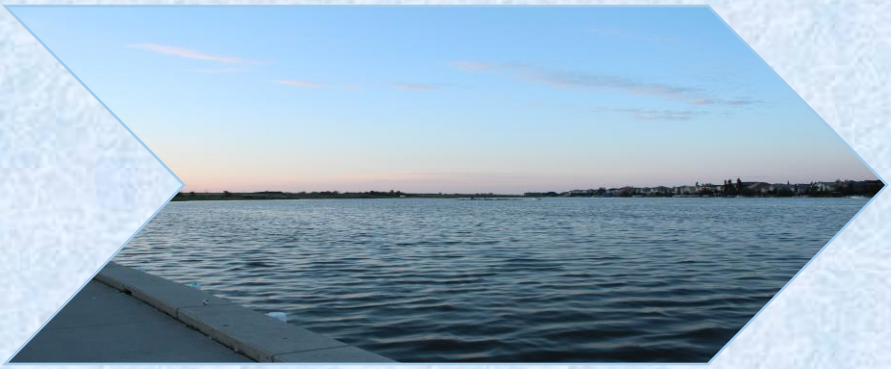
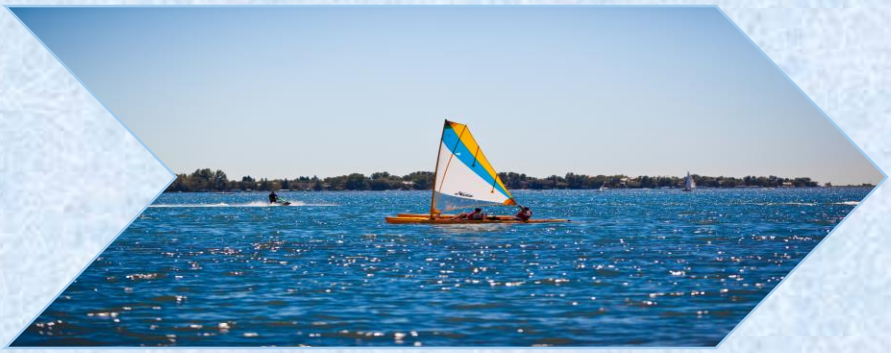
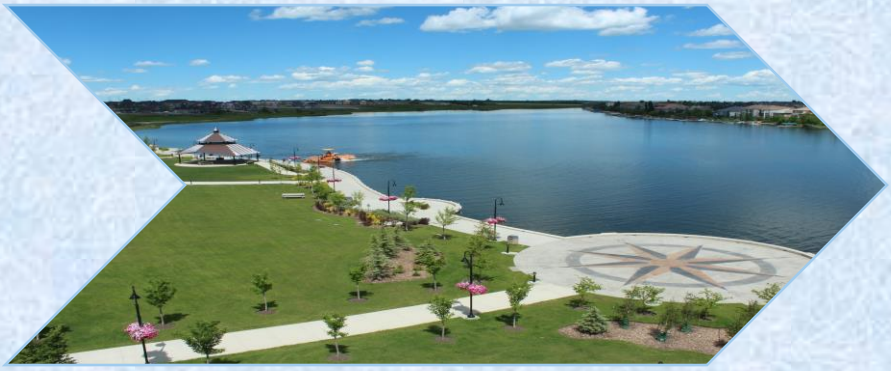


Draft
Chestermere Lake
Recreation Safety Plan





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INTRODUCTION

Lake Recreation Safety Plan

Chestermere Lake offers a great escape from everyday life and a lifestyle that promotes a playful or restful mindset depending on the season or time of day. No one wants that escape to include excessive traffic congestion on the lake, collisions, excess noise, or disrespectful or careless behavior.

As an urban 'water-based recreational landscape' of regional significance due to its proximity to the City Calgary (population of 1.26 million), Chestermere Lake has played an important historical role in the development of the City. As such, the City of Chestermere recognises the importance of balancing the availability of responsible lake recreational opportunities and the protection of the water and natural areas and habitat surrounding the lake.

Council's priority, as per the 2018 - 2022 Strategic Plan, is to protect Chestermere Lake as a significant recreational asset. More specifically, the desired outcomes are: *to be prudent in managing the lake with an eye to future sustainability, maintain the recreation potential of the lake by minimizing weed infestations, and ensure that appropriate policies are in place with respect to the recreation management and public safety on the lake.*

Further to this direction, on October 15, 2018, Council directed Administration to conduct the necessary public engagement, and prepare a recreation plan that addressed the safety issues and compatible uses for adoption and implementation for Chestermere Lake.

Purpose: "We will effectively manage access and recreation lake use opportunities, while protecting the lake's natural resources."

What Does a Lake Recreation Safety Plan Do?

The development of a Lake Recreation Safety Plan is the first step to guide decision-making, planning and policy making in the future with the goal of ensuring that public safety on the lake is well managed. This plan will include the following components:

1. Defined the desired future vision and conditions regarding recreation safety on the lake.
2. Encourages collaboration between concerned citizens, boaters, lakefront owners, local, provincial and federal governments,and special interest groups.
3. Identifies concerns that people believe are important to address.
4. Summarizes information on the recreation, accessibility and public safety issues of the lake and the adjacent access points.
5. Clarifies jurisdictional authorities and issues in order to set the foundation to establish policies, bylaws and procedures to best manage the use of the lake and the associated risks.
6. Defines next steps and makes recommendations on priorities and possible actions.

Desired Outcomes:

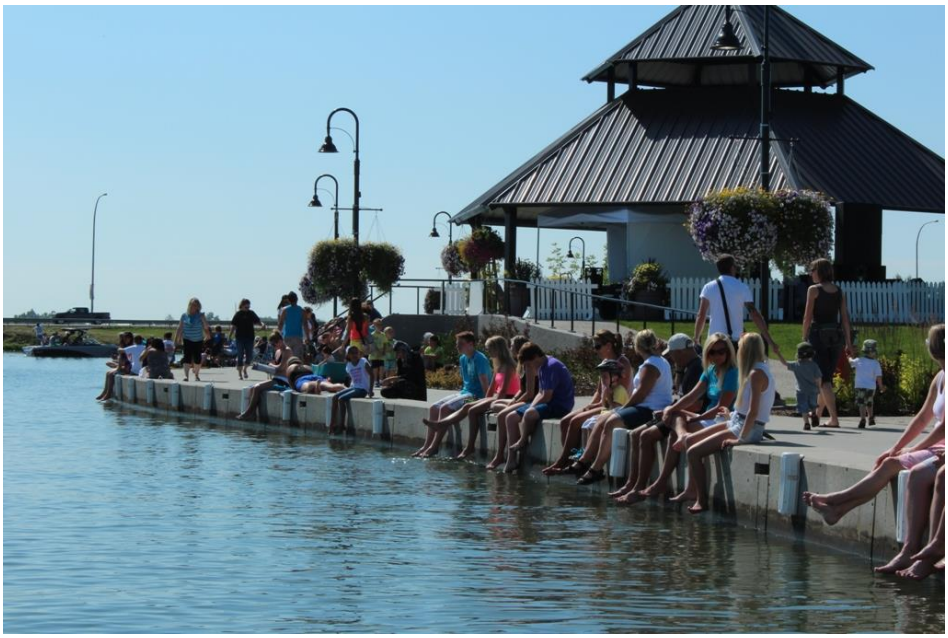
1. Facilitate safe and accessible recreation opportunities while minimizing risk to people and property.
2. Meet financial and legal responsibilities regarding lake recreation management.
3. Encourage and support the development of a community that will work together to respect and balance the various recreational, environmental and irrigation interests of the lake.
4. Manage recreation to minimize risks to the water and lake ecosystem.
5. Develop a multi-year progressive and evidence-based approach towards the achievement of excellence in lake safety standards.

NOTE: This Plan will not attempt to incorporate a number of nuisance factors that are important to the quality of the recreation experience on the lake, yet not specifically linked to safety issues on the lake.

Broader Context of Lake Research Within Our Watershed

It should be noted that a Lake Recreation Safety Plan is the first step of a broader Lake Strategy that will also result in the development of a Lake and Watershed Plan. Additional work in years to come will focus on environmental stewardship activities related to improving the health and resiliency of Chestermere's watershed. The City recently established the Lake and Watershed Advisory Committee which will provide guidance and support to this important work, in partnership with other regional partners and provincial organizations such as the Alberta Lake Management Society.

Definition of a Watershed: A watershed is a body of land where water from rain or snow melt drains downhill into a body of water such as a stream, wetland, river, lake, or reservoir. Therefore, dealing with land-use issues is a prerequisite to the success of a watershed management plan. *Source: Guide to Watershed Management Planning in Alberta*



BACKGROUND

Recreation Activity on Chestermere Lake

Recreation activity occurs on private land (close to 400 lakefront households), on commercial property (Chestermere Landing), through non-profit organizations (Calgary Yacht Club and Camp Chestermere), in municipally-owned parks, on shoreline owned by the Western Irrigation District and on the lake itself. The City also operates a public boat launch and hosts a summer water event (Waterfest) on the north end of the lake. More recently, commercial and non-profit operators have requested to host new recreational events or operations on the lake.

Similar to other Canadian lakes which are located closed to urban centers, a dozen activities define summertime life on, in and by the water. These leisure activities range from higher impact sports such as; wakesurfing, tubing, personal watercraft usage, waterskiing and wakeboarding, to historical activities such as relaxing on the dock, swimming, fishing, rowing, sailing and cruising with friends. More recently, lakefront beach activities and walking around the northwest end of the lake has dramatically increased due to recent park improvements.

Residents and visitors also enjoy the lake during the winter months, engaging in motorized activities such as snowmobiling, on-snow motorcycling and the use of all-terrain vehicles. More passive activities such as snowshoeing, skating, rink-building, ice fishing and dog walking are also popular.

The rapid development of the City and region has resulted in an increased diversity of usage, with the addition of larger and more powerful boats. A recent boom in kayaking and paddle boarding is also evident on the lake. This range from high speed or wake-producing boats to slow moving human-powered boats has resulted in a new challenge of how to share the space. Chestermere Lake has a limited water surface area and it has become increasingly clear that more work needs to be done to better manage both the space and the activities that are happening on the lake in order to facilitate and maintain a safe and enjoyable recreation experience for everyone.

As stated in the Michalski Nielsen Safety Report, 2019 (Appendix A),

> ” It is very easy to see why there are growing concerns about recreational safety and enjoyment of Chestermere Lake. In this regard, there is a high density of homes with direct shoreline access to the lake, as well as abundant backshore development with public access. Further, the lake’s proximity to Calgary, together with it having public access opportunities, results in there being a large group of weekend/summer visitors. The Marina (*Boat Launch*) and commercial operator renting personal watercraft and non-motorized watercraft contribute to traffic on the lake. In combination with the relatively narrow nature of the lake, and often shallow nearshore conditions, these circumstances result in a substantial potential for conflicts between user groups, including a very real potential for boating accidents and incidents.”

There are distinct stakeholders and recreation user groups who have a range of viewpoints about the current state of safety on the lake; however most would agree that stresses often develop on busy weekends; and that safety drives the overall quality of experience. A focus on safety will ultimately improve the public perception of the value of our treasured resource, and will progressively improve the culture and standard of what is considered to be acceptable behaviour on the lake.

Guiding Principles in the Planning and Decision-Making Process

The development of a Recreation Safety Plan for Chestermere Lake required a strong public engagement process due the distinctive jurisdictional constraints as a federal water body, the diverse group of stakeholders who use the lake and their often divergent opinions on how the lake should be managed. Knowing this, it was imperative that the City follow an effective public engagement, data collection and analysis approach in order to reach defendable solutions. An excerpt from "A Guide for Multiple Use Waterway Management (2004)" articulated this notion best when it said:

> "Work to establish and sustain the legitimacy of your organization, project, processes, responsiveness and effectiveness. How the process is conducted, who's involved, and its overall credibility end up being as critical as the decisions that are made."

Recommended Principles to Follow to Ensure Credibility and Efficiency	
1.	For a plan to be relevant and accepted, the stakeholders should be involved in decisions about the vision and strategies for management. Bring people to the table early, be honest and allow them to reveal their different, perhaps disconnected or conflicting agendas.
2.	Take the time to sort through and define your problems before you start to look at alternatives (e.g. separate the problems from the behaviours causing the problems; in some cases, users simply don't know what is expected versus deliberately wanting to create a problem).
3.	Pay attention to the layers of jurisdictions governing the lake and shorelines, and the complex regulatory frameworks that will likely affect your plans.
4.	Learn to collect and use data and information appropriately. Become well informed about what's happening on the lake and how decisions may have unintentional impacts on the recreational experience.
5.	State the desired future outcomes as clearly as possible to all stakeholders, and develop solutions with a full sense of the trade-offs that might be associated with achieving them.

Source: A Guide for Multiple Use Waterway Management" (National Water Safety Congress, Inc. and National Association of State Boating Law Administrators, 2004).

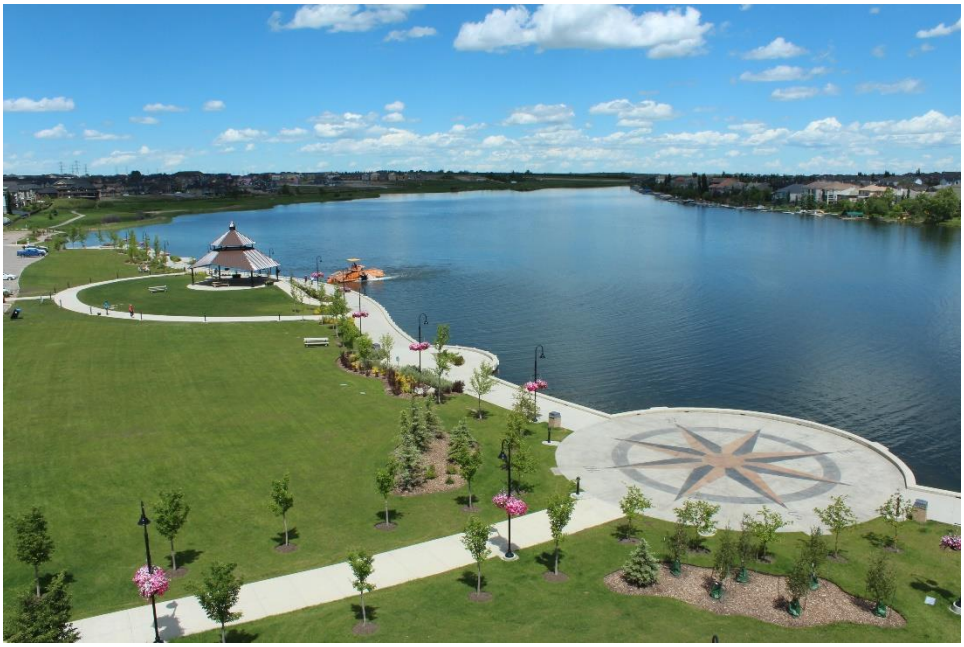
JURISDICTIONAL AND OWNERSHIP CONSIDERATIONS

City of Chestermere User Agreement with Western Irrigation District (WID)

As an irrigation reservoir, Chestermere Lake is owned by the WID. The City and WID entered into a User Agreement on Sept 1, 2005 and portions of the User Agreement were later amended (Dec 18, 2008). This User Agreement grants the public and City residents' access and use of the lake for recreational and aesthetic purposes. Recent events over the past few years have given the City reason to seek clarification and direction on its scope of responsibility and liability exposure related to managing the recreational use of the lake.

Chestermere Lake is used for downstream irrigation purposes; however, this function has been diminished due to the fact that WID has committed to maintaining prescribed lake levels for recreational purposes. The City annually compensates WID for this constraint placed on their irrigation system. The Irrigation Districts Act defines Chestermere Lake as an "irrigation works" which means that the lake is not to be considered the same as a natural or manmade water body; however, with respect to boating activity, the lake is considered to be a part of the Canadian waterway system and is subject to the federal vessel regulations.

The intent of the Agreement is that if the City wants the lake to be a public resource, then it is to assume the responsibility for control and management including ensuring the safety of all those using the public resource. The provisions provide a license grant by WID and the City to residents and property owners adjoining the lake to cross the municipally-owned and WID-owned lands in order to access the lake for non-commercial recreational purposes. The one exception relates to the property owners adjoining the lake whose land is designated under the City's Land Use Bylaw as Local Commercial District (C) (Chestermere Landing) or Special Recreation District (SPR) (Calgary Yacht Club). In these situations, commercial or community activity may be acceptable according to the User Agreement. These properties are also subject to all municipal bylaws and policies.



The Impact of Federal and Provincial Regulations on the City's Role in Managing the Lake

Municipal Role

Geographically, Chestermere Lake falls within the City's jurisdictional boundaries, whereby Council may pass bylaws for municipal purposes to address matters pertaining to the safety, health and welfare of people, and the protection of people and property that is open to the public. In the case of recreation lake management, this authority applies to the shoreline surrounding the lake (e.g. management of access, commercial activity, land use and boat launch) as well as the management of the ice/snow surface and all recreation activity that happens on the lake during the winter.

Shoreline Easements

Other than the shoreline owned by the City of Chestermere or WID, lakefront homeowners own approximately 15 meters of lake bed in front of their property on which they erect dock systems. These easements, which are governed under the Land Titles Act (Alberta), grant the owner of each lot a right of access, and are independent of the City's agreement with WID. Therefore, it is the responsibility of each owner to comply with those terms from their respective lands. These easements are also subject to all municipal bylaws and policies.

Provincial Collaboration on Environmental Issues

Several pieces of legislation regulate the environmental management of water bodies in Alberta which may create additional obligations for the City, where it assumes control and management over public access and use of the Lake.

Federal Vessel Regulations

Navigation of vessels on Canadian water ways are managed by Transport Canada under the Canada Shipping Act (CSA 2001). With respect to the local management of boating activity on the lake, the RCMP and the City's Community Peace Officers follow these federal regulations. In particular, they administer Section 1007 of *the Small Vessel Regulations – Prohibitions Against Careless Operation:* which states that "No person shall operate a vessel in a careless manner, without due care and attention or without reasonable consideration for other persons."

The federal government does not allow municipalities to establish bylaws which replicate or infringe on federal jurisdiction. A key principle under these regulations is the requirement to allow for fair and equitable access to all lake users, regardless of the type of boating activity or residency of the owner or operator. The education and enforcement of the existing regulations is particularly relevant to ensuring boating safety on the lake. It should be noted that the type of vessel is rarely the cause of safety issues – rather it is the operator's behaviour on that vessel which is usually the problem. Most, if not all of the identified problems can effectively be managed or eliminated through public education and a regular enforcement officer presence on the lake. Transport Canada, through their Office of Boating Safety, will work with the City and its enforcement officers to provide the support needed for effective public education and enforcement.

Vessel Operation Restriction Regulations (VORR)

In certain situations, a municipality may apply for a Vessel Operation Restriction Regulation (VORR) in order to impose additional restrictions on Chestermere Lake. It usually takes 2-3 years to complete all of the VORR application requirements. Once the requirements are met and Transport Canada supports the application, the federal government can amend the regulation - but that only happens once a year and all complete applications must be submitted to the federal government through Transport Canada before September of any given year.

In the past, Chestermere was successful in applying for, and imposing a boating speed restriction of 12 km/hour on the north end of the lake. In addition to this restriction, the City was also successful in getting the federal designation of “enforcement officers” for the City’s Bylaw Officers and Community Peace Officers (Level 1) under the Vessel Operation Restriction Regulations (Section 16 Enforcement, Sections 2-15) in order to enforce the VORR on the lake.

In some situations, VORR’s may help to improve safety on the lake. Restrictions may include:

- Prohibiting all boats on the lake (*or in certain areas)*;
- Limiting engine power or type of propulsion;
- Imposing speed limits;
- Restricting towing activities to specific times or days of the week, or prohibiting towing activities completely in specific areas or the entire lake; and/or
- Prohibiting sporting, recreational or public events or activities on the lake unless the organizer applies for a permit through Transport Canada.

It should be noted that VORR’s are used as the last resort for solving problems and the federal government requires that all stakeholders first work together to find and test alternative solutions which are often more timely, effective and affordable options. These solutions can often be implemented using non-regulatory (voluntary) measures. VORR’s require that extensive public engagement be completed, and clear evidence of the problem and attempted solutions must be documented. An evaluation protocol must be in place, and a cost-benefit analysis and impact needs assessment must also be provided.

In summary, the City of Chestermere is considered the Local Authority (under the VORR) and is able to work with Transport Canada to keep Canadians and vessels safe on Canadian water ways. The goal of this partnership is to balance people’s rights to navigate their vessels on Canadian waterways while maintaining the safety of persons, vessels, and the environment. Below are the seven distinct VORR categories which could be applied to water bodies:

	VORR Category
1.	Waters on which all vessels are prohibited
2.	Waters on which power-driven vessels driven by electrical propulsion are prohibited
3.	Waters on which power-driven vessels are prohibited (vessels propelled by an internal combustion engine or steam engine)
4.	Waters in public parks and controlled access bodies of water on which power-driven vessels and vessels driven by electrical propulsion are subject to an engine power limit
5.	Waters on which power-driven vessels and vessels driven by electrical propulsion are subject to a speed limit (standardized, e.g. 5,10,15, 20 km/h)
6.	Waters in which towing a person on any sporting or recreational equipment, or allowing a person to wake surf, is prohibited except during the permitted hours
7.	Waters in which a sporting, recreational or public event or activity is prohibited

Implications of Federal Regulations on Local Lake Recreation Safety Management

The fact that Chestermere Lake is subject to the federal vessel regulations requires that the City of Chestermere fully understands its options and limitations to managing recreation safety on the water. Although some safety solutions, at first glance, seem to be logical and appropriate, they may not be consistent with federal laws. Key learning's gained from this study through research and the advice of expert opinions includes the following:

1. Attempt Non-Regulatory Approaches First

   There is a need to trial non-regulatory lake management practices to the fullest extent possible before considering a VORR application. Without a VORR in place, prohibiting certain types of boats or restricting certain types of boating activities at peak periods (e.g. towing) cannot be enforced. However, many options can be considered using a voluntary approach and in collaboration with the affected stakeholders.

2. Enforce Existing Regulations

   The existing federal vessel regulations on careless and unsafe operation of a vessel provide for ample regulatory measures for enforcement officers to apply when education fails to make the needed changes to operator behaviour. The federal government does not consider crowding as a safety issue. Rather, it is the behaviour of the operators in crowded conditions which cause the safety problems. This means that when the lake is crowded there is more responsibility placed on boaters to lower their speed and modify their activity. However, what might be considered safe boating on a quiet day is not safe when the lake is crowded, and enforcement officers have the ability to warn boaters of the hazards present during crowded conditions and direct boaters to limit or stop their activity (e.g. no towing) due to the incompatibility of uses in a crowded area. When boaters fail to follow the lawful direction of enforcement officers the operator and/or vessel can be directed off the lake and/or charges can be laid against the operator.

3. Access Restrictions Must be Fair to All Uses

   As a public waterway, any proposed access restrictions to address crowding issues need to be equitable to all lake users, and cannot directly or indirectly give preference to lakefront homeowners or Chestermere residents over visitors. This means that any non-regulatory approaches that are tested prior to a VORR application should be consistent with this principle; otherwise a corresponding VORR application will be declined.

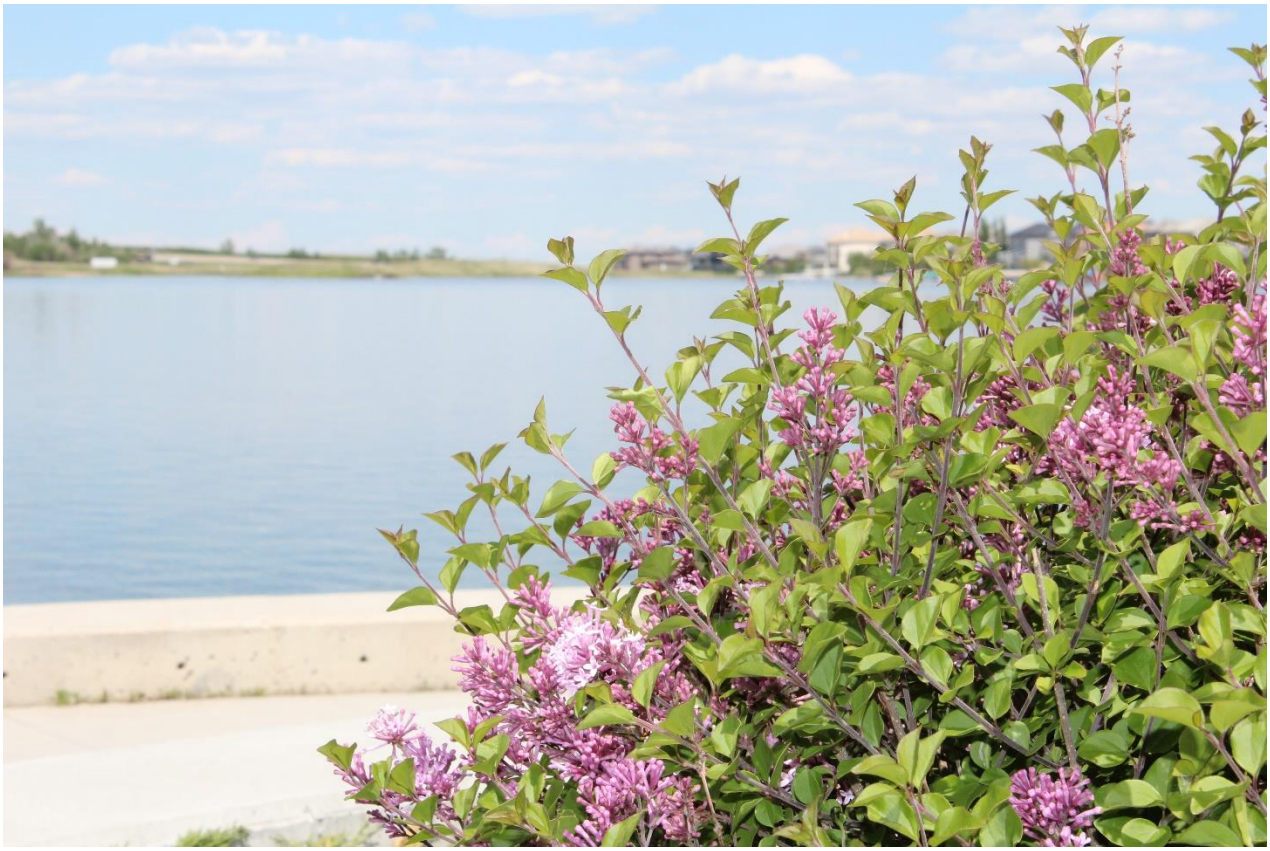
4. Events

   The City has the right to regulate events that happen on the shoreline surrounding the lake through its bylaws. Alternatively, on-water events that involve vessels or that will affect the navigation of vessels can be regulated through the application of a VORR. Each individual event requires a separate VORR application. *This is one situation where a VORR is easily obtained.* If a VORR is in place, all water-based sporting and recreation events must be approved and have a permit issued by Transport Canada. VORR-approved events enable the event operator to limit public access to the area on the lake in which they are running their activities.

5. Commercial Activity

   Although commercial activity on the lake (e.g. boat rentals and marina) is regulated through the municipality, consideration must be given to ensuring that local business operation restrictions do not unintentionally give favour to outside commercial operators. It is not possible to use the VORR, the CSA 2001, or any regulations created under it, to restrict or limit rented or borrowed vessels in any way that would not also equally apply to the same type of owner-operated vessel.

6. Transport Canada will not support any solutions, whether regulatory or non-regulatory, or any enforcement action using existing legislation, if it is used directly or indirectly to discriminate between vessels on any Canadian water way based on the vessel's owner or operator's place of residence, or the proximately of their residence to the water way.



The following Linden Lake scenario, described in the Transport Canada's Local Authorities' Guide (Vessel Operator Restriction Regulations), will help Council to understand a typical VORR process.

LINDEN LAKE SCENARIO

Linden Lake is approximately 1.5 kilometres long and a maximum of one kilometre wide, and its eastern half is nearly 600 metres at its widest point. It is surrounded by private property, except for a portion of the western shore that is part of a public park and a public boat launch at the end of Linden Lake Road, adjacent to the park.

The population in the area has grown in recent years, resulting in an increase in swimming, canoeing, kayaking, fishing, waterskiing and wakeboarding. Many long-term residents around the lake expressed their concern and unhappiness with the increased use of the lake, particularly by power boaters "hot-dogging", wake jumping, and buzzing close to other vessels and their docks. Their concerns ranged from potential damage to docks from wakes, to fears of wakes overturning smaller non-powered craft, and even the disturbance of what was once a quiet restful place to live being affected by noise some residents described as "chaos on the water".

During a Property Owners Association meeting, members decided to approach the municipality to limit the number of powerboats to those owned by property owners or to ban them from the lake completely. The municipality informed the property owners the responsibility for waterways rested with the federal government, but agreed to help them given the number of safety concerns raised by residents.
The municipality contacted the regional Transport Canada office and expressed the concerns of the members of the Property Owners Association about the activities on Linden Lake and requested a restriction or ban on powerboat use. The regional Transport Canada office gave the municipality representative background information on how the process works and told him/her that there may be non-regulatory options or other regulations already in place to improve the situation on Linden Lake.
The municipality said that the members of the association had taken a vote and 98% of the property owners felt that a restriction was the best way to address their concerns. The regional Transport Canada office advised that before they could help them resolve their concerns, the municipality—as the leader of the entire process—had to conduct proper consultation and an evaluation of the waterway concerns. Proper consultation and an opportunity to become involved in the process must include all users or those with an interest in the waterway and cannot be limited to one specific group.
After reading the Local Authorities' Guide (LAG) and doing some research, the municipality contacted stakeholders and followed the process in the LAG.
The first step was to identify as many waterway users as possible and examine ways of contacting them. During the peak period of use for Linden Lake, information signs were posted at the boat launch, notices on the park bulletin board, police station, city hall, and a few businesses serving waterway users. An ad was even placed in the local paper. The signs and notices explained that the Property Owners Association had concerns about safety and the present use of Linden Lake, and that it was seeking a vessel restriction or some other resolution and anyone wishing to comment should contact the local municipality.

Within the first month there appeared to be quite a split in opinion. Some people agreed that there were problems while others felt that since there were no accidents or injuries, there was no problem. After discussing the issue further with the regional Transport Canada office and receiving clarification about how it could help resolve some of the issues, the municipality decided to hold a meeting to clarify the problems, and find some possible common ground or understanding. In the interest of fairness, they appointed a person with no strong feelings one way or the other as chair of the meeting. The municipality sent out notices of the meeting and representatives from both groups were in attendance.

Despite some individual opposing views, both groups agreed that wakes from some vessels could cause problems for small craft, and high speed near shore around the swimming areas and possibly the docks along the shoreline was not safe. They also discovered that the noise concerns were mainly from music on board a couple of unidentified vessels during one or two parties that were so loud shoreline residents couldn't sleep. What was not easy to identify was:

- What efforts had the community already made to try and improve the situation other than some members seeking a ban or restriction?
- What could they do next?

This is the point where they identified and explored options. Everyone knew that a vessel restriction was an option but not one they could consider as the only solution at this time. They explored several options.

- Adopt a voluntary code of conduct among the power boaters who lived in the area where they would not travel at high speed near shore, or cause large wakes around the docks or smaller vessels. Although people agreed that this might work for most local users, it may not help in the case of transient vessels coming from other areas for a day then leaving.

- Advertise existing regulations to increase safety and cooperation among users. - Under the Vessel Operation Restriction Regulations, all waterways in their province were subject to a 10 km/h speed limit within 30 metres from shore. - There was also a regulation against careless operation under the Small Vessel Regulations. Careless operation may include, but is not limited to, weaving through other vessels at high speed, jumping waves or wakes, operating an engine at peak RPM causing excessive noise, operating a vessel in circular or criss-cross patterns for extended periods of time in the same location, or causing an excessive wake.

- Although engine noise (muffler requirements) is a federal responsibility, consider regulating excessive noise from music on board vessels by a local by-law if necessary.

- Set times of day when wake boarders and water-skiers would use the largest part of the lake in a counter-clock wise direction. This would be advertised by a sign at the boat launch and be self-policed.

At the end of the meeting, most people were willing to try these options to see if they resolved most concerns.

CURRENT MUNICIPAL BYLAWS AND POLICIES WHICH AFFECT RECREATIONAL USE OF THE LAKE

The following City of Chestermere municipal bylaws and policies have an impact on the management of recreation safety on the lake or the quality of the recreation experience. These will need to be taken into consideration when developing a future policy framework or modifying existing City bylaws.

Bylaw Name	Reference	Relevant Element
Off-Highway Vehicles	Bylaw 2003-203/1	• Hours of operation of off-highway vehicles between 0800 and 2200. • Only allows loading/unloading off-highway winter vehicles in John Peake parking lot during permitted hours.
Boat Launch	Bylaw 009-11; 007-15; 018-15	• Property owners/tenants of the City of Chestermere must register their watercraft to use the Boat Launch; a decal will be issued. • No more than 2 boats and 2 personalized watercrafts may be registered at the civic address. • Boat launch decals must be visible to the launch attendant. • No stopping on the boat launch is allowed other than to launch or retrieve a boat. • No swimming/playing around boat launch in the area/ramp.
Community Standards	Bylaw 004-12	• Standards relate to appropriate and respectful citizen behaviour, including noise infractions, polluting, etc.
Business License	Bylaw 027-16	• This bylaw references a required compliance with the WID Agreement and City policies and bylaws with respect to businesses operating on the lake.
Easement and Restrictive Covenant	Land Titles	• Stipulates restrictions placed on lakefront property owners on use of the easements. These are subject to municipal bylaws and policies.
Policies and Agreements		• Prohibit Sale of Food and Beverages at Public Parks (101) • Park and Pavilion Bookings (102) • Boat Launch (502) • Service Fee Schedule (643) • Event Sponsorship (604) • Health and Safety (642) • Use of Works (WID)

PUBLIC ENGAGEMENT PROCESS

Why Engage on Recreation Lake Safety?

According to recent research related to resource management planning in Southern Alberta, recreation resource management is a highly complex and interpersonal challenge. Varied forms of broad and on-going public engagement are required to more clearly understand the "diverse attitudes and perceptions" of users, and thus design policies and programs that will align with their interests and ultimately be accepted and successful.

Chestermere Lake is a public navigable waterway, which means that equitable access for all users and activities is required by Federal law. Understanding the shared values and interests held by all of Chestermere Lake's users, therefore, is essential both for lawful compliance and for achieving successful and sustainable behaviour change and safety outcomes.

Overview of Public Engagement Process

The study was supported by a phased engagement process, which explored lake safety from a variety of perspectives, to arrive at a number of stakeholder-generated recommendations. Delivered from December 2018 to early February 2019, the process drew on several complimentary engagement methods which ultimately led to a comprehensive, context-specific view of safety concerns and opportunities on Chestermere Lake.

- The first phase of engagement was designed to identify the lake user types and the safety issues that affect them, using three different approaches. These included: use of an online questionnaire and forum, completion of subject matter expert interviews and hosting open house events.

- The second engagement phase - designed to build off of the issues surfaced in phase one - explored the most commonly cited lake safety issues in greater detail through a series of user experience and organizational interviews, which sought to understand how these general issues uniquely affect the experiences of specific lake users.

- The third and final engagement phase then used the foundation of these combined safety issues and concerns to bring different users together and prompt the development of potential solutions using a public workshop format.

Phase One: Identify the Issues

In phase one of the engagement process, Chestermere residents and key lake user groups were invited to complete the online questionnaire, attend an online forum, or provide feedback at a series of open houses hosted by City staff.

The questionnaire, deployed online through the month of December 2018, collected quantitative data from 82 Chestermere residents related to lake use (modes and patterns), user behaviour, and perceptions of safety. The open houses provided a venue for the public to express their feedback and experience, and provided the City with a wealth of information on general lake safety issues, user experience, and perceptions of safety while recreating on Chestermere Lake in both summer and winter seasons. Held on December 10 and 12, 2018 at Camp Chestermere and the Chestermere Regional Community Association, respectively, the open houses were attended by a total of 74 interested

stakeholders. Finally, the online forum offered a social media version of the open house questions to provide people who couldn't attend a chance to give deeper feedback.

Results

Through feedback collected in this phase, the project team was able to define the areas of greatest concern affecting safety on Chestermere Lake. These areas are: high traffic, speed, conflicting activities and uses, and a lack of boating etiquette leading to poor behaviour outcomes. Though the phase was focused specifically on identifying lake safety issues, some participants also provided recommendations to improve safety on Chestermere Lake, including increasing enforcement on the lake, designating lake areas for specific activities, and introducing public education campaigns. Despite raising these safety concerns, a majority of participants indicated they felt safe while using the lake. Participants listed boating as their most common reason for lake use, with non-motorized activities such as kayaking and paddle-boarding as the second-most common.

Issue: Traffic

Seasonal traffic was raised as an issue, with evenings (4:00-9:00pm) and weekends (11:00am-9:00pm) during warm summer days identified as the busiest times with the greatest potential for use conflicts, problematic behaviour, and inexperienced users on Chestermere Lake. In contrast, little concern was expressed about traffic and capacity during the winter months, which were described as being generally quiet, with only the occasional spike in usage during days characterized by mild weather.

Issue: Boating Speed

With motorized vehicles widely used by Chestermere Lake users, speeding concerns were among the most commonly cited. In particular, participants reported speeding concerns related to personal watercraft and snowmobile operators, and recommended year-round enforcement of established speed limits.

Issue: Activity and Use Conflicts

A number of lake use conflicts were identified by participants including: conflicts between non-motorized and motorized activities, the impact of towing on other lake activities (e.g. high wakes, random patterns, and space requirements), and the potential for danger arising from a convergence of various uses during peak periods (fishing, swimming, motorized and non-motorized boating, rental launch) directly south of the lake bridge.

Issue: Awareness and Etiquette

Many participants were concerned over a lack of awareness and etiquette by different lake user groups. This commonly manifested itself as ignorance of speed limits, environmental impact, boating safety, noise bylaw, and the dangerous operation of watercraft due to poor behaviour and/or impairment from alcohol and drugs. Participants reported lake users travelling too close to towing activities and shoreline infrastructure, operating watercraft erratically, or acting rudely or inattentively while on Chestermere Lake.

Phase Two: Understand the Issues

User Experience and Organizational Interviews

Specific lake users were selected for 'User Experience Mapping', a process used to more deeply understand the detailed, nuanced experience of a particular kind of 'user' of a space. This process was chosen to understand the thoughts and feelings related to specific and unique users, and to ensure that policies and programs developed for the lake reflect the realities of the people and organizations that use the lake the most.

Three user groups were selected for user experience mapping: swimming/wading, wake-surfing, and paddle-boarding, and were interviewed between January 7 to 11, 2019. In addition, in-depth interviews with three non-profit and commercial operations on Chestermere Lake were completed during the same time period which focused on sailing, tubing and the use of personal watercraft. For both the user experience mapping and interview exercises, users were asked to walk the facilitators through a typical day or experience when using the lake, specifically explaining their safety- related challenges and feelings. Each interviewee brought their own perspective, and helped paint a picture of the complex interconnections that define safety on Chestermere Lake.

Results

While feedback from participating interviewees spoke to the unique context of each organization and user type, much of the interviewee input could be consolidated into several thematic areas. Several of the issues that arose as a result of the interviews aligned with those from phase one, but the level of detail as to where and why the issues occur, and the challenges and feelings (context) that surrounded them proved extremely helpful.

Phase Three: Co-Develop Solutions

Solutions Workshop

The information gathered via the first two phases of engagement made it clear that a collaborative approach to lake safety solution development was essential, and that stakeholders would need to work together to co-develop and test solutions that would provide the best results for all lake users, not just benefit one group alone.

On February 6, 2019, 26 interested lake users participated in a 'Lake Safety Solutions Workshop' at Camp Chestermere to collaboratively build and test solutions with the aim to make Chestermere Lake a safer place for all to enjoy. The participant group included representation from residents, local businesses, and community organizations. Participants considered a number of different lake user perspectives and developed creative solutions to lake safety issues identified in prior engagement phases.

Participants were walked through the engagement process to date, shown the themes and insights that has arisen thus far, and were introduced to several unavoidable design constraints related to the policy layers governing public lake management. A guiding question was presented to the participants: "How might we share space on the lake so that it's safe for *everyone*?"

The groups worked together to develop safety solution 'prototypes' and tested the feasibility of their ideas through critiques and an empathy-building exercise that placed them in the shoes of a lake user persona that had different needs and interest than them.

Results

As a result of this workshop, six collaborative lake safety solutions were prototyped and tested. Cumulatively, participant solutions were focused on addressing many of the issues identified in prior phases of engagement (i.e. access, behaviour, crowding, etc.). Given the boating regulatory constraints related to intervening on the lake, many participants were somewhat challenged to initially develop solutions. However, as the workshop progressed, participants embraced the challenge of finding innovative, proactive solutions to address the guiding question.

The specific intervention areas that were surfaced via the prototyping exercise included: communication and education; fees; preferred use areas; physical interventions, and enhanced enforcement.

Communication and Education

A large portion of workshop groups focused on communication and education approaches as a way to inform and educate lake users - particularly visitors to the lake who aren't familiar with safe behaviour on the water and the unique context of Chestermere Lake. While much focus was on visitors to the lake from outside the community, there was also wide support for the installment of significant visual signage and wide distribution of educational materials that would inform visitors and residents alike.

Fees

Utilizing financial (dis)incentives was identified as a mechanism to influence the volume of users of Chestermere Lake, which could in turn improve safety on the lake.

Preferred Use Areas

Given the diversity of users on the lake, some participants suggested the use of buoys and associated signage to provide guidance for where certain activities were preferred.

Physical Interventions

There were some suggestions for physical interventions that could have a net safety benefit to the lake.

These included:

- Weather flags, towing flags etc.
- Signage and symbols to denote zones (i.e. buoys)
- Bridge signage to indicate flow of traffic
- On-land signage at public launches

Enhanced Enforcement

Increasing patrols and on-water checkpoints were recommended by some participants. This would provide improved accountability for users to use the lake in an appropriate and safe manner, complementing the educational efforts mentioned above.

Summary of the Engagement Process

- The process of identifying and understanding issues and testing solutions presented participants with the challenges faced by the City of finding ways to improve safety on the lake in ways that work within the significant jurisdictional and relationship challenges. Several complex patterns or insights were uncovered:
- To lake users, safety does not begin at the water's edge, but where users begin their journey (whether from one's home, or navigating a crowded boat launch).
- Lake safety initiatives must draw a distinction between dangerous (or outright illegal) behaviour, and behaviour that is merely disliked or different from one's expectations.
- There is an assumption that the unwritten rules of safety and etiquette which govern behaviour on the lake are shared and commonly understood by all users, but multiple understandings of appropriate safety and etiquette exist.
- Frustration and anxiety are common feelings, as people want to do the 'right thing', but are not sure what that that is. Also, many struggled with managing feelings of anger and distrust when observing someone else, most likely a lake visitor, doing what they perceive as the 'wrong thing'.

- Safety can be managed without regulation, but relies on effective relationship-building and creating a shared and commonly understood culture of safe behaviour among lake users.
- Due to the strong connections between each thematic issue area, achieving impact in one area will undoubtedly complement another.
- Understanding the distinction between perceptions and reality of safety; personal annoyance vs. actual threat.

Possible Solutions

When it came to the solutions that the participants appeared the most interested to develop, test and pursue, the following themes emerged:

Relationship Building

- Build empathy and stronger relationships between all user types, and between residents and visitors
- Increase the amount of contact/information exchange between lake staff, residents and visitors

Education and Continued Engagement

- Public education with various touchpoints and modes, focused on visitors
- Have safety information delivered in a personal, fun and interesting way
- Introduce lake user agreements and/or exams
- Install web cams to communicate lake conditions which could be viewed from home

Increased Enforcement

- Increased presence during events and high-volume periods – both official and non-official/voluntary
- Provide information related to how to connect with enforcement when necessary

Use of Financial Disincentives

- Increase fees at the boat launch

Infrastructure and Tools to Increase Awareness

- Improve shoreline, lake design and infrastructure design (i.e. boat launch)
- Weather flags, towing flags etc.
- Signage and symbols to denote zones (i.e. buoys)
- Live-feed lake traffic camera
- Bridge signage to indicate flow of traffic and on-land signage at public launches

RISK/SAFETY REVIEW PROCESS

Outline of Process

This study used a variety of comprehensive methods to collect and evaluate information from key informants and boating and lake experts pertaining to recreation safety on the lake. More detailed information is available in the companion document which contains a variety of reports, raw data and background information.

Below are the primary means by which information was collected and used to inform this work:

1. Literature Search

   A literature search was initially completed on existing lake use management plans, lake surveys, municipal lake use management bylaws and policies, and federal boating regulations. This literature search was further refined once the feedback from the public engagement process identified boating as a key factor to recreation safety on the lake. Additional searches were then completed on boating capacity studies and waterway management guides.

Please refer to the detailed reference list of background documents used.

2. Michalski Nielsen Associates Limited Report

   An Ontario consultant specializing in environmental planning, biophysical analysis and lake capacity assessment, Mr. Gordon Nielsen, was hired to complete an internal report for the purposes of this report.

   This report provided the following information:

   - Background on issues of boating and recreational conflicts;
   - Background on methodologies that have been used elsewhere to determine appropriate thresholds for boating;
   - Michalski Nielsen Limited boating impact study design on recreational carrying capacity standards;
   - Opinion on current potential for boating-related conflicts on Chestermere Lake;
   - Input towards measures to reduce safety issues and other conflicts on the lake; and
   - A sample boat count survey form.

A summary is provided in the next section of this report, and a detailed report is included in Appendix A.

3. Marsh Risk Consulting, Lake Safety Risk Advisory – Chestermere Lake

   Because of this firm's expertise in the area of risk advisory services related to the identification of physical hazards as well as potential liabilities, this company was engaged to complete a risk profile for this study. The risk profile included the following: category of risk, description of risk, typical drivers and potential types of outcomes, and preliminary commentary on risk controls (leading practices).

A detailed table is included in Appendix B.

4. Internal Engagement Process with Protective Services Staff

   Given the fact that the City's RCMP Officers, Community Peace Officers and Fire Rescue team are on the lake and responsible for safe boating, it was felt that this team could provide valuable input into the process. Meetings were held whereby this group identified and summarized the current perceived hazards, dangers and issues on the lake. Follow-up meetings focused on the categorization and prioritization of potential safety solutions and identified further questions for clarification. Conversations were also held with the Transport Canada Boating Officer in order to gain clarity on additional enforcement options that are available to the City's Community Peace Officers with respect to enforcing boating activity on the lake.

5. Consultation with Transport Canada/Government of Canada Boating Safety Officer (Prairie and North Region)

   Several meetings were held with the Transport Canada Boating Officer, Mr. Jason Rosadiuk, in order to clearly understand the federal jurisdictional considerations and limitations related to boating and on-water activity. Verbal and written feedback was provided throughout the process due to the fact that the lake is privately owned and geographically situated within the City's boundaries, yet regulated federally with respect to all boating and on-water activities. Clarification and suggestions were provided by Mr. Rosadiuk on the options available to the City to address boating issues, including information pertaining to recent court cases involving municipally managed lakes. Detailed information on federal vessel regulations and the Vessel Operation Restriction Regulations (VORR) application process was also provided.

6. Legal Advice, Brownlee LLP Barristers and Solicitors

   After consulting with the City's legal counsel, it was determined that in order to be most cost effective, legal support would be best provided once a report is prepared and specific policy and/or bylaw research questions are clearly identified. As a first step, Administration has requested that the firm provide an opinion on the options available to the City in managing temporary crowding issues at the launch and on the lake.

7. Summary of Existing Bylaws Which Impact on the Lake

   The City's Corporate Services Department (Finance, Legislative Services) completed a review of the current bylaws which impact the lake and its shoreline.

Summary of All Safety Options for Chestermere Lake

Using all of the above-mentioned sources, experts and key informants, the following table summarizes all possible safety options considered as part of this report.

1. Use of Non-regulatory Approaches to Address Boating Safety

Risk Name	Option	Description	Pros	Cons	Comments
Unsafe Boating	1A. Increase signage	Use social media and physical signage to educate users on safety concerns, and their shared responsibility to create a safe and enjoyable space for all.	Very simple to implement and cost effective and can address a wide range of concerns and conflicts.	Not enforceable and some may choose to ignore information.	Most people want to behave as responsible citizens and may simply be unaware of how certain behaviours affect the safety and enjoyment of others.
Unsafe Boating	1B. Initiate a boater education program and develop a code of conduct.	Provide education on boating safety and etiquette at the boat launch and with partners.	Same as above.	Requires added staff and is not enforceable. Some may choose to ignore information.	One-on-one discussions are important in re-enforcing safety and enjoyment. A social contract has been effective amongst several lake associations and reinforces the notion that everyone on the lake has an individual responsibility for safety.
Unsafe Boating Personal Watercraft Rentals	1C. Work with boat rental operator to increase user safety of PWC.	Work with operator in a cooperative fashion to identify ways to prevent reckless driving. Develop safety monitoring protocols.	Recognizes investments made by operator and minimal impacts on operator's revenue.	May be difficult in achieving desired outcomes.	A cooperative approach with the operator is a good first step to improve the safety of its rental fleet.
Unsafe Boating Too Close to Shore	1D. Install a shoreline no-wake zone (30 m).	Place a series of buoys 30 m offshore around the entire south basin.	Reasonable cost. Separates incompatible uses creating a safer environment for non-motorized activities.	30 m may not be enough distance; a slow-no-wake zone could be extended to 60-100 m.	Reduces several safety concerns associated with incompatible activities proximal to docks, in shallower water.

Risk Name	Option	Description	Pros	Cons	Comments
Unsafe Boating Towing	1E. Consider designated times for certain towing activities.	These activities could be restricted to less busy times of the day (e.g. outside of the period of 11:00 a.m. to 6:00 p.m. on weekends) when boat traffic on the lake typically reaches its peak.	Has a considerable potential benefit in reducing potential safety issues during peak periods of use.	Requires buy-in from these stakeholders as it is not enforceable. Difficult to ensure visitors to the lake are informed of this in advance of their visit.	In combination with lake zoning, this could be considered in the future if other interventions fail.
Unsafe Boating Towing	1F. Consider a specific rotation pattern for towing activities.	All boats engaged in towing (other than wakeboarding) would be requested to travel in one direction only, over all or part of the lake basin, creating a more regular pattern of activity on the lake. This rotation pattern would need to be identified on signage and/or marked with buoys.		Not enforceable and a somewhat confusing and cumbersome approach. Requires buy-in from stakeholders and can negatively impact on the quality of user experience.	This approach appears to have more disadvantages than advantages.
Boat Launch Access Crowding	1H. Reduce access to the lake at the boat launch during busy periods.	Limit access to a smaller number of boaters during peak periods based on parking availability.	Would reduce congestion in the parking lot.	Will create some animosity from those visiting lake.	Lakes are public resources and approaches which favour one group over another are inconsistent with that philosophy and not easy to defend. Would require a legal review.
Boat Launch Access Crowding	1I. Introduce higher user fees for use of public launch.	Fees can be increased across the board, or on weekends only, or by engine size.	Provides offsetting revenue for other safety measures. May help to reduce traffic somewhat.	Causes the lake to be less accessible to average citizens.	Overall impacts on traffic may not be that significant.

Risk Name	Option	Description	Pros	Cons	Comments
Boat Launch Ramp Crowding	1K. Separate motorized and non-motorized launch activity at the Boat Launch.	Install a seasonal dock at John Peake Park to accommodate the launching of kayaks, paddle boards, etc.	Eliminates conflict at ramp area and reduces issues of slippery ramp for non-motorized boat users.	Cost and time to monitor the temporary docks.	Parks has budgeted for this item for the 2019 season
Towing Crowding	1L. During peak times, develop a flag system to warn boaters that towing is unsafe.	Develop a flagging system which informs boaters when towing is not recommended. CPOs to communicate to the Boat Launch and residents when unsafe conditions prevail, and flags would be changed.	Reduces the activity which has greatest impact on safety during peak times.	Not enforceable	Dependent on CPOs availability.
Water Monitors	1M. Water Monitors	Hire and train season water monitors to record the speed of boats in designated areas on weekends.	Could serve as a deterrent, even though this is not enforceable.	Cost	A long-term solution could be to create an Auxiliary Bylaw Program, whereby volunteers assist on the lake.

2. Use of Regulatory Approaches to Address Boating Safety Issues

Risk Name	Option	Description	Pros	Cons	Comments
Speeding North End	2A. Enforce existing speed restriction of 12 km/hour in north basin.	Maintain regular patrols by officers and enforce this limit after a grace period.	Can be implemented in short-term, without any approval hurdles. Warnings can also change behaviours.	Somewhat heavy-handed and increased enforcement presence may be costly.	Fines can be a very effective deterrent in cases where voluntary efforts to change attitudes and behaviours are not effective.
Speeding Close to Shore	2B. Enforce existing speed restriction of 10 km/hour within 30 m of shoreline.	Place speed limit buoys around the perimeter of the south basin (30 m from shore) in designated spots as reminders.	Same as above.		Same as above.
Unsafe Boating By Shore	2C. Apply for a speed restriction of 10 km/hour within 30-60 m of the shoreline in the south basin.	Same as above.	Allows for enforcement of speed within a safety zone;	Reduces the usable lake surface area by 30 m.	
Reckless Driving	2D. Increase enforcement presence on the lake during peak periods to address reckless driving issues.	CPOs to increase time on the lake during weekends and hot weather where they focus on education and enforcement. Explore whether a seasonal bylaw officer could be used as a second person in the boat instead of using two full-time CPOs.	Support improved boating etiquette and general safety and necessary	Costly	If the City wants to apply for a future VORR it needs to demonstrate that the enforcement of federal vessel regulations has been actively in place for a period of time. Transport Canada will also look at the City's enforcement history before adding new legislation.

Risk Name	Option	Description	Pros	Cons	Comments
Unsafe Boating Crowding	2E. Restrict boat motor size and certain types of watercraft or activities.	Application would need to be made through federal VORR, and will require a demonstration that other measures to improve safety have not been as effective as desired.	Would eliminate or significantly reduce many of the existing concerns on the lake.	Very heavy-handed. Long and cumbersome approvals process with no guarantees of success. Significantly restricts types of watercraft and activities and will be unacceptable to many.	This is the least effective type of restriction. Vessel type, size, and the HP of the engine(s) have very little direct correlation to any of the problems identified. Most problems are due to how vessels are operated.
Excessive Noise	2F. Pass a noise control by-law to ban above-water exhausts and restrict noise levels.	A municipal by-law would need to be established to restrict certain activities, and would need to include enforcement details.	Can be implemented at a municipal level and be designed in a manner that receives fairly broad support from stakeholders.	Effectiveness of this by-law depends on ability of CPOs to effectively enforce it.	Most of this nuisance likely comes from lakefront residents; an alternative approach is to facilitate positive communication between neighbours.
Illegal Commercial Activity	2G. Identify and restrict all illegal boating businesses	Ensure that lakefront owners are not operating commercial boating operations from their home.	Small reduction in crowding.	Requires staff resources.	May be difficult to prove.
Crowding Boating Rentals	2H. Pass a by-law which restricts or places conditions on boat rentals or demos on the lake.	A new municipal by-law would place conditions such as: maximum number and type of rental boats and/or demos associated with the marina operation (e.g. at peak times).	Can be implemented at a municipal level and easily monitored and enforced. Would likely receive fairly broad support from certain stakeholders.	Would impact on marina operator's existing business. Could favour rental companies in Calgary where individuals simply use the launch.	Imposing a bylaw that distinguished between rented vessels and owner operated vessels, other than with your local businesses, would infringe on federal jurisdiction and is contrary to existing federal legislation.

3. Events

Risk Name	Option	Description	Pros	Cons	Comments
Unregulated Lake Events Causing Conflicts	3A Consider establishing a formalized event application process.	All events would need to get advance approval based on specific standards and expectations.	Help to ensure safety of these events and better manage traffic and lake congestion	Requires ongoing time and effort on the part of municipal staff.	A VORR could be easily applied for whereby the federal government would review and approve event permits.

4. Winter Activities on the Lake

Risk Name	Option	Description	Pros	Cons	Comments
Unsafe motorized activity	4A increase enforcement on the lake in the winter.	Patrol during busy afternoons and evenings.	Can address a wide range of concerns and conflicts.	Requires additional staff resources.	
Unsafe motorized activity	4B Consider implementing a winter safety program.	Staff to provide educational information on winter lake safety and motorized winter vehicle etiquette throughout the winter. Place signage at access points.		Requires additional staff resources.	
Collisions Due to Rinks	4C Citizens to flag ice rinks on the lake	Provide the public with materials to flag their rinks to reduce the risk of a motorized vehicles hitting obstacles.	Can be easily implemented.	Some may choose to ignore flags.	
Unsafe Activity on Lake	4D. Strengthen Off-highway Vehicle Bylaw to address unsafe winter motorized activity on the lake.	Determine specific unsafe activity or undesirable vehicles allowed on the lake.	Can address concerns and conflicts.	May be difficult to enforce.	More research is needed to determine if this is needed.

5. Public Beaches

Risk Name	Option	Description	Pros	Cons	Comments
Drowning	5A. Have designated swim areas at all lakefront parks.	Install safety swim lines and “slow –no wake” buoys at all lakefront parks to protect and guide swimmers.	Improved safety for swimmers Improved signage for boaters		A “no power boating” restriction could be applied for by swim area through a VORR.
	5B. Introduce water safety education at lakefront parks.	Beach and park users would be provided with public education about waterfront safety through on-site public education.	Improved public understanding of the risks related to water recreation.	Staff resources and cost.	
	5C. Anniversary Beach crowding issues to be evaluated (on-site).	Municipality to evaluate usage experience in the beach area and identify specific issues and solutions.	Ability to interact with users and understand issues.	Staff resources and cost.	

6. Geographical and Physical Hazards

Risk Name	Option	Description	Pros	Cons	Comments
Physical Structures	6A. Reduce the chance of accidents adjacent to physical structures.	Add directional signage on bridge thruway; add warning buoys in advance of swim lines at weirs.	Improved user understanding of risks.		Easy to apply for a VORR for this.
Debris or Obstacles on Lake	6B. Regularly inspect the lake for floating debris, moorings, rafts, etc. which could cause injury to boaters.	Staff to monitor the lake for debris and obstacles based on either a scheduled basis or during routine work.	Improved monitoring may reduce the amount of issues related to debris and obstacles.	Staff resources and cost.	

7. Monitoring and Communication

Risk Name	Option	Description	Pros	Cons	Comments
Boat Launch Weather	6A. Introduce protocols at the boat launch to stop boaters from entering the lake during bad/windy weather.	Weather status to be communicated to lake users at access points. Create a policy to close the launch and boat rentals if winds exceed beyond a specified level.	Improved awareness of weather issues and boat preparedness	May require some additional staff resources.	This would require a change in protocol and staff training.
Boating Data	6B. Establish formal protocols to collect boat count information.	Implement boat counts to collect standardized information over specific portions of the lake; this would need to be undertaken during peak periods of the boating season, on an ongoing basis.	Provides needed information on effectiveness of management activities and an early handle on any new issues. Assists in effective decision-making.	Requires ongoing time and effort on the part of municipal staff.	The collection of such information in a formal, quantifiable fashion is considered critical to the long-term success of a management plan.

Risk Name	Option	Description	Pros	Cons	Comments
Boating Data	6C. Establish protocols to regularly collect boat user feedback.	A questionnaire on boat user experience and safety concerns to be established. Quantitative information can be collected to measure changes over time.	Same as above.	Same as above.	Same as above.
Boat Launch Access	6D. Install a boating management point of sale software on the City's boat launch arms.	Software to enable online registration of all boats and users, and be used to manage access and exit of all boats at the launch.	Improved understanding and management of lake access at the launch.	Conversion and education required for users.	The City is planning to implement this system for the 2019 season.
Community Engagement	6E. Establish a lake steering committee.	A multi-stakeholder boating steering committee, with membership reflective of the range of public interests on the lake would be established, to address lake safety issues.	Allows ongoing input from a broad-based group of citizens interested in alleviating boating concerns.	Requires ongoing time and effort on the part of municipal staff as well as a commitment from interested members of the public.	The ongoing involvement of an interested group of citizens is considered very important to the long-term success of a management plan.
Community Engagement VORRs	6F. Ensure that all public engagement processes inform the public that the City will consider a VORR should non-regulatory interventions not work.	The evidence required for a VORR application must show that the public is aware that the municipality may resort to using a VORR in cases where non-regulatory methods were unsuccessful and all efforts were made to enforce boating under the current vessel regulations.	VORRs are allowed in situations where other efforts have failed.	Most VORRs are very time-consuming (2-3 yrs.) and expensive to complete. Once VOOR's are in place there is no flexibility.	VORRs are the last course of action and should only be considered when all other federal vessel regulations have been attempted and not worked.

BOATING RESEARCH

For this report, Michalski Nielsen Associates Limited provided specific expertise around issues of boating and recreational capacity, boating safety, the safety and enjoyment of the lake by other user groups, and mitigation measures which should be considered to address specific concerns. Below is a summary of the report.

General Information Related to Boating/Recreational Concerns

The U.S. National Water Safety Congress (2004) lists a variety of trends and forces affecting multiple use waterways, including the following:

- Increasing, more intensive and in some areas, new uses of public waters;
- Continuing evolution in the kinds and combinations of watercraft and water contact activities;
- A relatively static acreage of waters accessible to the public;
- Rapid commercial and residential development along shorelines;
- Enhanced visibility and prominence of environmental issues;
- Increased public interest in the resource impacts associated with watercraft and shoreline development activities;
- Dramatic demographic and societal changes over the last few decades, and the everyday lifestyle and leisure time changes showing up in outdoor recreation;
- Variations in water users' and craft operators' experience, skill levels, education, interests and even consideration for and understanding of other user groups;
- Varied attitudes and social perspectives about recreation, water resources and the environment in general and the increasingly strident involvement of citizens, stakeholders and various interest groups in public management and policy decisions.

If there is a commonality between virtually all of the stakeholders who enjoy spending time on a water body, including those who are able to live on its shoreline and those who are only infrequent visitors, it is that time on the water body should be a pleasurable experience, and increased congestion and its associated potential for conflicts are harmful to that experience. Unfortunately, in near-urban environments such as Chestermere Lake, this trend is only going to get worse over time, unless there are efforts to manage issues of congestion and its associated potential for conflicts.

Accidents and safety incidents relating to recreational waterbody usage are a serious concern in North America. Statistics relating to all accidents are difficult to come by; however, the following summarizes available information from the Canadian Red Cross (2015):

> Between 1991 and 2010, there were 3,324 boating deaths in Canada, averaging 166 deaths/year. Of these 86% were associated with recreational or daily life activities. 61% of mortalities involved power boats and 33% involved non-powered watercraft. Although only 8% of the mortalities were because of collisions, some of the substandard causes included capsizing (37% of deaths), falling overboard (25% of deaths) and swamping (13% of deaths). No statistics are available on deaths of other recreational users, for example swimmers or paddle boarders, who may have been hit by a boat.

Background on Methodologies that Have Been Used Elsewhere to Determine Appropriate Thresholds for Boating

Various methods have been used to define the boating "carrying capacity" of a water body, defined as "the level of use beyond which impacts exceed levels specified by evaluative standards". Various techniques have been used in evaluating carrying capacity with pertinent findings:

1. The evaluation of carrying capacity should not be one of computing and rigidly enforcing a single explicit maximum value, but should include an element of perception from managers and stakeholders. For this reason, carrying capacity determination is never purely objective.
2. Data on use characteristics is important to the determination of boating carrying capacity.
3. Virtually all techniques that have been employed quantify a usable lake surface area, by subtracting a nearshore area which is poorly suited for power boating from the overall lake area.
4. Other variables relating to a lake's physical characteristics, including a shape factor and the shallowness of the lake have also been taken into specific consideration in some models.
5. Many techniques include the application of a boating density standard, usually in reference to what is considered an optimal condition, measured in surface area per watercraft, which is used to define a preferred or optimal standard for boating.
6. Some models differentiate by setting, which really equates to a stakeholder and management expectation on user experience.
7. Some models differentiate in the space requirements of different types of boats, and of boats moving at different speeds.
8. Some models estimate the proportion of the boat fleet that will be actively using lakes during peak periods of use, with these values sometimes relating back to historical data on lake use rates specific to that lake.
9. The modelling tends not to be driven by safety concerns, but rather on maintaining an expected quality of boating.
10. Various models recognize differences in perceptions of crowding, for example that shoreline residents tend to perceive conditions as being crowded at lower boating densities than do visitors.
11. Boating density tends to vary across a lake, with some researchers recognizing that in some lakes, there will be high-traffic "pockets" within larger areas in which the overall boating density is not that great.
12. Given the number of variables, some researchers are reluctant to develop a numeric capacity limit, but rather simply applied a level of management concern (low/moderate/high) to various areas.

Two Methods for Determining Boating Impact:

There are two types of modeling of boating capacity for waterbodies which Michalski Nielsen Associates Limited is very familiar with, and has used in over forty different settings on lakes in Ontario to gauge congestion.

Method 1: Standardized Method

In determining the boatable area, exclude areas which are not well-suited for power boating, including:

- Areas within 30 m of a shoreline;
- Any additional area of shallow water depth (<1.5m in depth) beyond the 30 m nearshore area;
- Any additional areas beyond that 30 m nearshore area that are within 20 m of a dock.

A cumulative count of all boats moving through the study area over the course of the day is kept, using an imaginary centre-line. Measurements are made at ten-minute intervals throughout the day to record the total amount of boating activity within the study area at each of these times. By adding up the space requirements of all boats observed in the study area at any given time, and comparing that to available space, we can determine the extent to which the existing capacity of the study area is presently exceeded during the busiest portion of the summer. In addition, observers are also trained to collect and record information on any unusual or dangerous activities they observe.

Using this method, boat types are assigned a specific surface area requirement (hectares) ranging from 1.0 ha for a slow-moving sailboat to 8 ha for a fast-moving power boat. In the majority of such studies, the collection and analysis of data is the first step of the process, and the second step being to superimpose reasonable predictions of any proposed new traffic onto the existing lake conditions to assess the potential influences. It is important to note that while safety factors are a major driver in the completion of such a study, that concern should be intertwined with a variety of other concerns including: congestion, perceived and real impact on shoreline residents' enjoyment of their lakefront properties, and protecting the environmental qualities of the resource – to name a few.

Method 2: Township of Seguin Official Plan, Muskoka-Parry Sound (July, 2015)

The calculation of recreational carrying capacity can also be determined based on the principle that the lake functions as a common space and assumes that beyond a certain limit, the amount of recreational use on a given lake will significantly reduce its attractiveness for shore land residents and visitors.

. It provides a simple formula as followed:

- Net surface area is calculated by reducing the total lake surface area by the surface area within 30 metres of the shoreline;
- A density of one residential unit for every 1.6 hectares net lake surface area and one tourist accommodation unit for every 0.8 hectares of net surface area shall be permitted;
- Distinct bays having connections to a larger portion of a water body less than 60 metres wide shall be considered as a separate water body for the purposes of the capacity calculation.

While this formula is simplistic, and does not take into account patterns of existing public use, these issues are addressed under the Township's Policy B.3.3 whereby it can impose limitations on the size of docks or seek voluntary restrictions on the power of boats using the lake.

The ability of the Township of Seguin to impose such restrictions as a hard cap, without consideration of existing traffic patterns or congestion, has been enshrined through an Ontario Municipal Board Decision (Case No. PL1S1021; decision issued on December 22, 2016). That decision includes that "the Board accepts that Recreational Carrying Capacity is an imperfect estimate of the capacity of the lake to accommodate recreational uses", and that its efficacy as a land use control is evolving. Nevertheless, the Board found that its use by the Township of Seguin to limit development did represent good planning, by capping development at levels aimed to prevent the recreational qualities of the lake from deteriorating.

A second municipality in Ontario, the Municipality of Dysart et al, has introduced a similar recreational carrying capacity, as a hard cap for development, of one lot for every 1.6 ha of lake surface area (Dysart et al Official Plan, November 2017). In this case, "if Council determines that an application for development of shore lands that involves the creation of a new lot, new residential units, or new non-residential development could unduly add to existing aquatic recreational stresses, conflicts, and hazards, it may require that the applicant submit a Boating Capacity Study..." The terms of reference for such a Boating Capacity Study requires an examination of all existing development, including public access, and to document existing boating activity on summer long weekends.

While the above-mentioned techniques to calculate boating capacity thresholds are significantly different from each other, both recognize the potential for conflicts with crowding, and that only the boatable surface of the lake should be considered.

Opinion on Current Potential for Boating-related Conflicts on Chestermere Lake

1. Chestermere Lake is considered an off-stream reservoir on the Bow River, and has a total surface area of 265 ha.
2. It is a very shallow waterbody, with a mean depth of 3.47 m and a maximum depth of only 7.0 m. The northern portion of Chestermere Lake is very shallow, being almost entirely less than 2 m in depth. Within the larger portion of the lake there are extensive areas of shallows, extending 50 m or more from the shoreline in areas. Docks associated with shoreline residential development tend to be quite long to address these shallow depths, with several extending 30 m or more from shore.
3. The area north of the bridge is poorly suited to power boats and has a speed restriction of 12 km/hour throughout.
4. The municipal boat launch is busy, with a total of 2,231 boat launches recorded by City staff through the May to October period of 2018.
5. The north basin connects to the south basin via a narrow (25 m wide) bridge.
6. The south basin is the primary area for power boating. It has a boatable area of approximately 183 ha.
7. There is approximately 198 ha of boatable area on Chestermere Lake, with a small portion of this presently subject to a speed limit of 12 km/hour.
8. There are approximately 392 homes on the lake.
9. There is an active weed harvesting program which tends to push power boating activity towards the centre of the lake.
10. All of the shoreline residential development is permanent residences.
11. There are many hundreds of backshores lots within 500 m of the lake.
12. Using boating volume estimates provided by the City of Chestermere on busy weekends, and applying a typical cross section of usage based on boat type (e.g. tubing, waterskiing, watercraft, and power boats), the total capacity requirement would be 305.5 ha of boatable space.

All of the above-described information provides a good indication of the very real potential for congestion and conflicts. Assuming that 10% of the boat fleet associated with private residences, the Calgary Yacht Club, and Camp Chestermere would be active under a peak condition, and that 40% of the boats from the marina and boat launch would also be active, the volume of power boat traffic would be 96 boats during a peak period. Under this particular scenario, and assuming that all of this power boat activity is occurring within the south basin, the capacity would be quite substantially exceeded at 167%. This estimate is based on power boats alone and ignores any sailing or other muscle-powered activity taking place on the lake.

> The very real potential for traffic to be routinely overcapacity on good weather days during the height of the summer, and particularly on weekends, suggests that the potential for boating conflicts on the lake is high. Because areas of potential conflict include areas where boat speeds are uncontrolled and may typically be fast, the potential for boating accidents under such conditions appears a very legitimate concern.
>
> Michalski, Nielsen Associated Limited, 2019

It is important to note that such an estimate is not based on outlandish estimates of boat fleet activity. Rather, it is based on quite conservative assumptions for peak periods. Further, it does not consider that portions of the south basin may have more congestion than others; for example, under this scenario, areas closer to the bridge may be considerably more overcapacity than the remainder of the south basin.

Despite the limited amount of data that has been collected on existing boat traffic on Chestermere Lake, our review of current conditions in light of these two boating impact/recreational carrying capacity models at the very least raises significant red flags; it is prudent that the municipality undertake additional monitoring work to get a better handle on boating congestion, and in the meantime consider the immediate implementation of measures which increase everyone's understanding of the potential for such conflicts, which help to reduce the potential for boating conflicts, and which help to reduce the potential for accidents.

The good news is there are simple measures which can be taken immediately to reduce the potential for virtually all such conflicts and issues, that the effectiveness of such measures can be evaluated, and that additional, some perhaps being more cumbersome, solutions can also be implemented over time (if additionally warranted). As virtually all users of the lake have a common interest in the safe enjoyment of the lake, common ground and broad buy-in can be achieved on many potential solutions to these issues (with appropriate stakeholder involvement in the process). The other good news, of course, is that the City of Chestermere is proactively involving the public in developing broadly supported solutions before there is a serious accident which forces this issue.

Input Towards Measures to Reduce Safety Issues and Other Conflicts

In general terms, management options for Chestermere Lake can be divided into two broad groups: non-regulatory measures, requiring voluntary buy-in, and regulatory approaches.

Non-regulatory, voluntary approaches, including improved public education on issues which are creating conflicts and safety concerns, are important tools, at least as a first step towards resolving conflicts. These measures can be implemented immediately, without any regulatory approval hurdles. It is important that they include a positive public information campaign, which explains the issues as well as the opportunities to remedy them. A "Lake Ambassador" program provides a good opportunity to share that messaging.

Regulatory approaches are, by their very nature, more difficult to implement, often requiring significant approval hurdles. They are also a more heavy-handed approach. Nevertheless, there are several useful regulatory tools that can be considered, particularly if a voluntary campaign is not producing all of the desired results. The simplest regulatory tools to implement in this particular circumstance involve the consistent enforcement of existing speed restrictions of 12 km/hour throughout the entire north basin, and 10 km/hour within 30 m of shore around the entire lake. The City of Chestermere is in a somewhat unique situation in that its own by-law enforcement officers have the authority to enforce these limits. This

overcomes one of the significant limitations of speed restrictions on most lake, which require enforcement by an outside police force, with visits to the lake by such outside forces generally being very sporadic.

Whatever the tools being considered, it must be remembered that lake management is a long-term process, which will require ongoing monitoring and adjustments.

Chestermere Lake 2018 Boating Information

The RCMP completed a water safety program consisting of water patrols and vessel and safety compliance inspections, resulting in a total of 528 vessel being checked. A marine safety decal program was also rolled out to identify vessels which meet safety standards. After a successful inspection of a vessel for the required safety equipment, a decal for the year was issued in order to reduce time spent on inspections during subsequent encounters. Overall, the majority of vessels were non-compliant because of a lack of safety equipment or owners failing to license their boat or update hull identification numbers.

Chestermere Fire Services responded to the following on-water incidents: 11 watercrafts were in distress, 4 water rescues/sinking vehicles/vehicles in floodwater, 1 animal call, and 1 airport standby.

SUMMARY AND RECOMMENDATIONS

The creation of an effective lake recreation safety plan hinges on the following key points which should be carefully considered as part of a successful planning and implementation process. Following these approaches will help the City to achieve the desired results of improving safety, enhancing user experiences on the lake, and reducing the City's risk and liability exposure.

1. **There is a Clear Need to Take Action – Especially When the Lake is Crowded**

   The research and public engagement process completed as part of this study clearly shows that there is a very real potential for traffic to be routinely overcapacity on warm days during the height of the summer, and particularly on weekends. Furthermore, the potential for boating accidents to occur under such conditions appears to be a legitimate concern. Over 90% of the public engagement feedback focused on boating issues, and this was also reinforced by expert opinions on the state of our lake, and the need for improved lake management practices.

2. **Develop Local Solutions Which are Specific to our Circumstances**

   Information gathered as part of this study points to the fact that lake management is a long process which requires the ongoing engagement of stakeholders in developing voluntary compliance measures which targets improved boating safety on the lake. Unlike other types of recreation amenities, there is a general lack of scientific evidence and proven practices to draw on regarding lake management - and each lake is different. As such, there is a need to develop local solutions that are specific to our unique circumstances.

3. **Adopt a Dual Approach of Using Existing Regulations as Well as Non-Regulatory Methods**

   As a Canadian waterway, our municipality is required to conform to, and make use of the federal vessel regulations. Effective solutions will only work if the City focuses on a dual approach of 1) focusing on the enforcement and education of the existing "careless operation of a vessel" regulations, and 2) implementing non-regulatory measures which focuses on user education as well as the reinforcement of desired on-water behaviours using in-situ reminders such as slow-no-wake zone buoys by the bridge and danger buoys by the weirs.

4. **Use the Existing Federal Regulations to Address Crowding Issues**

   Although at first glance it may feel that the City has limited options to address the crowding issues on the lake, this is not necessarily the case. Enforcement staff has the ability to interpret what is considered to be the reckless operation of a boat when the lake is over-crowded; and require that boaters modify or even limit their activity. Should the existing boating laws not sufficiently address the concerns over time, the City has the ability to apply for additional VORRs to further regulate boating on the lake. Examples range from modest changes (e.g. limiting towing activities at peak periods) to aggressive changes (e.g. a complete restriction of power boats on the lake). In the meantime, there is a strong need to help boaters understand the laws of the lake and general etiquette.

   Another avenue is to expand the Community Peace Officers' (CPOs') role on the lake through an application to the federal government under the Canada Shipping Act (Part 10). This added

training and authority given to the CPOs to board vessels, do safety inspections and enforce federal regulations will supplement the on-water efforts that have already been put in place by the RCMP. Use of the Fire Department's rescue boat would be necessary in order to increase the CPOs presence on the water on busy weekends or warm evenings.

5. Use an Incremental Approach and Stakeholder Engagement Strategy

Where possible, the use of incremental approaches is necessary in order to gain stakeholder buy-in. Although enforcement is critical and will be used as required, the reality is that the City has limited human resources and needs to allocate these resources effectively and efficiently.

Peer pressure and developing a culture of safety can also be effective through the development of a Lake Safety Steering Committee, and/or linking certain strategies outlined in this report to the existing role of the Lake and Watershed Advisory Committee. A public engagement framework and plan is needed for the next phase so that the City continues to build its legitimacy, partnership and trust with key user groups and the lakefront community.

If the City ultimately chooses to apply for special boating restrictions in the future, it will be imperative to demonstrate that strong efforts were made to collaborate with all recreational users. With several potential solutions to lake safety issues developed, the engagement process can now move to support the implementation phase.

6. Allocate Adequate Resources

Although the City has traditionally allocated resources to harvesting weeds on the lake in order to ensure safe boating and recreational activity, there is a need to identify and allocate added human resources to address the safety issues outlined in this report. Creative methods should be explored to leverage the City's existing Enforcement, Fire and Parks and Recreation budgets and staffing contingents; and consideration should also be given to developing volunteer roles in the future once pilot strategies have been tested and proven to be successful.

7. Develop a Lake Monitoring and Data Collection Program

In order to better understand safety issues on the lake, there is a need to develop a monitoring and data collection system of boating behavior and activity. The City will be implementing a tracking system at the boat launch, and Administration is also recommended that boating counts and water monitoring metrics be developed and recorded in order to support effective management practices.

8. Develop a Lake Recreation Use Bylaw

The City should seek legal advice and work on select issues that are within its jurisdiction such as:

- restrict moorings and anchored structures on the lake (as per the WID Agreement);
- ensure that new signage on the bridge underpass is enforceable;

- place permit conditions on events which are hosted on City-managed property and which use the lake (and/or apply for a VORR to transfer the approval of lake events to the federal government);
- reflect the lakefront commercial business property restrictions that are already impose on property owners by virtue of the existing WID Agreement;
- explore the necessity of restricting boat noise, exhaustion and muffler system venting.

9. Review the Boat Launch Bylaw

Review launch practices (public and private) and consider whether the Boat Launch Bylaw should become part of a more all-encompassing Lake Use Bylaw; and be expanded to include any other launch or access considerations. For example, if the City permits an event to be hosted on the lake, this may trigger a temporary closure of the public and private launches for the duration of the event. Guidelines may also be considered with respect to launching boats during inclement weather based on a pre-determined protocol. Similarly, there may be safety monitoring protocols that need to be in place in order for commercial activity to take place on the lake.

10. Review the Off-Highway Vehicle Bylaw

Review the Off-Highway Vehicle Bylaw to ensure that Peace Officers have the adequate tools to enforce motorized winter activity on the lake. *It should be noted that federal regulations do not apply to inland lakes and waterways once the lake freezes over. The lake then becomes a provincial and municipal jurisdiction.*

11. Apply for Federal Vessel Regulation Restrictions (VORRs)

Based on conversations with the Transport Canada Boating Officer, the following VORRs may be pursued without undue barriers:

- VORR to create a “no power boating” zone by public swim areas.
- VORR to extend the existing 12 km/hour speed limit that applies to the north end of the lake to include the area south of the bridge; the alternative is to use a non-enforceable slow-no-wake zone in this area as a first intervention.
- VORRs to require permit approvals for all events; this may be done as a shoreline municipal permitting process or as an on-water permitting process completed by Transport Canada.

12. Establish a Waterfront Safety Program for Public Beach Areas.

Additional on-site research is required in order to better understand some of the safety and nuisance factors which exist; and more importantly, what interventions might effectively mitigate these issues.

The following three themes provide an overview of the connection between the issues identified and the recommended regulatory and non-regulatory actions which can be taken to address these issues.

Theme: Physical, Structural or Geographical Factors

With respect to addressing safety issues on the lake, a number of issues surfaced which related to physical structures on the shoreline or obstacles in the water which could result in collisions and accidents. Geographical issues were also identified such as concerns about wake surfing events or regattas which encroached on other users' recreation experience. A summary of the concerns included:

Bridge, Weir ⟶	Narrow and low bridge underpass, dangerous weirs
Obstacles in Water ⟶	Floating debris, boat moorings, rafts, moored inflatables, private docks not being properly maintained and breaking away
Shoreline, Ramps ⟶	Boat Launch ramp which is slippery Unmarked beach swim area at Sunset Park
Winter Obstacles ⟶	Unmarked outdoor rinks
Events ⟶	Non-City hosted events which encroach on other boating activity without adequate pre-notification, communication or planning

Sample Inattentive Behaviours Which Can Heighten the Risk of the Factors Listed Above

1. Operators driving too close to the weirs, or driving too fast under the bridge.
2. Power boaters not watching for floating debris or obstacles in the water.
3. Skidoo operators not seeing windrows or other items around the temporary lake rinks.
4. Boaters not adjusting to boating events which are underway due to lack of knowledge.

Non-regulatory Measures to Consider:

1. Post signage (e.g. bridge underpass) and implement targeted boater education.
2. Do inspections on the lake to monitor debris, moorings, and floating structures.
3. Flag temporary obstacles (e.g. rink windrows).
4. Create a separate area to launch paddle boards and kayaks at John Peake Park.
5. Place "danger" buoys warning about the weirs.

Regulatory Measures to Consider:

1. Apply for a VORR to create a "no power boating" zone by the public swim areas.
2. Create a bylaw or policy to regulate lake events which operate from the shoreline, and/or apply for a VORR to transfer on-lake event permitting to the federal government.
3. Create a lake use bylaw.

Theme: General Boater Behaviour

Throughout the public engagement process, feedback was consistent with respect to issues related to how operators behave on the water, ranging from a general lack of boating knowledge and etiquette to the careless operation of boats; and not recognizing other users' need for a safe zone of operation. These safety issues were reinforced by boat safety experts who confirmed that this trend is common across North America and is a common cause of drowning and accidents. A summary of the concerns included:

Novice Paddle Boarders, Kayakers →	unsafe practices, being in the wrong place
Power Boats/Towing Operators →	lack of knowledge and etiquette, recklessness
Wakesurfers →	not attentive to the impact they have on others

Sample Operator Behaviours Which Can Heighten the Risk

1. Driving too close to other non-motorized vessels such as; sailboats, kayaks and paddle boards.
2. Using random unpredictable patterns (e.g. personal watercraft (PWC) and tubing operators).
3. PWC operators jumping wakes too close to other boats.
4. Wakesurfers creating unsafe large wakes for other users.
5. Driving too close to the shoreline, bridge and docks unnecessarily.
6. Being on vessels during high winds or inclement weather.
7. Drinking or the consumption of controlled substances while operating a vessel.
8. Not spotting appropriately or not having a spotter for towing activities.
9. Non-motorized operators not wearing life vests or paddling in high traffic power boat areas.

Non-regulatory Measures to Consider:

1. Implement a boater safety education program at the boat launch such as the Transport Canada Pleasure Craft Courtesy Check Program"; host user group discussions.
2. Install physical site-specific reminders and interventions (e.g. slow-no-wake buoy zones).
3. Supplement Peace Officer presence on the lake by creating a "water monitor" program.
4. Establish a stakeholder Lake Safety Steering Committee to support safety measures and education.

Regulatory Measures to Consider:

1. Increase the presence of enforcement on the lake by using Peace Officers and enhancing their capacity by obtaining added federal vessel regulation authorization and training.
2. Enforce unlicensed seasonal boating businesses which operate out of lakefront properties.
3. Install buoys 30 m from shore in designated areas in the south basis to signal to boaters of the 10/30 regulation (max. 10 km/hours within 30 m from shore).

Theme: Peak Period, High Traffic and Crowding on the Lake

There are high traffic areas of the lake which experience excessive crowding on hot days in the summer. The risk of drowning or collisions exponentially increases due to the fact that boaters have less space to manoeuvre, and need to drive more defensively and modify (or even limit) their activity. These areas include:

Area Immediately South of the Bridge →	activities include swimming at Anniversary Park, fishing, paddle boards rentals, PWCs, towing activities, power boats entering/exiting launch and going under the bridge
South End of Lake (deep area) →	activities include power boating, wake surfing due to depth of lake, extensive towing activities at Camp Chestermere
Yacht Club Area →	activities include sailing lessons, regattas and power boats traversing through the sailing area

Sample Behaviour Where Operators are Not Adjusting to the Heavy Traffic**:**

1. Driving too close to other vessels and in particular to non-motorized vessels such sailboats, kayaks and paddle boards.
2. Continuing to use random unpredictable patterns and changes in speed (e.g. PWC, tubing).
3. Not reducing speed of vessels creating unsafe large wakes for other users; or inability to react quickly enough.
4. Driving too close to the shoreline, bridge and docks.
5. Non-motorized vessels navigating into heavy motorized traffic areas.

Non-regulatory Measures to Consider:

1. Monitor the areas during peak periods and collect boating data (e.g. boat counts, risks).
2. Install a slow-no-wake zone extending 200- 300 m south from the bridge.
3. Work with specific user groups, rental company and demo operators to enhance safety protocols and monitoring during peak periods using a non-regulatory approach or bylaw approach.
4. Develop a flagging system to alert operators when it is too busy to engage in towing activities.

Regulatory Measures to Consider:

1. Apply for a VORR to extend the 12 km/hour speed limit to include the area south of the bridge (the alternative is to use a non-enforceable slow-no-wake zone).
2. Enforce existing federal vessel regulations – activity can be considered reckless if operators do not modify their behaviour in crowded situations.

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APPENDIX A – Michalski Nielsen Associates Limited Report

APPENDIX B – Marsh McLellan Lake Safety Risk Review

APPENDIX C – Lake Map with Commentary

APPENDIX D – Sample Buoy Placement Map