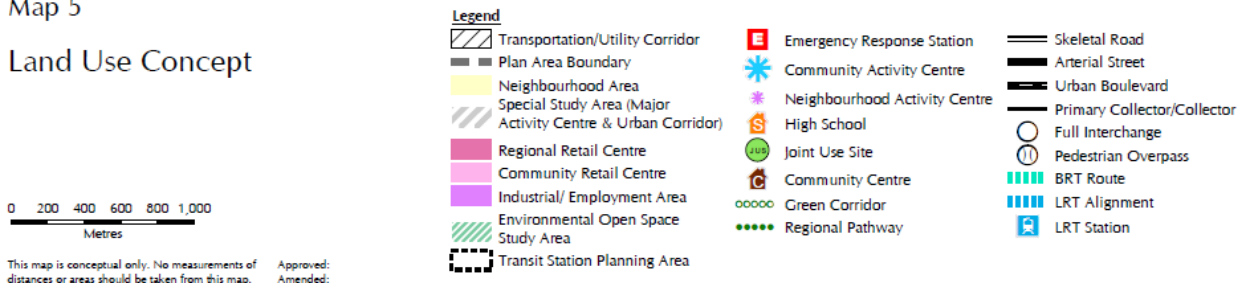


Figure 4-17: Keystone Hills ASP, Map 5: Land Use Concept Source (City of Calgary Land Use Planning and Policy: Planning, Development and Assessment, 2012, p. 6-2, one of 102 images or figures/tables).

In the business case for the Keystone Hills ASP under the section Greening the City it indicated, “A large community park is planned for the regional retail area. A significant greenway travels through the eastern portion of the business case” (Davies Murphy, 2018b, p. 3 of Attachment 2).

Map A1: Biophysical Features illustrates the biophysical features of the Plan Area.

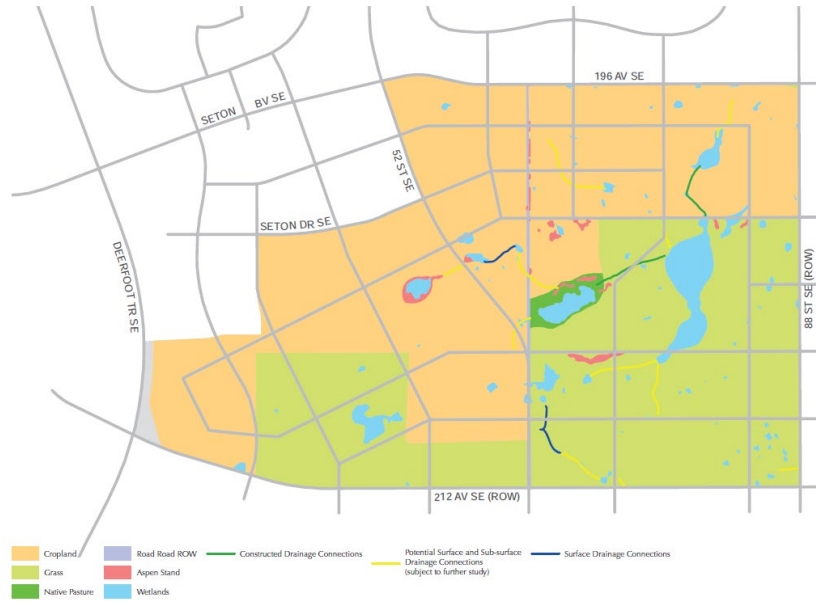


Figure 4-18: Rangeview ASP, Map A1: Biophysical Features Source: (City of Calgary Local Area Planning and Implementation - South; Planning, Development, and Assessment, 2014, p. 59, one of 93 images or figures/tables).

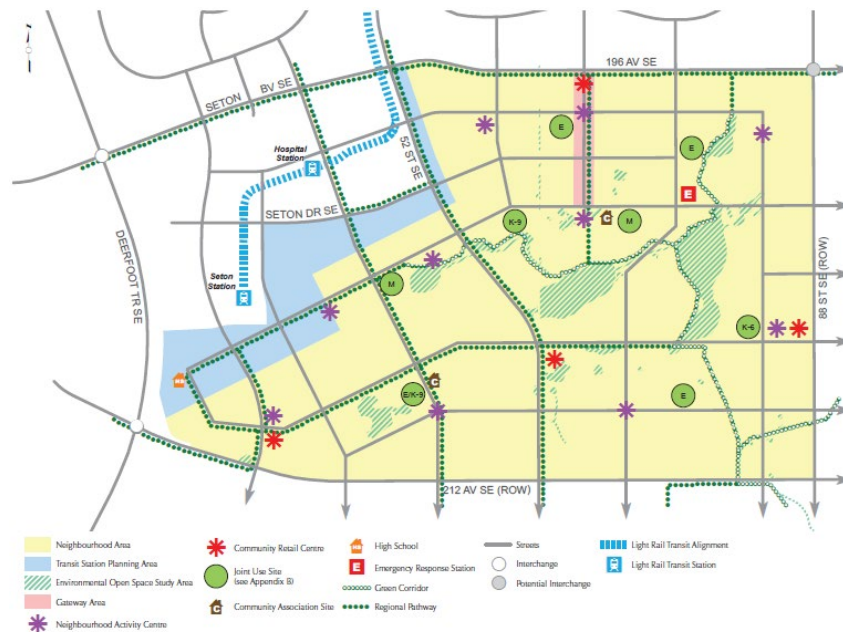


Figure 4-19: Rangeview ASP, Map 2: Land Use concept Source: (City of Calgary Local Area Planning and Implementation - South; Planning, Development, and Assessment, 2014, p. 8, one of 93 images or figures/tables).

In the business case for the Rangeview ASP under the section Greening the City it noted, “Rangeview introduces a continuous open space view corridor. Section23's agricultural urbanism includes 4 hectares of private agricultural space” (Davies Murphy, 2018b, Attachment 2, p. 31). Under the project readiness section, it noted the “Province indicated no crown claimed wetlands” (Davies Murphy, 2018b, Attachment 2, p. 32). For the Province to claim a wetland under the *Public Lands Act* it must be permanent and naturally occurring. Stewart (2008) highlighted the Province takes “the position that once water is drained from a wetland, the bed and shore belong to the landowner of the surrounding property” (p. 44).

The ASP land use concept shows “lands that are environmentally significant or that may qualify as Environmental Reserve and have the potential to be incorporated into an urban context to provide for amenity value and ecological services” (City of Calgary Local Area Planning and Implementation - South; Planning, Development, and Assessment, 2014, p. 29). The Outline Plan stage is where decisions are made whether to conserve natural features.

East Stoney ASP

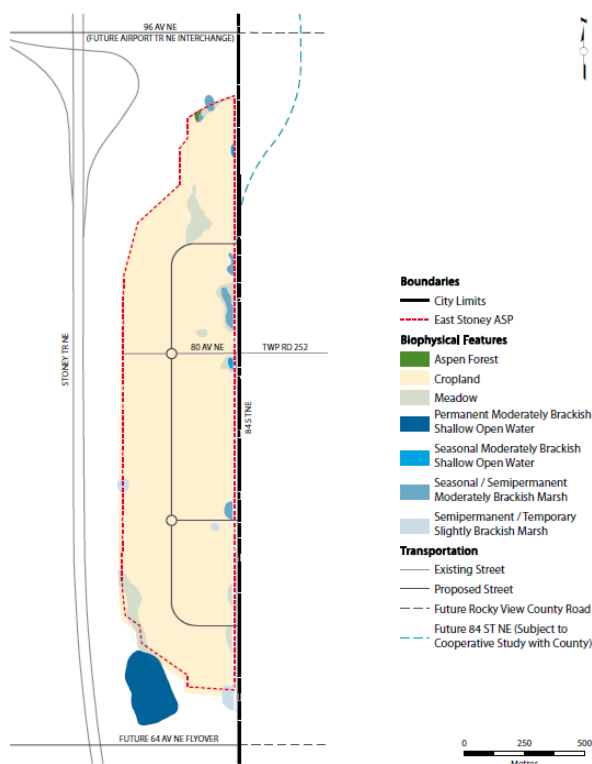


Figure 4-20: East Stoney ASP, Map 8: Biophysical Features Source: (City of Calgary, 2017c, p. 42, one of 34 images or figures/tables).

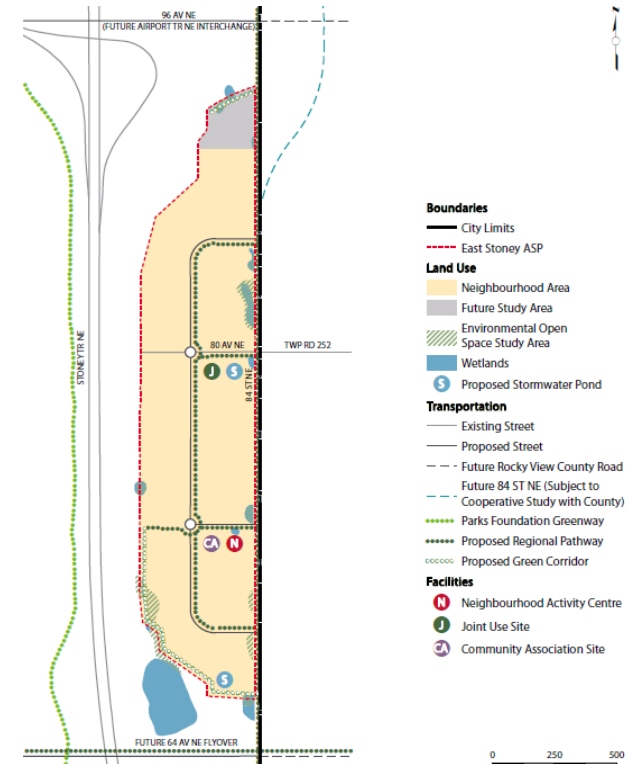


Figure 4-21: East Stoney ASP, Map 2: Land Use Concept Source: (City of Calgary, 2017c, p. 9, one of 34 images or figures/tables).

In the business case for the East Stoney ASP under the section Greening the City it noted, “The business case contains a school site, community association site and local parks. This represents 18% of the plan area” (Davies Murphy, 2018b, Attachment 2, p. 13).

In brief, the 14 communities to be included in *One Calgary 2019-2022* all have Environmental Significant Areas (ESAs), some of the areas and their ESAs have been mapped in regional policy plans or context studies. The Area Structure Plan (ASPs) identify the area subject to Environmental Open Space Studies, wetlands are featured in several communities. More studies will be done prior to the Outline Plan (OP) stage, which is when decisions are made whether to conserve wetlands, the ability of wetlands to survive post development will influence decision makers.

Urbanization is one of the reasons wetlands are disappearing at an alarming rate. According to the Global Wetland Outlook “we lose wetlands three times faster than natural forests” (Ramsar Convention on Wetland, n.d). The Global Wetland Outlook also highlighted, around the world the pace of wetland loss increased substantially after the year 2000 (Miller, 2018). In Calgary, over the past two decades rapid growth has put considerable pressure on the land. In Alberta, contemporary wetland loss is attributed to urban land use, for wetlands policies to be effective they need to address urban land use.

4.2 Summary

The purpose of this research was to investigate: How urban municipalities are using place-based policy to conserve and restore wetlands in the Prairie Pothole Region? Within this region many jurisdictions have adopted a ‘no net loss’ approach to wetland management (Rubec & Hanson, 2009). The *Calgary WCP* was a context-based approach to address wetland loss within the City of Calgary. The plan adopted a ‘no net loss’ approach for Environmental Reserve (ER) wetlands, these were prioritized for protection. No all ER wetlands were protected, that was not the goal. The goal was no net loss of Calgary wetlands. The City did not meet this goal. However, some wetlands were preserved or will be preserved and integrated into Calgary’s neighbourhood. In the absence of the *Calgary WCP* this most likely would not have occurred.

The need to ensure the long-term viability of conserved wetlands post urban development was a reoccurring theme. According to regional documents, the sustainability of natural wetlands

was to be ensured via stormwater engineering solutions proposed in the Master Stormwater Drainage Plan. However, to divert treated stormwater into a naturally occurring wetland is problematic, to do so requires a water licence, because of the 2006 South Saskatchewan basin closure, no new water licences are available. Further, concerns were brought up regarding the quality of stormwater and whether Calgary could release it into wetlands taken as environmental reserve. All this to say wetland conservation and restoration were hindered. While planning documents such as regional policy plans and context studies identified wetlands early on and prioritized the conservation of some of them, the areas were to be refined through the ASP preparation process and at the Outline Plan/Land Use Amendment application stage. It is at the OP planning stage that decisions are made whether to conserve and this decision is influenced by whether wetland can survive post development. Solving this problem is what will enable wetland conservation in an urban context. It is too early to say definitively which features will be conserved in the 14 communities included in *One Calgary 2019-2022*, we will have a better understanding when the Outline Plans/Land Use Amendment applications come in.

4.3 Recommendations

My ability to generalize theory from my research, a single case study, is limited. However, Flyvberg (2006) highlighted it was possible to generalize lessons from a single case. So, what follows are the lessons I offer municipalities and the Province.

- Municipalities need to adopt a no loss approach to wetland management. They need to identify, in their statutory plans, the wetland complexes and uplands they will protect. However, it is not enough to simply identify wetlands. There is a need to understand and consider how water moves in the landscape and how wetlands will receive water post-development. Studies need to be done well in advance of development to investigate this.
- After Municipalities have identified the wetlands complexes and uplands to be conserved, they need to communicate this information to the Province, particularly the wetland approval decision makers.
- Municipalities need to work with their neighbours because wetland conservation needs to happen at multiple scales.

- To address regional wetland conservation, the Province should require sub-regional wetland plans.

4.4 Research Agenda for Wetland Conservation and Restoration in an Urban Context

I offer three directions for future research:

- 1 Land developers views on wetland conservation in Calgary needs to be captured
- 2 More local urban ecology studies are needed
- 3 More comparative case studies are needed

The viewpoints in this research are from staff at the City of Calgary, the Province, a municipal practitioner who was on the team that developed the mitigation piece of the Alberta Wetland Policy (Alberta, 2013), and policy staff from an urban advocacy association. Developers viewpoints were not capture. Future research on wetland conservation in Calgary needs to consider what land developers have to say. Graduate and Post Doctoral student could conduct this research. The reason this is important is because “Planners make plans that combine a multiplicity of viewpoints and voices” (Hoch, 2002, p. 57). Further, at the end of the day, land developers play an important role in building our cities. The land developers behind communities such as Bridlewood, Cityscape, and Cornerstone should be interviewed. Bridlewood was Calgary’s first wetland community, a large wetland conservation area was conserved in Cityscape and there are large wetlands that are planned to be conserved in Cornerstone. Furthermore, researchers could also speak to the land developers whose communities were included in the portfolio of new communities for *One Calgary 2019-2022*. Several of these communities are in Area Structure Plans (ASP) where a number of wetlands are identified in the Environmental Open Space Study Areas, such as: Providence, Belvedere, South Shepard, Glacier Ridge, Keystone Hills, and Rangeview.

The second direction for research is more local urban ecology studies. An interviewee highlighted local cost and benefit studies were required to examine the costs of retaining undisturbed wetlands versus building stormwater treatment facilities. This recommendation is echoed in the literature. To improve the connection between wetland avoidance and land use

planning, Clare et al. (2011) recommended “more comprehensive economic and social valuation of wetlands” (p. 175). The Province’s Ecosystem Services (ES) Program commissioned a pilot project to research the cost of replacing naturally occurring wetlands with built infrastructure (Wang et al., 2011). The pilot project area spanned three municipalities, the City of Calgary, Rockyview County, and the Town of Chestermere. Wang et al. (2011), noted “there [were] no international standards, methods or processes for conducting an ES assessment” (p. 4).

Cuthbert and Tyler (2016) also focused on ecosystem services. The authors noted municipal land use planning and development does not adequately consider the importance or contribution of ES. Cuthbert and Tyler stressed (2016) “...there is an increasing awareness of the importance of ‘ecosystem services’ at the landscape level in the context of land use and development planning and engineering” (p. 2). As previously mentioned, there are four types of ecosystems services, they are: “nutrient cycling, provisioning freshwater and food, regulating floods, and cultural use” (UNEP as cited in Cuthbert and Tyler 2016, p. 2). Cuthbert and Tyler (2016) suggested more research was needed so planners could put the ecosystem services concept into practice. Specifically, the authors stressed the need for “new methods of valuation and mapping of social ecological benefit systems to link policy making to desired services and benefits” (Cuthbert & Tyler, 2016, p. 2).

Some of the ecosystem services associated with wetlands are: “floodwater storage, water quality improvement, and the supply of food and materials from the biological diversity of wetlands” (Baldwin, 2011, p. 77). Wang et al. (2011) estimated if all the wetlands in the previously mentioned pilot project area (eastern portion of the City of Calgary, Rockyview County, and the Town of Chestermere) were removed then it would cost an estimated \$338 million to replace the flood control services (p. 26).

“The case study area features (6,400+) wetlands ranging in size from less than 0.1 hectare to over 10 hectares. However, while the number of wetlands has increased 18 per cent since 1962, wetland area has decreased by 24 per cent. This translates into a total loss of 7.7 square kilometres of wetlands between 1962 and 2005” (Wang et al., 2011, p. 4).

The researchers noted “when the historic rate of wetland area loss [was] applied...[it] translated into an estimated \$2 million per year in economic losses” (p. 7). Baldwin (2011) stressed “Today, wetlands remaining in urban areas are important in disproportion to their size due to the

high density of human populations who benefit from their services and the scarcity of such habitat for wildlife (Mitsch & Gosselink 2007 as cited in Baldwin, 2011, p. 77).

Currently, there are global and national initiatives underway to value nature. According to The Economics of Ecosystems and Biodiversity (TEEB) website, the goal of TEEB is to:

“mainstream the values of biodiversity and ecosystem services into decision-making at all levels. It aims to achieve this goal by following a structured approach to valuation that helps decision-makers recognize the wide range of benefits provided by ecosystems and biodiversity, demonstrate their values in economic terms and, where appropriate, capture those values in decision-making” (The Economics of Ecosystems and Biodiversity (TEEB), ‘Making Nature’s Values Visible’).

The Municipal Natural Assets Initiative (MNAI) is a national initiative whose goal is “to make municipal natural asset management mainstream across Canada” (Municipal Natural Assets Initiative (MNAI), 2017). Natural assets include “woodlands, wetlands and creeks in urban areas [these are] part of a sustainable infrastructure strategy” (Brooke, Cairns, Machado, Molnar, & O’Neil, 2017, p. 1).

Through my interviews I learned the City of Calgary is conducting interesting urban ecology research (City of Calgary – Urban Conservation Lead; personal interview). I do not have a full grasp on the extent of the research. However, if natural assets are not currently being valued in economic terms and that information is not presented to decision-makers, then the MNAI presents an opportunity as “The MNAI team provides scientific, economic and municipal expertise to support and guide local governments in identifying, valuing and accounting for natural assets in their financial planning and asset management programs, and in developing leading-edge, sustainable and climate resilient infrastructure (MNAI, 2018). The MNAI also presents an opportunity to examine the assumptions. An interviewee said it is assumed wetlands are not sustainable if a water source was not provided (City of Calgary – Biologist, Environmental Planner; personal interview). Runoff from adjacent lands could provide conserved wetlands with water, the dilemma would then be to ensure the quality of the water was adequate, protecting sufficient uplands could help solve this dilemma.

The last direction for research is more comparative case studies. These studies need to occur between provinces whom have adopted divergent wetland management policy approaches and between Alberta municipalities. Perhaps the Federation of Canadian Municipalities (FCM)

could conduct the case study research between provinces and the Miistakis Institute can conduct the research comparing wetland policies of Alberta municipalities. I suggest the former because it operates on a national scale and the latter because of their previous and current research. Greenaway & Sanders (2006) prepared a study for the Miistakis Institute entitled, *The Fiscal Implication of Land Use: A “Cost of Community Services” Study for Red Deer County*. Currently, the Miistakis Institute has launched a monitoring program called *Call of the Wetland*, a citizen science project aimed at monitoring six amphibians in Calgary’s wetlands (Hunt, 2018).

Why do I suggest comparative case study research between provinces? In Ontario, a jurisdiction with a ‘no loss’ wetland policy approach, Schulte-Hostedde et al. (2007) found different policy outcomes in the rural and urban landscape. Wetland loss was seen in a rural case study but not in the urban one. Schulte-Hostedde et al. (2007) ascertained wetland loss by analysing aerial photographs; however, the authors suggested more research was needed to determine if there was an impact to wetland function. Patenaude (2011) did research to determine what was more detrimental to wetland function, urbanization or wetland loss; she found wetland loss to be more detrimental. From reviewing Clare (2013) and Schulte-Hostedde et al. (2007), I can hypothesize divergent wetland policy approaches produce different results in the urban landscape. Ontario’s policy approach preserved wetlands in the urban landscape, whereas Alberta’s approach did not. However, the ecoregions are quite different; therefore, to say definitively whether one approach produces different results a comparative case study between two similar regions in the different provinces is needed.

Comparative case studies evaluating different Alberta municipal wetland policies and different approach to wetland conservation are needed. One of the people I interviewed was a Biologist and Environmental Planner working for a specialized municipality, a unique type of municipality in Alberta. Of note, this specialized municipality also adopted a wetland policy, five years after Calgary, in 2009. Their policy adopted a no net loss approach to wetland management, a mitigation hierarchy, and a 3:1 compensation ratio. Between 2009 to 2015, this specialized municipality tracked wetland losses due to urban and other types of development such as industrial development. The interviewee reported their municipality did urban and rural mitigation and exceeded their 3:1 mitigation ratio. More research on municipal wetlands policies

is needed to investigate why this specialized municipalities experience was so different from Calgary's.

Furthermore, different municipalities have adopted different solutions to deal with the problem of wetland loss. Divergent approaches should be studied. One of the people I interviewed said it might be instructive to look at Edmonton's experience with the Province regarding wetland conservation, which was very different (City of Calgary – Urban Conservation Lead; personal interview). Originally, my intention was to do a smaller case study of Edmonton; however, I was advised it would be more manageable to focus on a single case for my research. This was good advice! I will leave comparative case study research to those whom come after me.

Aside from Edmonton, another case that could be investigated is the Town of Okotoks. To my knowledge the Town of Okotoks is the only Alberta municipality to consider carrying capacity, specifically in relation to its watershed. Dale's (2012) definition of sustainable development includes the ecological imperative, which focuses on carrying capacity. What is the carrying capacity of the Calgary landscape and can it accommodate continued population growth? This is not the question driving this research, but an important one for practitioner to consider in their own municipalities.

Chapter 5. Retrospective and Policy Alternatives

When I was researching, thinking about and writing this practicum a lyric from a Lauryn Hill song kept on looping in my mind “Everything is everything” (Hill & Newton, 1998, track 13). I am a big picture thinker and I tend to think everything is interconnected. I also like to research, hence why it has taken me so long to finish this project! Also, it is why a good file management system is very important. Creswell (2009) described unexperienced writers, I am certainly one, because I prefer to think and discuss my research rather than write it. My advisor, David van Vliet, has been patient and suggested strategies to help me in this journey. Some key insights I gained from this research were: plans should be assessed while they are being made, wetland loss persists despite the existence of federal and provincial policies, place is important, a qualitative research strategy is labour intensive, and there are alternatives approaches to deal with the problem of wetland loss.

My previous work experience influenced my topic selection. I learned of the *Calgary WCP* when I was working as a municipal professional for a medium sized city in northwest Alberta. Because I took a two-day course on wetlands, I knew municipalities could play a role in wetland protection; however, I did not know how they could or should exercise their authority. In searching for examples, I discovered several municipalities had adopted wetland and riparian policies. I came across the *Calgary WCP* and I was impressed. Baer (1997) posed the question “How would you know a good plan if you saw one?” (as cited in Hoch, 2002, p. 57). When I saw the *Calgary WCP*, I thought it was a great plan though I did not completely understand how it would be implemented. I gained insight on how the plan was used during my interviews with key stakeholder, I also gained an understanding that the plan’s implementation was not completely thought out when the plan was developed.

Baer (1997) argued planners needed to develop evaluation criteria and evaluate plans while plans are being formulated. He called this type of evaluation, plan ‘assessment’ (p. 330). In my career, I will return to Baer’s work, as he created a list of criteria for plan assessment, which consisted of “...about 60 items, grouped into eight basic classifications” (p. 339). These were ‘conventional’ criteria and Baer recommended planners use them when making and assessing plans. The eight classifications were: “adequacy of context, ‘rational model’ considerations,

procedural validity, adequacy of scope, guidance for implementation, approach, data and methodology, quality of communication, and plan format” (Baer, 1997, pp. 338-339).

Perhaps wetland loss would not persist if policy was assessed when it was developed. Wetland loss persists even though wetland policies have been developed by federal and provincial governments, although not every province has a wetland policy in place (Lynch-Stewart et al., 1999; Rubec & Hanson, 2009). The provinces and territories also have various legal tools to pursue wetland conservation objectives (Lynch-Stewart et al., 1999). There is an interplay between policy and legislation, which is why wetland management is complex. Perhaps this is best illustrated by an example. Clare (2013) noted “while Alberta was one of the first provinces in Canada to adopt a wetland policy [1993], very little progress was made with respect to implementation of the policy until December of 1999, when the outdated *Water Resource Act* was replaced by the *Water Act*” (p. 41).

My undergraduate studies exposed me to the study of public policy. Therefore, I recognize federal and provincial government policies are aspatial and there is a need for spatially targeted approaches (Bradford, 2005). Hope (2002a) reported, the creation of a wetlands inventory was the first step “to create a made-in-Calgary [wetland] policy, rather than have it imposed by the provincial or federal governments” (p. HS05). Because of this research, my interest in place and placemaking has increased, I have gained an appreciation of its importance:

“Place-making is central to the pursuit of urban sustainability; without an appreciation for and attachment to the uniqueness of location, landscape, and community, there can be no hope for the reconciliation of the ecological, economic, social-cultural, and personal imperatives that underpin sustainability” (Lister, 2012, p. 52).

This research has also given me an appreciation of how laborious a qualitative research strategy is. As a municipal practitioner, I discovered plans are not always implemented; therefore, I knew talking to practitioner was an essential component of evaluating the outcomes of plans. However, I did not appreciate the amount of time required to undertake a qualitative research study. It is time consuming to get ethics approval, transcribe interviews, analyze and code interviews, write up findings, and then revise. Further because the context of cases is important I reviewed a plethora of City documents (see Appendix D – Reports from Administration). This was also time consuming. I have gained an appreciation of why policy work often only involves information sharing. However, as a practitioner I know in-depth policy evaluation is valuable,

because often municipalities do not have the capacity to analyze diverse policy alternatives to determine which are effective.

I know wetlands are important, but was Calgary’s approach, a stand-alone plan dedicated to wetland management, necessary? Is it more appropriate to focus instead on biodiversity or have a broader environmental planning approach? I shared my doubts with an interviewee and their response was encouraging:

“I think with climate resiliency and moving into the future with these extreme weather events, wetlands are the most important thing on our landscape to build that resilience. I totally understand why you would focus on them. They are hubs of biodiversity in an urban area for sure. It’s a natural place to build that conservation ethic, it kind of grows out of that. A lot of times you conserve these wetlands, these wetland complexes, but then you are also conserving the upland, the riparian areas surrounding it. It’s a bit of a seed for those conservation goals. Wetlands are very visible on the landscape. People love them, or they hate them” (Specialized Alberta municipality – Biologist, Environmental Planner; personal interview).

This last statement makes me think of a quote attributed to Baba Dioum, which is highlighted in the *Destination Africa* pavilion at the Calgary Zoo:

“In the end we will conserve only what we love, we will love only what we understand, and we will understand only what we are taught.” (Baba Dioum)

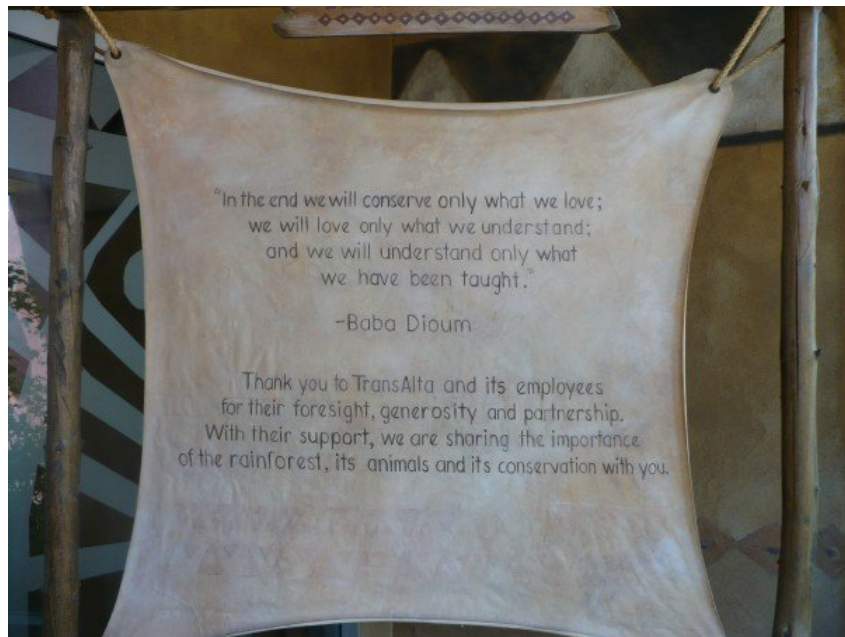


Figure 5-1: Signage in Destination Africa Pavilion at Calgary Zoo Photo credit Lucy Ramirez

This underscores the importance of the information and extension policy instrument. Scarth (1998) used four categories to classify policy instruments influencing land use and promoting wetland conservation. These categories were based on the work of Leitch and Baltezare (1992) and are as follows: information and extension, land use incentives/disincentives, public acquisition, and land use restrictions (as cited in Scarth, 1998, p. 171). Communities that integrate wetlands into their built form create an opportunity for residents to learn about the importance of these features in the landscape, this will foster a conservation ethic. Also, conservation of wetlands contributes to achieving biodiversity and environmental goals (Alberta NAWMP Partnership, 2016).

There are multiple solutions to any given problem, to address the problem of wetland loss there are multiple solutions. How we frame problems leads us to solutions to resolve them, “to find the problem is thus the same things as finding the solution” (Rittel & Melvin, 1973, p. 161). Calgary’s wetland inventory was a reaction to losing wetlands because they were not mapped, and the inventory was a precursor to the *Calgary WCP*. This research concludes that identifying wetlands is not enough. Rittel and Melvin (1973) stressed that “the problem can’t be defined until the solution has been found” (p. 161). Therefore, I offer three alternative policy solutions: a biodiversity approach, environmental planning, and regional planning approach.

5.1 Biodiversity Approach

According to Connery (2009), “Few local governments have dedicated resources to establishing planning frameworks and implementation strategies to explicitly address biodiversity” (p. 23). Connery highlighted over the past 20 years, Edmonton, Alberta has been proactive in developing a “strategic plan to conserve and enhance the city’s rich biological diversity” (p. 2). Connery noted Edmonton is an example of how local governments in North American “have begun to engage the complexities of biodiversity conservation by developing regionally integrated spatial frameworks based in large part on Landscape Ecology’s patch corridor-matrix principles” (Forman 1995 as cited in Connery, 2009, p. 23). Calgary’s Natural Area Management Plan (1994) also used a landscape ecology approach (City of Calgary. Parks, 2002). Calgary’s 2009 *MDP* contains policy on the ecological network, this policy is rooted in landscape ecology, for more information on the policy see the section entitled, *Municipal Development Plan (2009)*.

Connery (2009) highlighted the ecological network has three important scales, all are important for conserving urban biodiversity: the regional-scale, neighbourhood open space planning scale, and on-site scale design. Planning and design practices can be used at the different scales. Connery concluded the real challenge is whether practitioners are interested in using these planning and design practices. Further, he raised an interesting point regarding naturally occurring features versus constructed features:

“More commonly, the goals for indigenous biodiversity in urban areas are focused on enhancing the functionality of those remaining pieces of former ecosystems, rendering those aspects of indigeneity to virtual museums” (Connery, 2009, pp. 36-37).

If the focus is on biodiversity, then does it matter if ecosystems are naturally occurring or constructed? Should the focus be on the habitat and if it enhances biodiversity? For constructed wetlands Connery (2009) emphasized:

“Detention ponds and constructed wetlands are another pair of design strategies that offer tremendous opportunities to enhance urban biodiversity. To be functional they require significantly more room than biofiltration swales and rain gardens and this can limit their appeal. However, both ponds and wetlands provide numerous opportunities for more complex assemblages of plants and more diverse aquatic/terrestrial interfaces. Individually, each of these design elements can represent small environmental patches that begin to add more diversity to site development. When interconnected they collectively create a rich ecological network at the site scale” (p. 31).

One of the people I interviewed highlighted the difference between storm ponds and undisturbed wetlands:

“Storm ponds are deeper, steeper slopes, and monoculture vegetation, they do not have the same biodiversity as undisturbed wetlands. Naturally occurring wetlands have greater biodiversity of species, including migratory and shore birds. Engineered wetlands have waterfowl, some frogs. However, they have different vegetation and not as much species diversity. In a storm pond generalist species will survive but specialist species will not survive” (City of Calgary – Biologist, Environmental Planner; personal interview).

It seems there is an opportunity to use the information and extension polity tool more. An interviewee from the City of Calgary identified the opportunity to work with high schools on a wetland monitoring programs, as well as educating grade five students about the value of wetlands. The City of Calgary is providing wetland education via signage and through its Environmental Education Centre at Ralph Klein Park. The Parks Foundation Calgary has also

placed signage along the Rotary Mattamy Greenway as well as other sites. The Miistakis Institute has launched a monitoring program called *Call of the Wetland*, a citizen science project aimed at monitoring six amphibians in Calgary's wetlands (Hunt, 2018). Citizen science presents an opportunity to gather data and monitor what is going on in Calgary's wetlands and to engage the wider public.

In Calgary's *Open Space Plan* (City of Calgary. Parks, 2002), biodiversity is mentioned five times, twice in the context of assessment such as the Environmental Assessment and Biophysical Impact Assessments (BIA). In the *Calgary WCP*, it explained "wetlands serve as a substantial source of biodiversity by increasing the complexity of landscapes" (City of Calgary, 2004, p. 26). In 2010, the City joined the Local Action for Biodiversity (LAB) program "as a part of implementing a strategy for biodiversity conservation" (Snell, 2015, p. 3). Snell (2015) explained Council approved a biodiversity work program, which included five components:

1. Developing a biodiversity report,
2. Signing the Durban Commitment: Local Governments for Biodiversity,
3. Developing a 10-year biodiversity strategic plan,
4. A Biodiversity Policy
5. Implementing biodiversity projects (p. 3).

The City of Calgary adopted a Biodiversity Plan in 2015, entitled *Our BiodiverCity*. It is a ten-year strategic plan and "provides a local context plan for the conservation of biodiversity in Calgary" (Snell, 2015, p. 1). A biodiversity policy was adopted concurrently with the strategic plan. The Plan "cite[d] numerous opportunities to improve biodiversity in the city. They include[d] conserving and reclaiming wetlands during development of a planned 384-hectare industrial park in east Calgary and establishing a monitoring program by a city waste management facility to assess impacts on adjacent wetlands (Robinson, 2015, p. 19). It's too early to evaluate the outcomes of Calgary's biodiversity work program.

5.2 Environmental Planning

What are the solutions to address wetland loss? Does it require adopting an urban water management framework, a watershed/landscape-based approach, or integrating landscape systems into land use? Are all these subsets of environmental planning? Kevinsen et al. (2013) presented an urban water management framework, which consisted of six components, wetlands

conservation was one of the components of the tool. The components of the framework were selected by the authors through a literature review, they were described as the big issues in Canadian water management. Kevinsen et al. (2013) noted, their tool was meant to assess “the effectiveness of urban water management” (p. 113). The authors tested their framework in three Canadian urban centres in the Canadian Prairies, Calgary, Medicine Hat, and Saskatoon. The authors highlighted Calgary was the only municipality with a wetland conservation plan. Having a plan in place does not necessarily mean it gets implemented or the outcomes are what the plan intended.

MacIntyre (2011) conducted a general “inquiry into the broad state of watershed/landscape-based planning and governance in Alberta” (p. 25). He reviewed “best practice within a land use planning context and searched for evidence of watershed/landscape-based approaches at the municipal level, with special attention to riparian ecosystems” (p. i). MacIntyre (2011) argued:

“watershed/landscape-based approaches recognize riparian ecosystem functions and values and protect these systems within the urban landscape by using an integrated approach to simultaneously address source water protection, protection of aquatic ecosystems, surface and groundwater hydrology, geotechnical stability and recreational, leisure and visual amenity. A watershed/landscape-based approach also addresses fiscal sustainability issues and protect[ed] property values, the property tax base and public infrastructure” (p. 48)

MacIntyre conducted exploratory case studies of four communities, his methods included a legislative review of the municipalities’ statutory documents and interviews with municipal staff “to gain insight to legislative strengths and weaknesses as well as community attitudes toward the environment” (p. 48). He identified five themes of municipal riparian ecosystem management, which existed on a continuum and showed an evolution from past urban conventions to newer approaches. The themes were:

1. *“geotechnical stability,*
2. *flood risk reduction,*
3. *water resources,*
4. *ecosystem/biodiversity, and*
5. *watershed stewardship/partnership”* (pp. 45-46).

Calgary was among the municipalities MacIntyre studied and he concluded Calgary’s municipal planning framework placed a large emphasis on all the themes noted above (p. 46). Calgary has

strong policy; however, there is an implementation gap.

Cuthbert and Tyler (2016) asserted in Alberta “There are few active examples of environmental planning at the municipal level in which landscape systems and processes are physically integrated into land use patterns or development forms other than as a direct response to flood risks or hazardous terrain conditions” (p. 5). In their work, Cuthbert and Tyler (2016) focused on two important concepts: ecosystem services and hydrological function. The authors argued ecosystem services are valuable; however, municipal land use planning and development does not adequately consider their contributions.

MacIntyre (2011), argued protecting and managing the environment required having a science-based understanding of ecosystems features and functions, as well as an understanding of governance – the ways in which individuals and communities make decisions. Until recently, Alberta’s governance system was not conducive to regional planning. Alberta dissolved its regional planning system in 1995 and the province “[got] out of the business of planning” (Sturgess, 2010, p. 107). Because municipal environmental planning needs to look at multiple spatial scales, particularly the urban regional landscape, regional planning is needed.

5.3 Regional Planning Approach

Hanna and Slocombe (2012) highlighted cases where collaborative processes lead to integrated regional planning approaches. Hanna and Slocombe highlighted three cases: the Fraser River Estuary in British Columbia, Oak Ridges Moraine Region in Ontario, and the North and Central Coast in British Columbia. The first case was a regional approach to managing land and water interactions, the second case explored integrating complex rural-urban uses, and the final case explored integration at the scale of large regions. All three cases represented some degree of integration, which required comprehensiveness and a strategic approach (Hanna and Slocombe, 2012).

According to Tyler, et. al. (2008), for regional land use planning to be strategic it should be informed by a spatial analysis of the regional landscape, which should focus on preserving not only the existence but also the functioning and connectivity of ecological infrastructure, which provides ecological goods and services. The *Calgary Plan* was Calgary’s Municipal Development Plan (MDP) when the *Calgary WCP* was adopted, and it acknowledged “planning

for the river valleys and watercourses require[d] cooperation and collaboration with Calgary's neighbours to ensure that ecological systems [were] managed consistently and comprehensively, regardless of municipal jurisdiction" (City of Calgary, 1998b, p. 13).

The *Calgary WCP* developed a regional approach. However, doing compensation on a regional basis entailed negotiating with neighbouring municipalities, which was difficult to do when there were no structures in place to facilitate a larger plan (City of Calgary – Urban Conservation Lead; personal interview). In Alberta, the regional planning system was eliminated in 1995. Thereafter, regional planning became voluntarily. The Calgary Regional Partnership (CRP) attempted voluntary regionally planning and considered the ecology of the landscape in its plans. However, the voluntary partnership fractured because of diverging urban and rural interests.

5.3.1 Planning for the Calgary Region: cooperation was voluntary

Calgary is part of the Calgary Regional Partnership (CRP), which was formed in 1999. The CRP was formed "so that Calgary and area jurisdictions could work together in a voluntary cooperative partnership on common issues in order to present a regional focus to residents, business and government" (McFarlane 2001, p. 14 as cited in Sturgess 2010, p. 70). Voluntary cooperation can only get you so far in regional planning because inevitably, conflicts arise. Greater municipal self-sufficiency and the elimination of regional planning in Alberta led to inter-municipal conflict. Sturgess (2010) observed annexation and development competition as the two main inter-municipal conflicts that emerged.

Barss (2004) argued regional planning was required to protect the ecological integrity of the environment. Further he asserted "...municipalities should be the primary participants in the design, operation and outcome of any regional governance system" (p. xv). I interpret this as an acknowledgement of the importance of place and of placed based approaches. Barss' research, was done almost a decade after Alberta's regional planning system was dismantled. The dissolution of Alberta's regional planning system resulted in the province "getting out of the business of planning" (Sturgess, 2010, p. 107). Thereafter, municipalities became self-sufficient planning authorities, who could in theory protect the environment.

Unsurprisingly, after a number of years of voluntary regional planning, the Province was called on to take a more proactive approach. In 2005, the Province committed to develop “a comprehensive land use policy for the Province”(Alberta, 2005, p. 19 as cited in Sturgess, 2010, p. 84). The result, a new Land Use Framework (LUF), whose intent was to “create a wide-reaching land use planning system that encompass[e] the entire province” (Sturgess, 2010, p. 86). Adopted in 2008, the Land Use Framework set-up a new regional planning system where seven new regional plans were to be developed. Sturgess (2010) noted, these regions “were delineated based on watershed information, municipal boundaries and input from the public” (p. 87). The authority for the new regional planning system came from the Alberta Land Stewardship Act (ALSA), which came into force in 2009. Sturgess explored the history of the previous regional planning system and its failures, she then made recommendations on how to reduce inter-municipal conflict and how to support inter-municipal cooperation.

Wetland management requires inter-municipal cooperation because of the scale it needs to occur on. Nicol noted city-regions are increasingly focusing on ecological issues because “...the city-region scale had become a principle site for advancing sustainability” (Wheeler, 2002 as cited in Nicol, 2013, p. 3). A city-region approach was adopted by the Calgary Regional Partnership. Nicol (2013) explained, “In 2005 these municipalities [CRP members] embarked on a major city-region rescaling initiative involving water sharing and land-use planning. However, by 2009 four rural municipalities had left, bifurcating the partnership along urban and rural lines” (p. iv). Nicol’s research focused on the process used to develop the Calgary Metropolitan Plan. She highlighted the “...challenges in establishing a unique water sharing arrangement under a regional governance framework” (p. 2).

The Alberta Land Stewardship Act (ALSA) enabled the development of regional plans. Calgary is in the South Saskatchewan Region, the South Saskatchewan Regional Plan (SSRP) took effect on September 1, 2014 (Alberta. Environment and Parks, n.d.). The Oldman River Regional Services Commission (2014) described the plan as very broad, the SSRP:

“...intent [was] to ensure that land [was] well-managed, important aspects protected, and land use conflicts [were] minimized into the future. The difficulties in creating a regional plan [were] readily apparent given the region’s great diversity. This seem[ed] to highlight the need for sub-regional plans. (There [was] reference to supporting the

Calgary Regional Partnership, but there [was] little mention or support for other sub-regional plans)” (p. 5)

The Calgary Metropolitan Plan (CMP), a voluntary regional plan, was published in 2009. Only urban municipalities supported the Plan and it had “...no statutory backing to ensure compliance” (Sturgess 2010, 98). Amendments to the Plan were adopted in 2012 (City of Calgary, n.d. E). These amendments reflected updates and Provincial feedback. In March 2013, the Calgary Regional Partnership entered mediation with Rockyview County and the Municipal District of Foothills (Dormer, 2014). Amendments were adopted because of mediation. Thereafter, the expectation was the Plan would be legislated.

5.3.2 Growth Management Board for the Calgary Area

In February 2015, the Province gave the Calgary Regional Partnership two options: establish a Growth Management Board or make the Calgary Metropolitan Plan a sub-regional plan under the South Saskatchewan Regional Plan (SSRP) (Calgary Regional Partnership, 2015). In December 2015, the Province announced a growth management board for the Calgary area (CBC news, 2015). The rationale was as follows:

Although all rural municipalities surrounding Calgary initially participated in the regional planning process voluntarily, none have continued to participate in the regional partnership and none have adopted the metropolitan plan. That ha[d] hindered integrated planning and servicing across the region” (Alberta, 2018).

In January 2018, the Calgary Metropolitan Region Board was officially established (Alberta. Municipal Affairs, 2017). It can be surmised voluntary regional planning in the Calgary area was a limited success. In sum, voluntary regional planning in the Calgary area contributed to the creation of a Growth Management Board for the City of Calgary region. This Board is provincially mandated, meaning it has statutory authority.

Perhaps municipal land use planning and development will give more consideration to ecosystem services because a regional governance system with statutory authority is now established in the Calgary area. The Calgary Metropolitan Region Board is required to develop a long-term growth plan and servicing plan by January 2021, an interim growth plan has been developed in the interim (Calgary Metropolitan Region Board, 2018). Perhaps the background studies that informed the *Calgary Metropolitan Plan* will also inform the new long-term growth

plan. These studies looked at the regional ecological infrastructure and ecological mapping (Tyler et al., 2008; O2 Planning + Design Inc. 2009). Calgary's 2009 *Municipal Development Plan* includes a Part entitled *Framework for Growth and Change*, in this section in underscored:

“The City must ensure that growth occurs within the legislative and regulatory framework of other orders of government. In particular, the Alberta Land Use Framework and the Calgary Metropolitan Plan will provide direction on how the city grows and interacts within a regional and provincial context” (City of Calgary, 2014b , p. 5-2).

5.4 Summary

McDonnell (2011) defined urban ecology as follows: “Urban ecology integrates both basic (fundamental) and applied (problem oriented), natural and social science research to explore and elucidate the multiple dimensions of urban ecosystems” (p. 9). I am interested in problem oriented social science research, namely the implementation gap and how to address it. There are multiple approaches to enable conservation in urban areas, the key is to pay attention to place, as well as the ecology and the natural processes that occur within the landscape. It is also important to plan across multiple scales and to realize “ecological patterns and processes differ in cities as compared with other environments” (Grimm et al., 2000; Wu, 2008 as cited in Niemelä, et al., 2011). This is a simple summary of a complex problem: how to manage conservation and development. I believe our cities need to reconnect to and reflect the natural landscape.

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Appendices

Appendix A – Interview Questionnaire

Questions related to context

1. What do you know about the context (social, political, economic, environmental) in which the Calgary WCP was developed?
2. What do you know about the process used to develop the Plan?

Questions related to plan outcomes

3. What do you think would have occurred in the absence of the *Calgary WCP* (2004)? What difference did having a plan in place make?
4. In your opinion, what were some of the unanticipated outcomes of the *Calgary WCP*?
5. Hoch encouraged planners to move beyond a Rational analysis, where plans are blueprints for products. Instead he encouraged planners to adopt a pragmatic approach where they look for “the similarity binding plan and product” (Hoch, 2002, p. 66). In other words, the links between the plan and reality.
 - a. Who used the plan?
 - b. Who resisted the plan?
 - c. Who ignored it altogether?

Questions related to whether the new provincial policy responds to issues identified through past policy analysis

6. In your opinion, does the new policy recognize the interplay between wetlands and riparian areas (Stewart, 2008)?
7. In your opinion, is the role municipalities can play in environmental protection acknowledged in the new policy?
8. In your opinion, does the new policy address:
 - “fragmented jurisdiction
 - interagency communication,
 - financial arrangements,
 - enforcement,
 - promoting informed decision making” (Schulte-Hostedde et al., 2007, p 83).

Are there other potential participants with knowledge of the Calgary WCP and/or provincial wetland policy?

9. Can you think of anyone else who has knowledge of:
 - a. The context and plan outcomes of the Calgary WCP, and/or
 - b. Whether the provincial wetland policy responds to past policy issues and might be useful for me to talk to?”

Would you be willing to pass on my recruitment material to this person and let that potential interviewee decide whether to contact me?

Thank you for your time, I am going to transcribe our interview, I will send you a copy of the transcript and you will have an opportunity to edit it.

Appendix B – Interview Consent Form



UNIVERSITY
OF MANITOBA

Department of City Planning, Faculty of Architecture
201 Russell Building
84 Curry Place
Winnipeg, Manitoba R3T 2N2

Tel: (204) 474-9458
Fax: (204) 474-7532

Statement of Informed Consent

Research Project Study: Municipal Wetland Conservation and Restoration: An evaluation of place-based policy in Calgary Alberta

Principal Investigator:

Lucy Ramirez, Graduate Student, Master of City Planning, Faculty of Architecture, University of Manitoba

Advisory Committee:

Supervisor	David van Vliet, Professor, Department of City Planning, Faculty of Architecture, University of Manitoba
Internal Advisor	Richard Milgrom, Head and Associate Professor, Department of City Planning, Faculty of Architecture, University of Manitoba
External Advisor	Mary Ellen Tyler, Professor, Environmental Design: Architecture + Landscape Architecture + Planning, University of Calgary

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

Introduction

You are invited to take part in a research study. This consent form, a copy of which you can keep for your records, is intended to ensure you have consented willingly and with all necessary information. It should explain what is involved in the research and what is expected of you as a participant.

Please take time to read, understand, and review the consent form and information about the research. If you would like more information, please feel free to ask me Lucy Ramirez, the Principal Investigator.

Purpose of the study

The purpose of this research is to study existing municipal wetland policies to understand their effectiveness. The proposed research seeks to understand the outcomes of the Calgary WCP (2004). The literature acknowledges the importance of learning from practice. Planners may be interested in this research because “[a] key challenge in the sustainability discourse is to illustrate practical approaches to putting sustainability into practice, especially in planning” (Hanna & Slocombe, 2012, p 30).

Information for this study will be gathered through semi-structured interviews with key-informants who have knowledge of the Calgary WCP and/or provincial wetland policy.

This research project is a requirement of the Master of City Planning program at the University of Manitoba.

Study procedures

If you participate in this study, you will be asked a series of questions pertaining to the Calgary WCP and/or Provincial Wetland Policy. You can refuse to answer any questions, and may end the interview at any time. The interview will be audio recorded, and transcribed. You will have the option to choose to see the transcription prior to the publication of this project. The interview will be approximately 45 minutes to one-hour long.

Participant risks, benefits, costs

There are minimal risks related to taking part in this project. This proposed research study is based on your expertise and experiences relating to the Calgary WCP and/or provincial wetland policy. Although your name will not be included in this study, in order to convey your particular form of expertise and knowledge, you will be identified only by a generic job title and/or a brief description of your familiarity with the Calgary WCP and/or provincial policy. I will engage you in the process of coming up with a generic title and/or brief statement on your experience that you are comfortable with including. Your name will be kept anonymous; however, there may be a risk to confidentiality due to the inclusion of a generic job title and/or a brief description of your familiarity with the Calgary WCP and/or provincial policy, and a small sample size. Steps will be taken to minimize this risk by providing you with an opportunity to review your interview transcript and make sure your comments are appropriate for public domain.

Benefits for participants include the opportunity to share your knowledge and experience related to the Calgary WCP and/or provincial wetland policy. Participation provides you with a platform to share your insights, which may help future researchers understand how urban municipalities are using place-based policy to conserve and restore wetlands in the Prairie Pothole region. Here, jurisdictions have adopted a ‘no net loss’ approach to wetland management. You have the potential to be indirectly responsible for the development of more informed municipal wetland management policies.

Audiotaping & confidentiality

With your permission, the interviews will be audio recorded and transcribed later to ensure accuracy. If a participant does not agree to record the interview, then notes will be taken. In the transcription and the researchers notes, personal identifiers will be removed, except for a generic job title and/or a brief description of your familiarity with the Calgary WCP and/or Provincial Policy. I will engage you in the process of coming up with a generic title and/or brief statement of your experience that you are comfortable with. Including this information is important to be able to show interviewees are experts in their respective fields and can offer a unique insider perspective that would not be possible to uncover if interviewing a non-expert.

Data will be stored in a secure location on a locked computer and will not include names of participants. Data will only include participants’ generic job title and/or brief description of how they are familiar with the Calgary WCP and/or provincial policy. The Principal Investigator will destroy all audio tapings and interview transcripts and notes one year after the final submission of this Major Degree Project, no later than September 2019.

Feedback & debriefing

After the interview and once the interview has been transcribed, you will be provided with an interview transcript. This gives you an opportunity to verify the information and remove or modify any comments that you feel are inappropriate for the public domain. If you declined to have interview audio recorded, you will be provided with the principal investigators notes to review. You will be provided with individual feedback within two months of the interview through phone, email, or in person to ensure the information I have compiled from the interview is accurate. Once the Major Project Degree has been completed, you will be provided with a digital copy of it.

Dissemination of Results

Study results will be disseminated through my Master of City Planning Major Degree Project, a hard copy held at the Architecture/Fine Arts library at the University of Manitoba, a digital copy online through University of Manitoba’s M Space, and my oral defense. Results may also feature in conference papers, presentations, or journal articles arising from this research. You will be offered a digital copy of the Major Degree Project via email, once the Masters’ Defense has been approved and required revisions have been completed.

Voluntary participation/Withdrawal from study

Your decision to take part in this study is voluntary. You can refuse participation or withdraw from the research study at any time. You can withdraw from the study up until the interview data has been coded and analyzed. However, once the interview data has been reorganized based on themes it is no longer possible to withdraw from the study.

If you want to withdraw from the study, you must contact the principal investigator, Lucy Ramirez, via email at ramirezl@myumanitoba.ca or by telephone at [REDACTED] before May 7, 2018. If you withdraw from the study all audio recordings and transcripts will be immediately destroyed. Contact information

Student researcher:

Lucy Ramirez, Graduate Student, Department of City Planning, Faculty of Architecture,
University of Manitoba

Phone: [REDACTED]

Email: ramirezl@myumanitoba.ca

Research supervisor:

David van Vliet, Professor, Department of City Planning, Faculty of Architecture,
University of Manitoba,

Phone: 204-474-7176

Email: David.VanVliet@umanitoba.ca

Statement of consent

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 may look at my research records to see that the research is being done in a safe and proper way.

This research has been approved by the Joint-Faculty Research Ethics Board (JFREB) 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 204-474-7122 or by email at humanethics@umanitoba.ca. A copy of this consent form has been given to you to keep for your records and reference.

If you agree to each of the following, please place a check mark in the corresponding box. If you do not agree, leave the box blank:

Statement	Response
I have read or it has been read to me the details of this consent form.	<input type="checkbox"/> Yes <input type="checkbox"/> No
My questions have been addressed.	<input type="checkbox"/> Yes <input type="checkbox"/> No
I, _____ (print name), agree to participate in this study.	<input type="checkbox"/> Yes <input type="checkbox"/> No
I agree to have the interview audio-recorded and transcribed.	<input type="checkbox"/> Yes <input type="checkbox"/> No
I agree to be contacted by phone or e-mail if further information is required after the interview	<input type="checkbox"/> Yes <input type="checkbox"/> No
I agree to have the findings (which may include quotations) from this project published or presented in a manner that does not reveal my identity.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Do you wish to receive a summary of the findings?	<input type="checkbox"/> Yes <input type="checkbox"/> No
How do you wish to receive the summary?	<input type="checkbox"/> E-mail <input type="checkbox"/> Surface mail
Would you be willing to pass on my recruitment material to a potential interviewee and let them decide whether to contact me?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Address:

Participant's
Signature

Date

Researcher's
Signature

Date

Appendix C – Coding Framework

Code number/colour	Codes	Sub Codes
1.	Context	<ul style="list-style-type: none"> • Environment • Economic • Social • Political
2.	Outcomes	<ul style="list-style-type: none"> • Increased awareness of wetlands <p>Anticipated outcomes with a no net loss approach that adopts a mitigation hierarchy.</p> <ul style="list-style-type: none"> • Avoidance • Minimization • Compensation • Restoration <ul style="list-style-type: none"> • Importance of wetland complexes and hydrological flow <ul style="list-style-type: none"> • Integrating wetlands into the built environment <ul style="list-style-type: none"> • Implementation gap
3.	Issues identified through past policy analysis.	<ul style="list-style-type: none"> • Interplay between wetlands and riparian area (upland) • Municipal role <p>Are following issues addressed?</p> <ul style="list-style-type: none"> • Fragmented jurisdiction • Interagency communication • Financial arrangements • Enforcement • Promoting informed decision-making • New governance models

Appendix D – Reports from Administration

Report Number	Title
M-98-008	<i>Calgary Plan (Municipal Development Plan)</i>
OE2001-44	<i>Wetlands in the Transportation and Utility Corridor,</i>
C2001-47	<i>Additional Resolutions for the 2001 Conference of the Alberta Urban Municipalities Association (AUMA)</i>
C2001-82	<i>Land Acquisition Strategy for Natural Areas</i>
IGA2002-19	<i>Report on the City of Calgary's Participation in the Alberta Urban Municipalities Association (AUMA) Resolution Process</i>
CPS2002-42	<i>Open Space Plan</i>
OE2003-49	<i>Wetland Conservation Plan Progress Report</i>
UE2004-25	<i>Wetland Conservation Plan</i>
UE 2004-51	<i>Environmental Reserve Setbacks</i>
UE 2005-03	<i>Environmental Reserve Setbacks</i>
UE 2006-07	<i>Environmental Reserve Setbacks - Deferral</i>
UE 2006-30	<i>Environmental Reserve Setbacks</i>
UE 2007-15	<i>Environmental Reserve Setbacks</i>
UE 2008-09	<i>Wetland Compensation Update.</i>
UE 2008-39	<i>Wetland Compensation Update.</i>
C2013-0057	<i>New Area Structure Plan Process</i>
PUD2014-0864	<i>Environmental Open Space Policies Progress Report</i>
PUD2015-0200	<i>Environmental Open Space Policies Progress Report</i>
PUD2015-0809	<i>Environmental Open Space Policies Progress Report</i>
CPC2015-219	<i>Policy Amendments – Amendments to the Municipal Development Plan (The New Community Planning Guidebook) City-Wide, Future Greenfield Areas, New Communities Bylaw 47P2015</i>
PUD2016-0221	<i>Environmental Open Space Work Program Update</i>