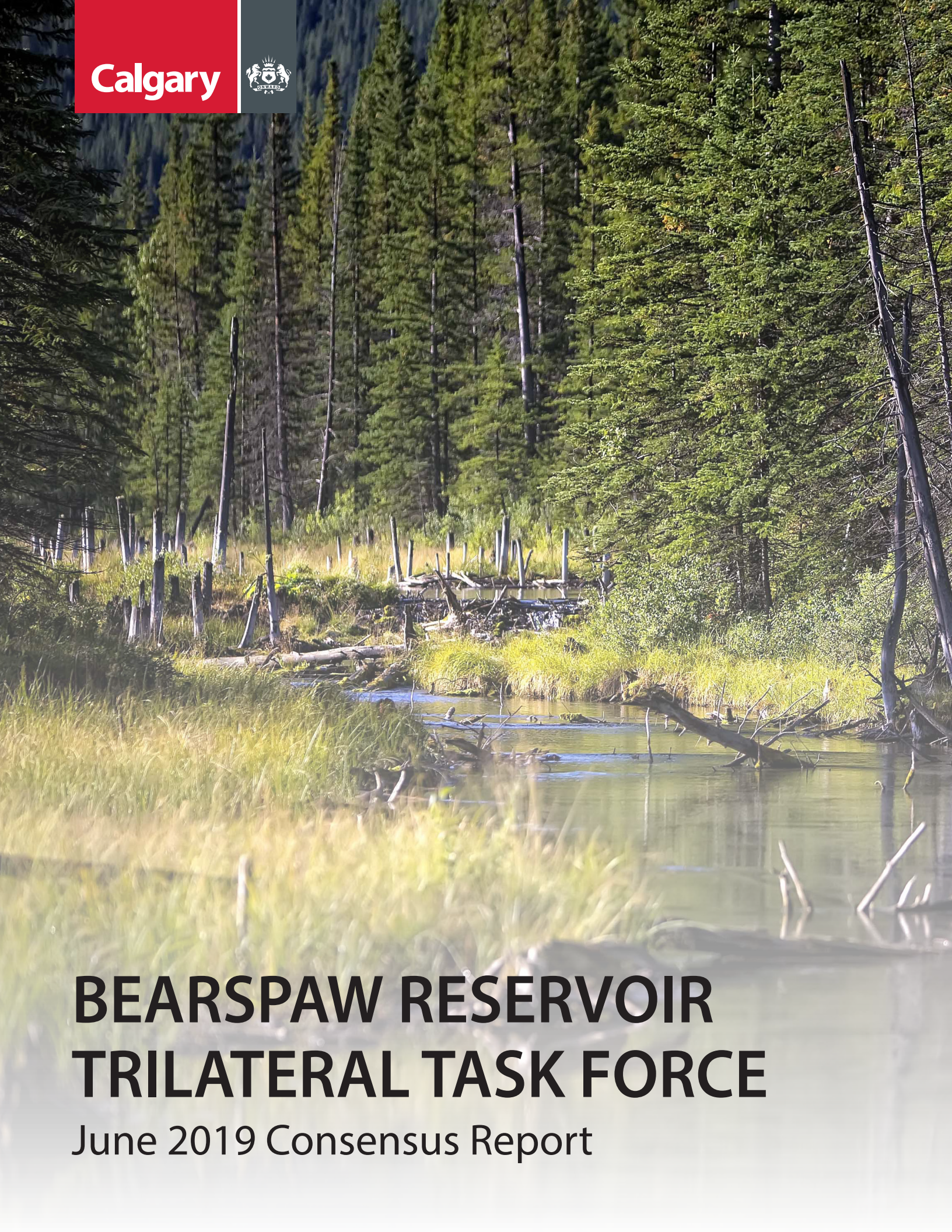

BEARSPAW RESERVOIR TRILATERAL TASK FORCE

June 2019 Consensus Report

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1. INTRODUCTION

The Bearspaw Reservoir (Reservoir) along the Bow River is formed by the Bearspaw Dam. Originally constructed in 1954, TransAlta owns the dam and most of the shoreline surrounding the Reservoir. The Reservoir is the source for drinking water used by approximately 1.4 million customers in the Calgary region. This relatively pristine water source is at risk of pollution due to urban growth, increased recreational use, and other hazards. Safety hazards due to increasing reservoir access and use also pose concerns. To proactively address these emerging issues, representatives from The City of Calgary, Rocky View County, and TransAlta formed a Task Force in 2018. The Task Force worked together to identify and discuss risks, issues, and management options for the Bearspaw Reservoir. This report provides a summary of the work and recommendations from the Task Force.

1.1 TASK FORCE SCOPE

The **purpose** of the Task Force was to collaboratively identify key risk factors and then explore management and governance strategies to mitigate these risks. The specific **objectives** for the Task Force were to:

- Explore governance and management structures, and identify actions and methods to achieve the following:
    - Balancing human activities on or near the Bearspaw Reservoir with the **protection of water quality**
    - Balancing human activities on or near the Bearspaw Reservoir with the **protection of public safety, access, and liability issues**
    - **Clearly delineating roles and responsibilities** and enhanced working relationships between the parties, for the purposes of implementing source water protection

1.2 REPORT ORGANIZATION

This report summarizes the work completed by the Task Force and recommended next steps for consideration by decision makers. Section 2 below provides additional context and background information, including jurisdictional and regulatory considerations, gaps in current planning and policy, existing Reservoir uses and access, and a summary of potential risks to water quality and public safety. Section 3 summarizes the consensus achieved on outcomes, management principles, and recommended next steps for the Bearspaw Reservoir.

2. CONTEXT AND BACKGROUND

2.1 STUDY AREA

The Task Force defined both local and regional study areas (Appendix A), to separate key topics based on geography. The local study area discussions focused on recreation on the Reservoir and the immediate shoreline. The regional study area facilitated discussions of broader stormwater and land development issues affecting Reservoir water quality. Key attributes of the local and regional study areas are shown in Table 1. Of note, the Glenbow Ranch Provincial Park - established in 2008 - is prominent within both the Regional and Local Study Areas.

TABLE 1. LOCAL AND REGIONAL STUDY AREAS DEFINED BY THE BEARSPAW TRILATERAL TASK FORCE

Criteria	Local Study Area	Regional Study Area
Geographic Area	Bearspaw Reservoir and shoreline	Bow River watershed sub-catchments, from Cochrane to the Bearspaw intake at Stoney Trail
Primary Issue	Recreation management	Stormwater management
Total Area (approx.)	3 km^2	330 km^2
Municipalities present	Rocky View County, City of Calgary (majority of NE shoreline)	Rocky View County, Town of Cochrane, City of Calgary
Existing and future subdivisions	Emerald Bay (Rocky View County), Haskayne	*Calgary:* Crestmont, Valley Ridge *RVC:* Springbank, Harmony, Cochrane Lakes, Lynx Ridge, Watermark, Glenbow *Cochrane*: All neighbourhoods

2.2 OWNERSHIP, JURISDICTION AND LEGISLATION

As shown in Figure 3 & Figure 4 (Appendix A), the Bearspaw Reservoir's southwestern bank and a small portion of the north-east bank are within the jurisdiction of Rocky View County. The City of Calgary's jurisdiction ends along the northeastern bank of the Reservoir. The regional study area includes a small portion of The City of Calgary, a sizeable area of Rocky View County, the Glenbow Ranch Provincial Park, and the Town of Cochrane (Appendix A, Figure 3 & Figure 4). Figure 5 indicates which subwatersheds in the area drain upstream from the Bearspaw Reservoir.

2.2.1 LAND OWNERSHIP

The local and regional study areas include a mix of privately and publicly owned lands. TransAlta owns the majority of the shoreline of the Reservoir and is the owner of the Bearspaw Dam site. Major subdivisions in the area are indicated above in Table 1. A large proportion of the study area still remains within large, undeveloped privately-owned quarter sections.

Publicly owned parks include the Haskayne and Bearspaw Legacy Parks owned and operated by The City of Calgary, the Glenbow Ranch Provincial Park (Alberta Environment and Parks), as well as various Environmental Reserve and Municipal Reserve parcels owned and operated by Rocky View County, and the Town of Cochrane (Appendix A).

2.2.2 SUMMARY OF JURISDICTIONAL ASSESSMENTS

Federal, provincial, and municipal governments all play a role in the governance of water resources within their legislative scope. This section aims to paint the interjurisdictional picture of water resource governance focusing on key components of the most important pieces of legislation.

Federal Jurisdiction

The federal *Navigation Protection Act* (NPA)[1] governs the use of navigable waterways in Canada, including the Bearspaw Reservoir. There are constitutional doctrines that govern the relationships between federal, provincial and municipal legislation, which means that a municipal bylaw cannot:

- Conflict with federal constitutional power
- Have an adverse impact on a federal power
- Create a scenario where compliance with a municipal by-law results in non-compliance with a federal law

For a municipal bylaw to affect navigation, which is under Federal Jurisdiction, a municipality would have to include their specific body of water for a new restriction under the *Canadian Shipping Act* (CSA) – *Vessel Operation Restriction Regulations*.

In addition to the above, the *Fisheries Act*, the *Canada Environmental Protection Act*, and the *Transportation of Dangerous Goods Act* are additional pieces of federal legislation that govern matters related to water and watershed protection.

[1]A newer *Canadian Navigable Waters Act* (CNWA) has been drafted and the federal government intends to repeal and replace the existing NPA with the CNWA; however, as of April 2019 this had not occurred.

Provincial Jurisdiction
The provincial government's *Water for Life Strategy* provides direction for water management in Alberta, and helped to guide the Bearspaw Task Force's work. The Strategy has three broad goals:

- Safe, secure, drinking water
- Healthy aquatic ecosystems
- Reliable, quality water supplies for a sustainable economy

Provincial jurisdiction related to water focuses mainly on the use, protection, and stewardship of water resources. Key provincial legislation related to source water protection includes[2]:

- *Environmental Protection and Enhancement Act* – municipal and industrial point-source discharges, pesticide use, etc.
- *Water Act* – management and stewardship of water resources
- *Alberta Safety Code* – for private sewage systems
- *Public Health Act* – nuisance and sanitation regulation
- Various regulations that require setbacks from water bodies for various activities or structures that could adversely affect water quality

Several other pieces of provincial legislation play indirect roles in maintaining watershed quality and water resource sustainability. The *Public Lands Act* indirectly affects land conservation and stewardship in and around water bodies and watersheds, and by extension source water protection. The *Provincial Parks Act* also affects watershed conservation and is particularly relevant in the context of the Glenbow Ranch Provincial Park which falls within the Bearspaw Reservoir study area.

Municipal Jurisdiction
The role of municipalities in environmental management is important and has recently been expanded. The *Municipal Government Act* states that the purpose of a municipality is (Section 3):

> *a.1) to foster the well-being of the environment*
>
> *b) to provide services, facilities or other things that, in the opinion of Council, are necessary or desirable for all or a part of the municipality,*
>
> *c) to develop and maintain safe and viable communities, and*
>
> *d) to work collaboratively with neighbouring municipalities to plan, deliver and fund intermunicipal services*

In addition, *Section 60 (1)* of the MGA states that: "*Subject to any other enactment, a municipality has the direction, control and management of the bodies of water within the municipality, including the air space above and the ground below.*"

[2] As summarized at the provincial website: https://www.alberta.ca/drinking-water-protection.aspx

In summary, municipalities are authorized to manage environmental and surface water resource issues within their boundaries, provided they do not conflict with higher orders of government legislation. In practice, this means that municipalities are authorized to integrate regulation of environmental resources within their plans, land uses, and activities within their boundaries, in order to pursue excellence in environmental management and water quality[3].

In addition to the above, The City of Calgary also has new powers through the recently adopted City Charter, which includes the ability to adopt bylaws for *"the well-being of the environment, including bylaws providing for the creation, implementation and management of programs respecting… iii) environmental conservation and stewardship."*

2.2.3 PLANNING AND POLICY CONTEXT

Existing planning and policy documents (Table 2 & Appendix B) are overwhelmingly clear on a general commitment to maintain source water quality, while balancing development and recreational opportunities to meet the needs of the Region's growing population. However, these policies and plans do not provide specific, clear direction on how to approach source water protection to achieve the appropriate balance at the Bearspaw Reservoir. To address this gap, the Task Force felt a more specific, focused version of the preceding policy advice would be critical for moving forwards.

The following plans and policies provide key guiding direction, while lending support to source water protection and recreation management at the Bearspaw Reservoir:

TABLE 2. SUMMARY OF KEY GUIDING POLICIES AND PLANS

Provincial	*Water for Life* Strategy
Regional	South Saskatchewan Regional Plan (SSRP)
	Calgary Metropolitan Region Board (CMRB)
	Bow River Basin Watershed Management Plan
Intermunicipal	Rocky View County/City of Calgary Intermunicipal Development Plan (IDP) Rocky View County/Town of Cochrane Intermunicipal Development Plan (IDP)
Rocky View County	County Plan (Rocky View County Municipal Development Plan)
	Riparian Land Conservation and Management Policy
	Glenbow Area Structure Plan Springbank Central Area Structure Plan Harmony Conceptual Scheme

3Interpretation confirmed by each of the three parties, including legislative experts and literature

	Springbank Master Drainage Plan Glenbow Master Drainage Plan
	Parks and Open Space Master Plan
City of Calgary	City of Calgary Municipal Development Plan
	Haskayne Area Structure Plan
	Haskayne Master Drainage Plan
	Sport for Life Policy
	City of Calgary Source Water Protection Plan

Appendix B provides additional summaries of relevant policies for each of the above as well as additional relevant policies and plans.

2.3 RESERVOIR USES

This section summarizes existing uses of the Reservoir, including hydropower, source water supplies for drinking water systems, and recreation. Potential future increasing demands for source water and recreation are also discussed.

2.3.1 HYDROPOWER

Constructed in the early 1950s, the Bearspaw dam and reservoir helps limit ice jams and winter flooding in Calgary, as well as generate power. Today, the Bearspaw Dam site is owned and operated by TransAlta and continues to generate hydroelectricity. The plant's output provides enough electricity to power approximately 10,000 homes in the Calgary region.

2.3.2 SOURCE SUPPLIES FOR DRINKING WATER

One of the primary uses of the Bearspaw Reservoir and adjacent reaches of the Bow River is a water source for drinking water systems. In total, eleven water intake structures used by drinking water utilities are located in the Bearspaw regional study area (Figure 4). The City of Calgary draws water for the Bearspaw Water Treatment Plant at the Bearspaw Dam site, and from a second site directly in the Bow River near Stoney Trail (Figure 4). Under normal conditions, the Bearspaw plant satisfies about 60-65% of the water demand for The City of Calgary and its' regional customers. However, Calgary's water mains are all inter-connected and The City maintains the capability to supply virtually all of its customers

(> 1.3 million people) with water from the Bearspaw Reservoir on a temporary basis to meet operational needs in the event of a shut-down of the Glenmore Water Treatment Plant.

Rocky View County residents are also supplied with potable water from privately owned water utilities drawing from the Bearspaw Reservoir or adjacent reaches of the Bow River. The largest water provider in the County is the Rocky View Water Co-op, which draws water from intakes directly in the Bearspaw Reservoir, and provides water services to approximately 6,000 people[4]. Smaller water utilities drawing water from the Bearspaw Reservoir include the North Springbank, Salt Box Coulee, and Emerald Bay systems. Private water utilities drawing water directly from the Bow River downstream of the Reservoir include the Blazer Water System (servicing Watermark and Lynx Ridge), and the Poplar View Co-Op (servicing Artist's Ridge and Burnco). These water withdrawal locations would also be affected by water contamination in the Bearspaw Reservoir immediately upstream. In addition, the Harmony Advanced Water Systems Corporation draws its water from the Bow River just upstream from the Bearspaw Reservoir. All Rocky View County water intakes are indicated on Figure 3 and Figure 4 (Appendix A). The estimated total County population currently serviced by water utilities drawing from the Bearspaw Reservoir and vicinity is 9,000 people and growing.

2.3.3 RECREATION

The Bearspaw Reservoir is an attractive water body with amenity and recreation values. Current recreational activities include swimming, fishing, non-motorized boating (e.g., canoeing), and motorized boating. The main public access for boat use is upstream at the Town of Cochrane. Within the County, a small private motorized boat launch and dock on the southwest side of the Reservoir (Emerald Bay) is used by local residents. There are no formal public access points on the Reservoir.

A number of informal access points in Rocky View County provide access to the Reservoir. In the Rocky View County Parks and Open Space Master Plan (2011) the County heard the desire from residents for the development of on-water recreation activities that include designated river access points for non-motorized recreational activities (i.e. paddling, fishing), as well as marked roads to river access points.

The City of Calgary owns two large parks adjacent to the Reservoir: Haskayne Legacy Park on the northeastern side of the Reservoir, and Bearspaw Legacy Park directly across from Haskayne Legacy Park on the southwestern side (Figure 3). The two parks preserve the area's natural features and provide a range of active and passive recreational activities for Calgary area residents. The visitor facilities for Haskayne Park north of the CP railway tracks are currently under construction. The Haskayne Park Master Plan has future plans for a below-grade railway crossings to the south side, a regional pathway

[4]Brad Mason, General Manager of Rocky View Water Co-Op, estimates a current serviced population of 6000 people from 1450 active connections, a sold capacity for 2100 connections, and licensed capacity to eventually serve 3000 connections in the future (personal communications, November 2018)

connection, and eventual development of a riverside recreation area with terraced seating, picnic spaces, and non-motorized boating access.

Although recreational demand remains relatively low, it is expected to grow rapidly in the future along with urban growth and land use change in Calgary, Cochrane, and Rocky View County. Appendix C includes additional details on recreational use and access.

2.4 RISK SUMMARY

The following section explores the risks and hazards related to both source water contamination and the safety of recreational users.

2.4.1 SOURCE WATER CONTAMINATION RISKS

In the context of drinking water, risk is the chance of a threat causing harm to the drinking water system or human health. Providing safe drinking water requires an integrated set of risk reduction measures, including source water protection, treatment, controls in the water distribution system, monitoring, and emergency response (Figure 1). These measures are designed to avoid and reduce risks to public health and the drinking water system. The use of multiple barriers provides redundancy and system resilience.

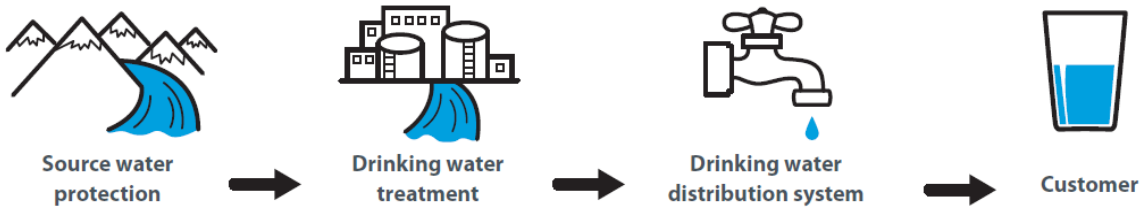

FIGURE 1. A MULTI-BARRIER APPROACH TO PROVIDING SAFE, CLEAN DRINKING WATER

Growth and Land Use Change

In 2018, the estimated population residing in drainage basins upstream from the Bearspaw Reservoir drinking water intakes was 77,000[5]. At the scale of the Bearspaw Regional Study Area, there are approximately 43,000 residents including those from Cochrane (27,960), Rocky View County (7,542[6]), and Calgary (7,410). Growth in this area is expected to add an additional 89,000 residents to the Regional Study Area over the next 30-40 years, representing an increase of almost 200% from today[7].

[5] Includes >31,000 people further upstream from the Regional Study Area in the Bow watershed (e.g., Canmore, Banff, Morley, M.D. of Bighorn)

[6] These include all County residents located within the subwatersheds that drain into the Bow River, as shown on Figure 5, Appendix b

[7] Future estimates are based on growth and development projections for Cochrane (+30,000), as well as new communities planned in Rocky View County including Harmony, Glenbow, and Cochrane North (+29,000), and new communities planned in Calgary including Haskayne/Rowan Park, Calgary West, Crestmont, and Westview (+29,700).

Stormwater Risks

Stormwater runoff from developed land uses contain a wide range of contaminants that can pose threats to water quality downstream. As upstream growth continues, stormwater runoff from developed lands poses increasing risks to source water quality in the Bearspaw Reservoir and Bow River. Many contaminants found in stormwater – including hydrocarbons, pesticides, herbicides, and complex organic compounds – cannot be effectively removed at water treatment plant facilities. In addition, monitoring in the Calgary region shows that stormwater contains surprisingly high amounts of faecal matter and pathogens, which is of concern for public health. Land development in the watershed is also growing and projected to increase significantly with the addition of 89,000 residents in the Regional Study Area.

Stormwater inputs to the watershed have the potential to result in chronic risks to public health from low concentrations of pollutants, or more acute impacts due to chemical spills entering storm sewers. The relatively fast movement and cycling of water in the Bearspaw reservoir also creates challenges, as it can be difficult for plant operators to receive notice and react to spills due to rapid travel times as low as one hour or less during spring high flow events[8]. For these reasons, pollution related to stormwater is considered to be a "High" risk to source water quality at the Bearspaw Reservoir[9].

Recreation

Recreational activities pose varying risks to source water quality, including:

HIGH RISK

- Unmanaged illegal campfires on both sides of the Bearspaw Reservoir trigger escape fires. In addition to the threats fire poses to life and property, runoff from burn-affected areas is known to be a significant contaminant of source water.

MODERATE RISKS

- Motorized boating, which poses risks of toxic hydrocarbon release into surface waters, either through spills or general operations.

Spill Travel Times

Spills entering the Bearspaw Reservoir travel quickly downstream. The average time for water to travel from a spill about 500 m from the dam site to the intake is 3 hours. During a 1:20 year high flow, this is reduced to under 10 minutes. This poses challenges for water treatment plant operators to react in time to close water intakes.

[8]Kerr Wood Leidal, MPE Engineering Ltd., Tetra Tech EBA (2016). *Haskayne Master Drainage Plan Source Water Protection Study.*

[9] Based on technical risk assessments that were used to inform The City of Calgary's Source Water Protection Plan (2018): http://www.calgary.ca/UEP/Water/Documents/Water-Documents/Source-Water-Protection-Plan.pdf

- Swimming or other body contact recreation by people or pets, which can introduce faecal matter and chemicals, including sunscreen, insect repellant, or personal care products into surface waters.

LOW RISKS

- Non-motorized recreational activities that don't involve direct contact with the water, such as canoeing, fishing, etc.
- Land-based recreational activities and sports

Recreational activities on and near the Bearspaw Reservoir remain largely unregulated. This contrasts sharply with the *Glenmore Park Bylaw*, which restricts swimming, motorized boating, pets, pump-out sanitary systems, as well as access points to the Glenmore Reservoir within Calgary (Appendix B).

Other Risks to Water Quality
Additional high and moderate risks to water quality in the Bearspaw Reservoir include[10]:

HIGH RISK

- Runoff after major wildfires upstream

MODERATE RISK

- Train derailment spills
- Hazardous goods spills on adjacent highways/roadways
- Oil pipeline spills
- Wastewater / sewage
- Pesticides or herbicides applied to farms, lawns, or golf courses
- Livestock or manure spreading activities
- Industrial discharges
- Runoff from construction sites
- Algae blooms

Risk of Train Derailment Spills in the Bearspaw Reservoir

The Task Force discussed the risk of a train derailment spilling toxic materials into the Reservoir, and the Calgary Emergency Management Agency and Calgary Fire Department were also consulted to discuss this scenario.

Emergency planning and response procedures for train derailments and response protocols are in place. Federal requirements for CP Rail to plan and respond to incidents have also increased since the 2013 Lac Megantic disaster in Quebec. In April 2018, Calgary emergency responders collaborated with CP Rail as a "lead agency" for a train derailment scenario. TransAlta and Rocky View County have both been identified as part of emergency operations and communications protocol for a train derailment scenario affecting the Bearspaw Reservoir. While the ability to respond to a derailment is robust, resources are based on availability and delays may occur in spill containment, requiring ongoing vigilance for this scenario.

2.4.2 PUBLIC SAFETY RISKS

Where there is water, there is risk to public safety. With increased use it is anticipated there will be increased risk to individual users. The importance of safety on waterways in the Calgary region cannot be understated.

The RCMP are responsible for water rescue services on the Reservoir as well as upstream on the Bow River. Rocky View County also contracts to the Town of Cochrane Fire Department to assist when fire services are involved in rescue operations. Through the South Central Mutual Aid agreement, mutual support between municipalities would also be provided if a State of Local Emergency is activated. However, resources to enable day to day surveillance or potential enforcement measures are currently unavailable at the Bearspaw Reservoir. This contrasts with the river downstream from the Bearspaw Dam, where the Calgary Fire Department (CFD) is designated as an enforcement agency under federal

[10]Based on technical risk assessments that were used to inform The City of Calgary's Source Water Protection Plan (2018): http://www.calgary.ca/UEP/Water/Documents/Water-Documents/Source-Water-Protection-Plan.pdf

legislation for reaches of the Bow River in Calgary. Additional information regarding public safety on Calgary's waterways can be accessed at calgary.ca here.

Existing fire stations in proximity to the Bow River are shown on Figure 4. Rocky View County maintains fire stations at the Springbank airport and in the Bearspaw community along Highway 1A. The Town of Cochrane's Fire Department and Rocky View County work together to deliver on-water rescue that is dispatched through 911. Cochrane's fire station is located approximately 20 km upstream. CFD maintains fire stations in the community of Valley Ridge south of the Bow River, and a new station in the community of Tuscany north of the Bow River. Current CFD emergency response times to the Bearspaw reservoir do not meet Calgary City Council's approved response times. The RCMP has jurisdiction to respond within the Reservoir and is responsible for water rescue services.

There are some constraints to emergency response access to the Reservoir. The existing emergency access route is from Bearspaw Dam Road NW, through the restricted security gate, across the Canadian Pacific (CP) Rail line, and along the access road to the Dam site. As part of the development of Haskayne Legacy Park, a new public at-grade crossing of the Canadian Pacific (CP) Rail line will be installed, with planning underway for a future below-grade crossing to be installed soon after the park opening. Both of these crossings will accommodate emergency access to the Reservoir.

3. MANAGEMENT OPTIONS & RECOMMENDATIONS

This section focuses on guiding themes and outcomes to improve the governance and management of the Bearspaw Reservoir for the future. It identifies outcomes, key issues, management principles, options and recommended next steps.

3.1 OUTCOMES

The Task Force recognizes that an effective reservoir management strategy is required to achieve the following two main outcomes:

Protection of Water Quality: The high quality of water in the Bearspaw Reservoir is maintained, to protect public health through a multi-barrier approach to the provision of safe, clean drinking water.

Management of Public Safety: The risk of death or injury to recreational users of the Bearspaw Reservoir is reduced.

3.2 PRINCIPLES FOR RESERVOIR MANAGEMENT

The Task Force conducted an iterative process to generate the following draft "***Principles for the effective management of the Bearspaw Reservoir***":

Collaborative Management – A comprehensive, integrated, collaborative approach is needed to effectively manage the Bearspaw Reservoir.

Long-Term Sustainability – Decisions shall be proactive and forward-thinking, to avoid incremental impacts resulting in risks to public health and aquatic environments for future generations.

Precautionary Approach – Where scientific uncertainty on the risk of harm from activities or land uses persist, a precautionary approach to risk management shall be applied.

Accommodate Low Risk Uses – Low risk uses that will not diminish source water quality shall be accommodated in a balanced manner, in recognition of recreational, amenity, and hydropower values.

<table>
<tr><td>Reservoir Uses</td><td>Source Supplies for Drinking Water</td><td>Recreation</td><td>Hydropower</td></tr>
<tr><td>Outcomes</td><td colspan="2">Protection of Water Quality</td><td>Management of Public Safety</td></tr>
<tr><td rowspan="4">Principles</td><td colspan="3">Collaborative Management</td></tr>
<tr><td colspan="3">Long-Term Sustainability</td></tr>
<tr><td colspan="3">Precautionary Approach</td></tr>
<tr><td colspan="3">Accommodate Low Risk Uses</td></tr>
</table>

FIGURE 2. SUMMARY OF USES, OUTCOMES, AND PRINCIPLES FOR EFFECTIVE RESERVOIR MANAGEMENT

3.3 EXPLORING OPTIONS

To achieve effective reservoir management, a number of management and governance options were explored by the Task Force. Each option was associated with a set of potential tools to improve source water protection, while balancing and accommodating land use change and increasing demands for recreational uses, as summarized below.

Issue	Tools Explored
Public Education and User Awareness	○ Information Campaigns ○ Public engagement
Access Points	○ Defined and centralized public access / egress ○ Restrictions on water access near the dam and water intake infrastructure ○ Emergency responder access
Emergency Response	○ Jurisdictional options for emergency response
Types of Recreational Uses	Prohibiting higher risk uses, while including permissions and limitations at the reservoir, considering but not limited to each of the following types of use: ○ Motorized boating ○ Docks/marina development ○ Uses that involve human body-contact ○ Pets ○ Non-motorized boating ○ On-land recreational activities/sports
Stormwater Pollution	○ Evaluating and implementing enhanced stormwater design requirements in source water areas to reduce the risk of polluting drinking water supplies ○ Regional approaches to stormwater management ○ New stormwater outfalls to discharge downstream of drinking water intakes where feasible ○ Prohibiting high risk land uses or activities near water intakes (e.g., industrial, gas stations/automotive, waste management, dry cleaners, chemical storage facilities, etc.)
Monitoring and Enforcement	○ Enhancing protective services, ability to monitor and enforce bylaws using appropriate staff (police, fire department, bylaw services)
Jurisdiction and Authority	○ Transfer of management authority to regulate and enforce water activities from Federal jurisdiction ○ Bylaw options and requirements

3.4 TASK FORCE RECOMMENDATIONS AND NEXT STEPS

A. Recommendations

The Task Force makes the following recommendations with respect to the **local** study area:

1. All three parties adopt the outcomes and principles that form the basis for an effective risk management strategy for the Bearspaw Reservoir.
2. Conduct public consultations to obtain input on options and tools for a Bearspaw Reservoir Risk Management Strategy. The public consultations should be co-led by the two municipalities, with input from TransAlta.
3. Draft a recommended Bearspaw Reservoir Risk Management Strategy and report on progress to both Councils no later than June 2020.

B. Proposed Next Steps

1. Develop public education materials on the importance of the Bearspaw Reservoir as a drinking water source and as a hydroelectric facility.
2. Continue to explore the process for exemption under the *Canadian Navigable Waters Act* and the *Canadian Shipping Act*, to enable enforcement authority regarding boating on the Bearspaw Reservoir.
3. With respect to the **regional** study area, address source water quality risks related to storm water quality through:
   (a) evaluating tools and strategies to advance the treatment of storm water, with the invited participation of the Town of Cochrane and the Province of Alberta.

   (b) regional direction from the Calgary Metropolitan Region Board (CMRB).

3.5 CONCLUSIONS

Representatives from The City of Calgary, Rocky View County, and TransAlta have collaborated on identifying and characterizing risks at the Bearspaw Reservoir, and providing options and recommendations to achieve effective reservoir management over time.

By taking action today, we can help protect the quality of our drinking water, while maintaining the safety of Reservoir users for generations to come.

APPENDIX A – STUDY AREA MAPS

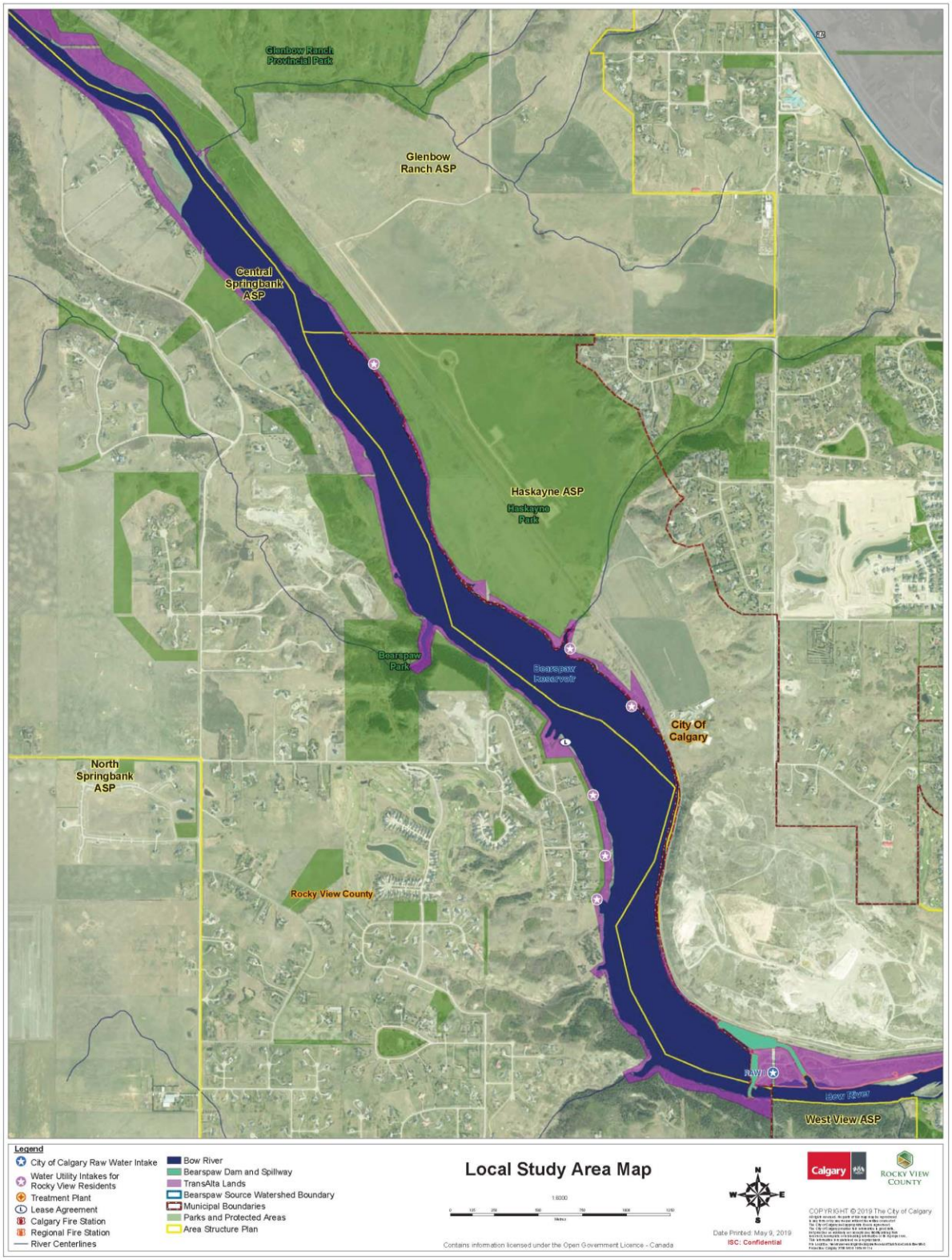

FIGURE 3. LOCAL STUDY AREA MAP

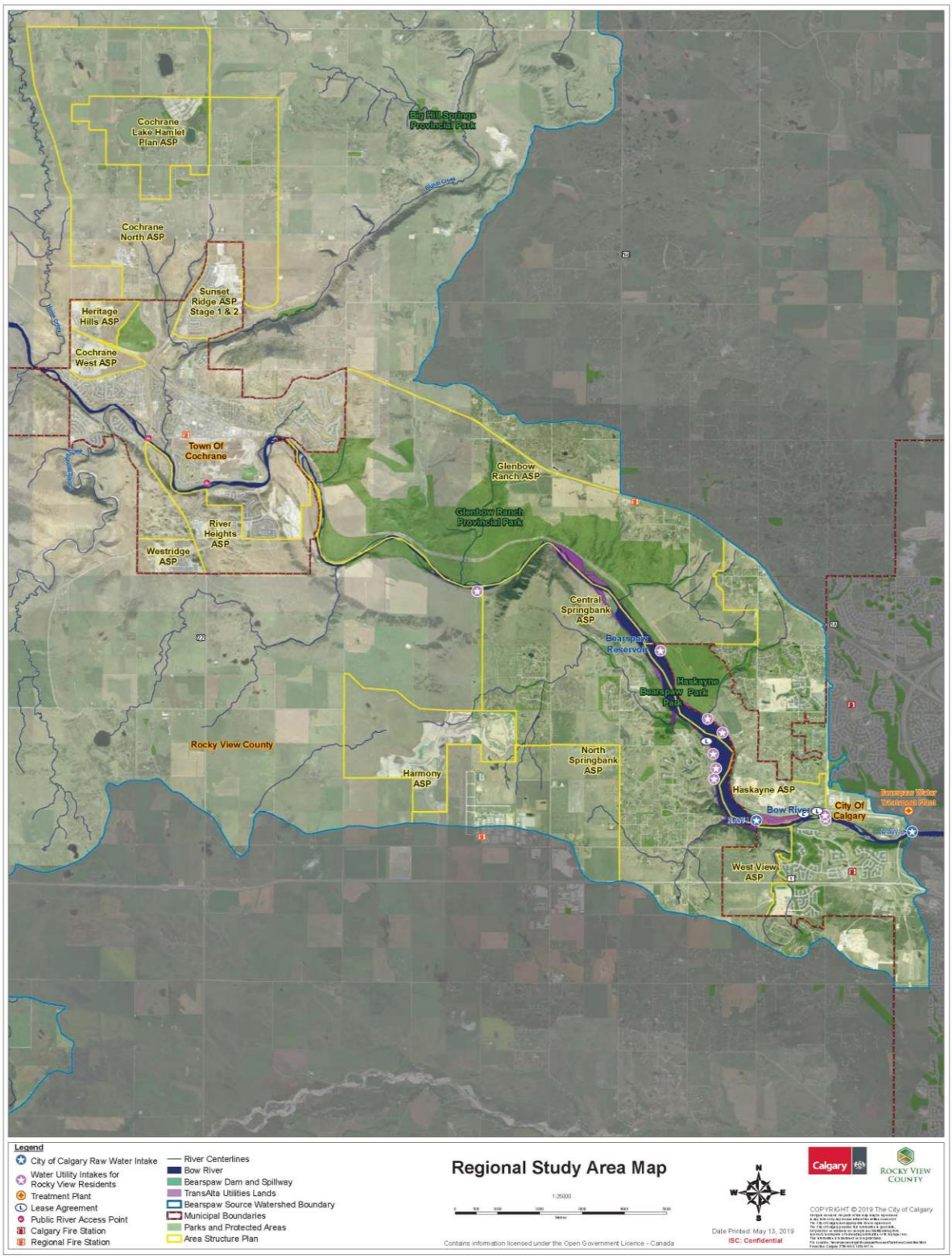

FIGURE 4. REGIONAL STUDY AREA MAP

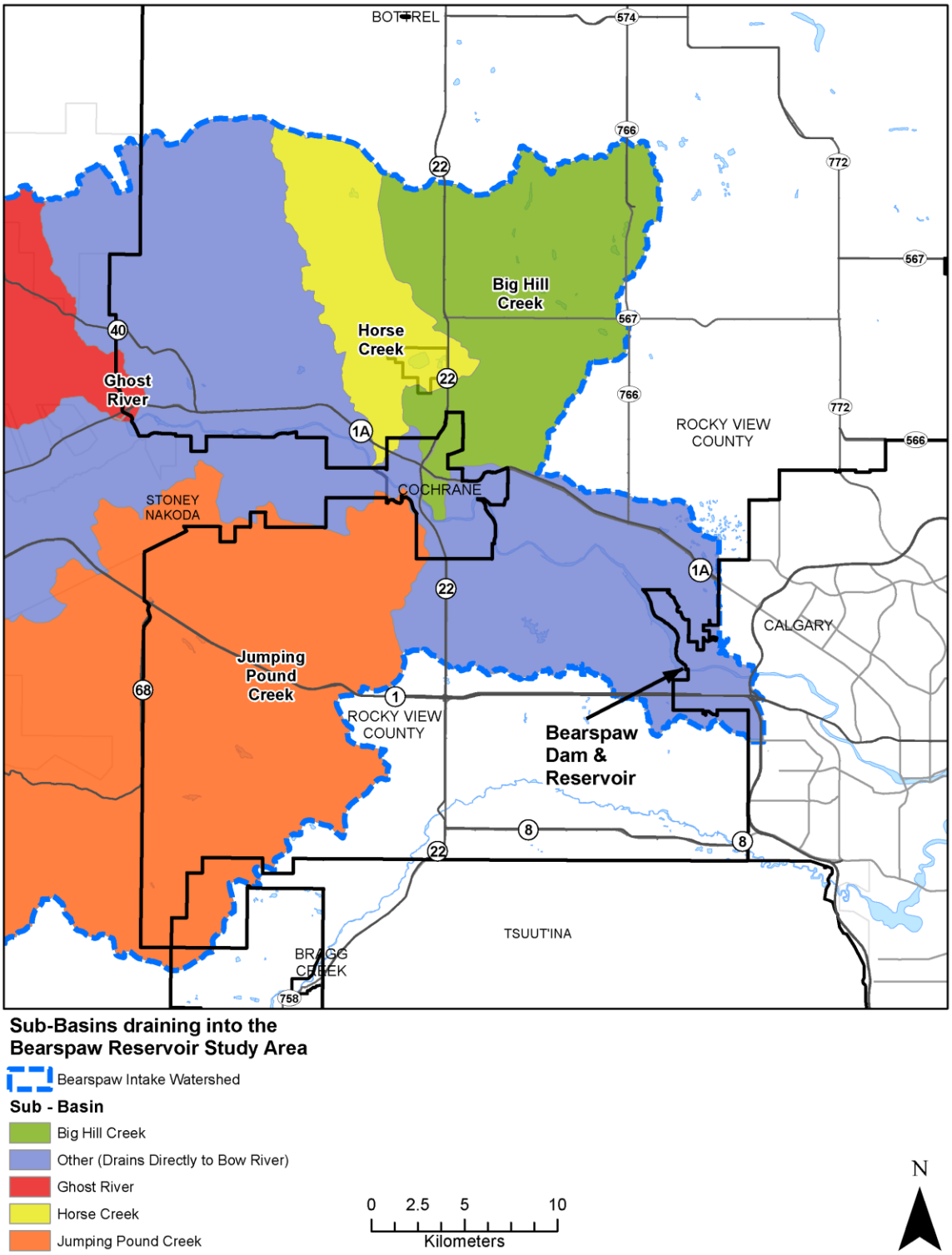

FIGURE 5. MAP OF UPSTREAM SUBWATERSHEDS THAT DRAIN INTO THE BEARSPAW RESERVOIR STUDY AREA

APPENDIX B – ADDITIONAL PLAN AND POLICY DETAILS

Key existing guiding policies and plans at the regional and municipal scales were reviewed and synthesized as part of the work of the Task Force. The table below provides additional summaries of all key relevant policies found within each of these.

Alberta *Water for Life* Strategy	Provides direction for water management in Alberta and underpins this work. The Strategy has three broad goals: • Safe, secure, drinking water • Healthy aquatic ecosystems • Reliable, quality water supplies for a sustainable economy
Active Alberta Policy	Albertans enjoy a high quality of life, improved health and wellness, strong communities, economic benefits and personal fulfillment, through recreation, active living and sport. Active Alberta will inspire Albertans to become more active every day, through sustainable, province-wide activities that generate awareness and motivate action through collaboration. Government of Alberta Policy Framework; Outcomes Identified • Active Albertans: More Albertans are more active, more often. • Active Communities: Alberta communities are more active, creative, safe and inclusive. • Active Outdoors: Albertans are connected to nature and able to explore the outdoors. • Active Engagement: Albertans are engaged in activity and in their communities. • Active Coordinated System: All partners involved in providing recreation, active living and sport opportunities to Albertans work together in a coordinated system. • Active Pursuit of Excellence: Albertans have opportunities to achieve athletic excellence.
Land Use Framework & South Saskatchewan Regional Plan (SSRP)	The SSRP was approved by the Government of Alberta in 2014. All municipalities must comply with the SSRP. The plan includes environmental management frameworks for surface water quality, and emphasizes the importance of source water protection planning and implementation (*Policy 4.7*), and collaboration with upstream stakeholders to identify and mitigate watershed risks (*Policy 4.8*). This plan also emphasizes the importance of enhancing quality of life of residents through increased opportunities for outdoor recreation by supporting current and future projects for the public to access recreational water bodies (*Policy 6.4*), and

	delivering education, awareness and compliance programs to promote and support responsible land use and shared stewardship (*Policy 6.5*).
Calgary Metropolitan Region Board (CMRB)	The mandate of the CMRB is to develop a Growth Plan and associated Servicing Plan by January 1, 2021. In order to facilitate continued development in the region, the CMRB adopted an Interim Growth Plan in late 2019. A principle in the interim plan directs members to "*Protect Water Quality and Promote Water Conservation*" by managing the risks to water quality, quantity, and drinking water sources in accordance with federal and provincial legislation and regulation. All statutory planning in the region must be consistent with the Growth Plan.
Bow River Basin Watershed Management Plan	The Bow River Basin Watershed Management Plan (2012) has developed the following key outcomes that are considered highly relevant for the Bearspaw Reservoir: **9.2 Water Quality –** *Maintain or enhance surface water quality for human consumption* **9.4 Land Use** – *Lands are managed with source water protection as a high priority* The Plan was developed by the Bow River Basin Council (BRBC), a multi-stakeholder charitable organization designated as a Watershed Planning and Advisory Council (WPAC) by the province. The BRBC maintains a forum to share perspectives, exchange information, prioritize issues, and develop plans, reports, and pilot projects.
Rocky View County / City of Calgary Intermunicipal Development Plan (IDP)	The IDP has a goal to "partner in studies to inform coordinated planning across the municipal boundary." Specific objectives direct both municipalities to manage "watersheds for water quality and quantity" and to "work collaboratively to mitigate negative impacts on watersheds" in the IDP Policy Area.
Town of Cochrane / Rocky View County Intermunicipal Development Plan	The IDP includes specific policies and objectives that address natural areas and water quality. These two policy areas have specific relevance to the governance and management of the Bearspaw Reservoir, as they characterize how the Town and County will may choose to move forward with collaborative governance and management. There is a focus on cooperation, and preservation of the natural areas for the benefit of residents. "**2.8 Water Quality** **2.8.1 OBJECTIVES** 1. To strive for a naturally clean water supply for agricultural and domestic use. 2. To pursue water quality which sustains a healthy ecosystem and

	provides high quality recreational opportunities. 3. To promote public awareness and educational programs that protect water quality and quantity and support water conservation. 4. To minimize the threat to public health and reduce economic loss in the event of a flood."
One Calgary 2019-2022 Service Plan	Released in 2018, includes a Council Directive on Integrated Watershed Management which states*: "Integrated watershed management is essential to protect public health and the environment….Accomplishing sustainable watershed management within Calgary and the region will require working collaboratively with other orders of government, adjacent municipalities, residents, landowners, developers, businesses, and First Nations."*
City of Calgary Municipal Development Plan (2009)	Multiple relevant policies on watershed management and ecological networks, including but not limited to: • 2.6.3b. Protect and integrate critical ecological areas such as wetlands, floodplains and riparian corridors into development areas. • 2.6.3c. Create watershed overlay maps to achieve water quality and quantity objectives and integrate the principles and policies of relevant watershed management plans into Local Area Plans. In addition, a policy on recreational access to water bodies to help make leisure and recreation activities available to all Calgarians states: • 2.3.4p. Ensure public access is maintained or improved to major water bodies, including the Bow and Elbow Rivers and Nose Creek, where appropriate access can be acquired and maintained across public lands or from public roads and pathways
City of Calgary Sport for Life Policy	The City of Calgary's **Sport for Life Policy** (CP 2018-03), Section 5.1.3 states that: *"The City will strive to enable the health, well-being and active lifestyles of all Calgarians when developing, amending, maintaining and reviewing municipal plans, policies, and bylaws*
City of Calgary Recreation Master Plan	Recreation encourages environmental responsibility. Outdoor recreation opportunities enhance our appreciation for the environment, increasing citizens' sense of responsibility for caring for the environment and for addressing community issues that threaten environmental stability.
Rocky View County Municipal Development Plan (County Plan)	County Plan Principles ***#2. The Environment*** Rocky View County will develop and operate in a manner that maintains or improves the quality of the environment... The County will:

	• Manage stormwater and wastewater systems in a manner that does not adversely impact surface or groundwater, while providing for a safe and reliable drinking water supply. • Undertake a wide range of measures to support the conservation of land, water, watersheds, energy, and other natural resources. • Maintain the rural landscape and character of dark skies, open vistas, and working agricultural lands. • Provide a variety of well-designed parks, open spaces, pathways, and trails that connect communities and accommodate residents' recreation and cultural needs. ***Environmental goals:*** • Providing for a safe, secure, and reliable drinking water supply. • Treating and managing stormwater and wastewater to protect surface water, riparian areas, and wetlands. • Managing private development and County operations in a way that maintains and improves the quality of the natural environment. • Encouraging partnerships and public education initiatives that contribute to environmental awareness and management.
Rocky View County's Parks and Pathways: Planning, Development and Operational Guidelines	Includes a "Blue Way" guideline outlining the potential of the Bow River for recreational paddling and angling, and the need to promote responsible use and conservation of the waterway within the County.
Glenbow Area Structure Plan	The Glenbow ASP uses land use and conservation design to provide the permanent protection of riparian and sensitive ecological lands while locating urban development in areas that are lower risk to the Bearspaw Reservoir. By locating development on the upper escarpment and adopting a multi-barrier treatment approach for stormwater, the plan supports source water protection through engineering design requirements as well as land use strategy and built form.
Bearspaw Area Structure Plan	The Bearspaw ASP's policy the County requires developers to include a Stormwater Management plan that includes a forecast of the quality of runoff water to the Bow River. This ASP is currently being reviewed and updated.
Springbank Central Area Structure Plan	The Springbank Central ASP recognizes that the creation of new or the expansion of existing intensive livestock operations shall be in accordance with any Provincial regulations and shall be sensitive to the proximity of residential uses, and any potential impacts on the City of Calgary and the Bow and Elbow River watersheds.

	The Bow and Elbow Rivers are significant watercourses throughout the Plan Area that provide natural beauty, a drinking water source, wildlife corridors, fisheries and open space. In the Bow and Elbow River Valleys Special Planning Areas, additional requirements in the preparation of a conceptual scheme include regard for the maintenance of drinking water quality and supply in the Bow and the Elbow rivers, and open space connections to the rivers. *This ASP is being updated (see below)*
Springbank Area Structure Plan {currently under development}	Draft ASP policies will be completed by early 2019, this includes further technical study of watershed management. The Vision and goals of the ASP prioritizes the watershed management of the natural environment in Springbank. The ASP's goals set out to provide potable water, waste water, and storm water infrastructure within the Plan in a safe, cost effective and fiscally sustainable manner. As well, to demonstrate sensitivity and respect for environmental features include the Bow and Elbow rivers, groundwater resource and drainage patterns within this area.
Rocky View County Springbank Master Drainage Plan	Source Water protection is identified as a constraint of storm water management. Key parts of the plan are focused on managing the amount of phosphorous that impacts the Bow River and Bearspaw Reservoir. It also identifies the Reservoir as critical infrastructure for stormwater drainage.
Bearspaw / Glenbow Master Drainage Plan	Requires a multiple barrier/treatment approach to enhance post development stormwater in Glenbow to address Source Water Protection, including Land Use location considerations (restricting high risk activities such as fuel stations, etc.), Oil/Grit Structures, Low Impact Development BMP's, Source Controls, Water Reuse, Wet Pond Detention Facilities, and proposes 2 "end of pipe" Regional Wetlands that will further enhance water quality prior to entering the Bearspaw Reservoir. The plan also requires comprehensive erosion and sediment controls that address post development stormwater flow velocities.
Rocky View County Riparian Land Conservation and Management Policy	Policy Statement 2: The County will investigate and, where appropriate, utilize source water protection strategies identified in provincial policies and laws to maintain source water quality and quantity for downstream users and the aquatic environment.
Haskayne Area Structure Plan	The City of Calgary's **Haskayne Area Structure Plan** is of note, as it includes the following statutory policies applying for an area that may eventually house 13,000 residents and 1,400 jobs: • 3.7.2. Provision of access for the public to the Bow River is encouraged. The City acknowledges that to achieve access to the Bow River for the public, safety, ownership and maintenance issues must be resolved.

	• 6.6.3. Proposed land uses with potential for source water contamination shall not be permitted in any areas with a surface or subsurface connection to The City's raw water supplies on the Bearspaw Reservoir and the Bow River, as identified in the Master Drainage Plan.
Haskayne Master Drainage Plan	Requires any stormwater discharges from developments in the area to occur downstream of The City's Bearspaw water treatment plant intakes, in order to protect source water
Calgary Open Space Plan	• Provide a continuous integrated river valley park system that reflects the city's unique prairie and foothills setting • Promote connected open space systems and the protection of natural areas and water quality in areas of future urban growth. • Provide a healthy, well-managed urban forest and ensure that road rights-of-way are designed to contribute to urban aesthetics, as well as to the air and water quality of the city.
City of Calgary *Source Water Protection Plan*	Finalized in 2018, this Plan includes a Vision, Goals, and key Actions for implementation nested under each goal. Of note, the first action specified under this Plan is to "*Develop and implement recreation management strategies and actions for the Bearspaw Reservoir.*" Separate actions related to land use planning in source watershed areas, stormwater management, partnerships with other agencies, and education were included in the Plan. The Plan can be accessed at calgary.ca here (http://www.calgary.ca/UEP/Water/Documents/Water-Documents/Source-Water-Protection-Plan.pdf).
City of Calgary *Glenmore Park Bylaw #9018*	In the 1930s, the first bylaw governing the Glenmore Reservoir excluded all public access and use to protect Calgary's drinking water supply. As The City grew around the reservoir throughout the 1950s, public pressure for access and use of the reservoir as an amenity increased. Illegal swimming and other activities began to be common occurrences. The current *Glenmore Park Bylaw #9018* - originally established in 1974 - allowed for the establishment and management of Glenmore Park, while also achieving the intent of not "*adversely impacting the supply of pure, wholesome and potable water to the residents of the City*" (Sec. 2. (2)). Key highlights of the bylaw include strict rules to manage recreation for source water protection, including: • Restrictions on any recreational access north of the Glenmore Trail Causeway (in the vicinity of the City's water intakes) (Sec. 13.2) • Severe restrictions on swimming or any other human contact with the reservoir (Sec. 16). "*No person shall enter the waters of the Glenmore Reservoir for any purpose whatsoever.*" • Boating restrictions (Section 11) ○ Restrictions on motorboating (Sec. 11.1)

	○ Restrictions on sailboats with pump-out sanitary systems (Sec. 11.3) • Restrictions on animals inside boats (Sec. 13.3) The bylaw also includes sections dedicated to public safety for boating and stipulates enforcement authorities and fines. A 1984 amendment to the *Glenmore Park Bylaw* addressed stormwater risks as follows: "*No drain connected to any structure erected in Glenmore Park shall drain into Glenmore Reservoir or to any water lying West of the dam at the East end of Glenmore Reservoir."* (Sec. 17)
City of Calgary Water Safety Bylaw # 9084	Calgary's *Water Safety Bylaw #9084* - originally established in 1974 - requires life jacket / personal flotation device use by anyone boating within city limits.
City of Calgary Riparian Action Program	The City of Calgary's Riparian Action Program (RAP) sets out a systems approach to program design and implementation, to help maintain and restore riparian "green infrastructure" in our urban watersheds and their related services and values, which includes source water protection values for all downstream users. The RAP is focused on three program areas and related outcomes: **Land Use Planning:** Further loss of riparian areas is minimized **Riparian Health & Restoration:** City-wide riparian health is improved **Education & Outreach:** Stakeholders and citizens value riparian areas An overview/summary website of the RAP is available here: http://www.calgary.ca/UEP/Water/Pages/Watersheds-and-rivers/Riparian-areas.aspx The full RAP report .pdf can be accessed here: http://www.calgary.ca/UEP/Water/Documents/Water-Documents/Riparian-Action-Program-Report.pdf
City of Calgary Environmental Reserve Setback Guidelines	Provides guidance to administration for determining setbacks from water bodies, to be dedicated as Environmental Reserve at subdivision in accordance with the *Municipal Government Act.* The current guidelines (UE 2007 -15 Environmental Reserve Setbacks – Att2) include variable setbacks based on stream order, wetland class, slope, cover type, and hydraulic connectivity.
City of Calgary River Access Strategy	Created in response to a Notice of Motion (NM2016-20), the purpose of this strategy was to allow for better access to river sport and recreation, while protecting riparian habitats and increasing appreciation of our river environments, without compromising water management and environmental objectives.

	The Bearspaw Dam and Reservoir was out of scope for this strategy, but the process used for identifying the best sites for public access with consideration for water management, environmental protection and public safety.

APPENDIX C – ADDITIONAL DETAILS ON CURRENT RIVER AND RESERVOIR ACCESS

The main public access route to the Bearspaw Reservoir is currently via canoe or other boats launched from underneath the Highway 22 bridge in Cochrane, about 18 km upstream from the north end of the Bearspaw Reservoir. A second river access point is located in Cochrane at the River Avenue bridge about 16 km upstream from Bearspaw.

Several formal or informal private access points to the Reservoir or river also currently exist. The most notable of these is the private access point on the south side of the reservoir in Emerald Bay, where a road, boat launch, and dock is located.

Desktop assessments (not physically verified through comprehensive site visits) based on high resolution air photo review conducted by The City of Calgary identified strong evidence of multiple additional trail access points, as well as hand launches or boat launches that are **not** sanctioned by either The City of Calgary, Rocky View County, or TransAlta.

There is also a relatively well-used foot path accessing the Reservoir through Bearspaw Legacy Park, on the south end of the Reservoir approximately halfway through the area. Informal and unmanaged uses are occurring at the shoreline at this location. Campfires are banned in this area and signage is present indicating this fire ban, although enforcement has been a challenge in the area.

With respect to public access to the immediate vicinity of the Bearspaw Dam site, foot access is constrained by the railway and hydroelectric facilities. In 2008, a chain link barbed wire fence to restrict public access to the CP rail line and Reservoir in the vicinity of the Bearspaw Dam was erected. This was in response to a number of near-miss safety incidents involving CP Rail trains and the public. Despite this, some people still illegally access this area, as shown by remains from campfire pits.

With respect to access to the dam site from the water, there are virtually no controls restricting river and Reservoir user access to the dam, spillway, and The City's primary water intake in the dam. An existing portage route allows for safe passage of river users through the dam site.

The City of Calgary Parks is currently developing access and visitor facilities in the 145 ha Haskayne Legacy Park on the north side of the Bearspaw Reservoir. Park developments will be concentrated north of the railway tracks and access to the Bearspaw Reservoir shoreline for the time being will remain limited. However, there are plans to develop a pedestrian underpass crossing the CP Rail line and to eventually create a shoreline access point including a "Riverside Recreation Area" with terraced seating and picnic spaces with panoramic views, and non-motorized boating access to allow park users to interact with the Bow River / Bearspaw

Reservoir. Agreements with CP Rail and TransAlta would be needed, and timing for this remains uncertain. However, it is generally assumed that the eventual opening of the planned waterfront access will accelerate use of and access to the Reservoir and stimulate demand for a wide variety of activities. All agencies and parties will need to be ready for this well in advance of increased usage.