Alberta Parks

Lois Hole Centennial Provincial Park
Draft Management Plan July 2017

EXECUTIVE SUMMARY

Lois Hole Centennial Provincial Park (LHCPP) protects one of the largest wetlands in the central parkland natural sub-region of Alberta. It is internationally recognized as an Important Bird Area for its abundant and diverse bird populations. The park's location within a busy urban landscape provides provincially significant opportunities for nature-based education and experiences that connect people to nature while supporting community engagement in environmental stewardship. The park also offers limited opportunities for low-impact, nature-based recreation and introduces Albertans to the larger system of Alberta Parks experiences and values.

The following management plan outlines the specific issues, opportunities and challenges relevant to managing a unique and significant Provincial Park within a highly developed urban context. In the plan, each issue is given context, management objectives are identified and associated strategies are provided. The LHCPP Management Plan will become the key reference document used to guide operations, development, decision-making and management of the park, now and in the future. It has been produced in consultation with Albertans, stakeholders and Indigenous communities, and is intended to help achieve conservation of natural and cultural resources, while providing lasting social and economic benefits for Albertans.

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1.0
INTRODUCTION

Photo: Dragomir Drajs Vujnovic

This section provides the context from which LHCPP will be managed, including the regional, historical, legislative and policy context. It describes the park's classification, its role in the overall Alberta parks system and natural regions framework, and the relationship of this management plan to North Saskatchewan regional land-use framework planning and other plans.

Based on the context provided in this section, subsequent sections outline the management objectives, recommendations and strategies that will help achieve the management vision for LHCPP as described on page 6.

1.1 Purpose and Scope of the Management Plan

The management plan is designed to provide a long term and comprehensive framework to guide both park operations and park developments. It has been produced in consultation with Albertans, stakeholders and Indigenous communities, and is intended to help achieve sustainable protection of the valuable natural and cultural values, and to provide stakeholders and Albertans a place for community engagement, stewardship, education, and scientific research.

Management plans enable effective decision-making, management for recreation and conservation values, and help address land management conflicts in parks. The LHCPP Management Plan is broad in scope, and provides operational guidance for park management for a ten year period. The management plan:

- Defines how the park will be managed to maintain and restore ecological health and protect key natural and cultural values;
- Defines specific objectives for the four key Alberta Parks program goals of Conservation & Protection, Learning & Engagement, Outdoor Recreation & Healthy Living, and Tourism & Community;
- Describes the type and extent of outdoor, nature-based recreation and tourism opportunities, facilities and services that will be permitted;
- Describes the services and facilities that will be provided to enable visitors to explore and learn about the site's natural and cultural values;
- Identifies issues, concerns and conflicts, and provides recommendations for remedial actions;
- Identifies infrastructure development requirements that will enhance outdoor, nature-based recreation opportunities and ensure that recreational use occurs in appropriate locations and in environmentally acceptable ways;
- Recommends effective and efficient allocation and prioritization of fiscal and staff resources.

The management planning area includes the lands currently within the Lois Hole Centennial Provincial Park boundary

as legally described in the Order in Council (Government of Alberta, 2005). Land use in the surrounding watershed could significantly impact the Big Lake ecosystem and the park, therefore management recommendations are also made for adjacent lands and additional lands within the 1:100 year flood plain that are desirable lands for park acquisitions. The management plan focuses primarily on lands that are within the existing park boundary.

This document outlines the unique considerations relevant to managing Lois Hole Centennial Provincial Park within the context of its role in the system of Alberta's Provincial Parks. In the plan, each issue is given context, management objectives are identified, and corresponding strategies are provided.

1.2 Management Vision

Stakeholder input shaped this vision statement, which summarizes the ideal future state of the park.

Lois Hole Centennial Provincial Park protects a unique and important wetland ecosystem and connects people to nature through educational and low-impact nature-based experiences.

The park models how biodiversity and urban development can exist in harmony, and facilitates community engagement in environmental stewardship and nature appreciation.

All activities that happen in the short- and long- term within the park must support and be consistent with this vision. Activities that conflict with this vision will not be permitted.

The goals, objectives, and associated management strategies specified in the management plan all are designed to contribute to the achievement of this vision.

1.3 Guiding Principles

Alberta's Plan for Parks (2009) lays out a number of Guiding Principles to help navigate an increasingly complex decision-making environment where needs are diverse and sometimes competing. As per the Plan for Parks, and tailored to suit the unique context of LHCPP, the following principles will guide decision-making and management of Lois Hole Centennial Provincial Park:

Knowledge-Based Decision-Making: Decision making is informed by natural and social science, evidence and experience, which includes traditional knowledge of Indigenous peoples.

Environmental Leadership: Management and operations demonstrate environmental leadership and employ best practices in energy and water efficiency, environmental design, construction practices and products.

Education: Alberta Parks strives to inform, inspire and involve Albertans to increase their understanding of, responsibility for and connection to the natural world.

Integrated management: Management decisions consider the combined impacts of environmental, economic and social factors.

Accountability: Milestones and deliverables are established and Albertans receive timely information regarding progress.

Collaboration: Integration and collaboration with adjacent communities, municipalities and developments to ensure alignment of management actions in support of mutually beneficial outcomes.

Citizen Engagement: Albertans have opportunities for meaningful input into decisions about parks; the decision-making process is inclusive and transparent. Increased value for visitors will be created and common goals will be achieved through the application of the Alberta Parks engagement and consultation policy.

Inclusion: Apply the Alberta Parks Inclusion Strategy, working to ensure facilities and programs are designed so that multiple needs are considered.

Shared Stewardship: Shared stewardship implies a collaborative approach among land managers and users in managing and caring for the land and associated ecosystems. Shared stewardship requires that government agencies – having a legislated mandate for land and resource management – work cooperatively with disposition holders, resource users, and interest groups to achieve common stewardship goals.

Adaptive Management: Recognizing that the future cannot be predicted perfectly, adaptive management means modifying planning and management action as better information becomes available. Adaptive management applies a science-based approach; meaning management decisions are informed by good advice and based on rigorous, fact-based knowledge. Monitoring is a

critical component of the adaptive management approach. Input from affected stakeholders and land managers will be sought during adaptive management processes.

Ecosystem-based Management: Ecosystem management requires an understanding of the processes by which natural systems sustain themselves and that management actions emulate natural processes so as to maintain healthy, self-perpetuating ecosystems.

1.4 The Planning Process

The planning process is integral to the development of a comprehensive park management plan. There are seven main stages in the planning process: pre-planning, strategy development, draft plan and reviews, approvals, implementation, monitoring and evaluation, and reviews. Typically, these stages occur in a sequential manner.

During the pre-planning process and development of this management plan, Indigenous communities and stakeholders were engaged through a variety of meetings and one-on-one discussions between 2016 and 2017. Recommendations and advice from those meetings have been reflected in this plan, where appropriate.

Draft and final plan content was developed collaboratively between staff from Alberta Parks and other government divisions and departments. The dialogue with other government departments or divisions will continue throughout implementation. As identified in the plan, implementation also requires ongoing dialogue and/or partnerships with First Nations, stakeholders, and the public.

During the development of Lois Hole Centennial Provincial Park Management Plan, the four surrounding municipalities, (St. Albert, Edmonton, Parkland County, and Sturgeon County), were engaged in an iterative process structured around workshops, meetings, and conference calls. These discussions focused on matters of municipal excellence, environmental protection and recreation planning. Municipal representatives from the departments of planning and development, environmental sustainability and recreation were engaged to determine environmental best practices for adjacent land uses and to determine linkages for public recreation and community engagement and stewardship.

A formal 60-day public review and consultation on the draft plan is a critical part of the planning process, as outlined by the Alberta Parks Consultation Framework. Feedback from this process contributes to the drafting of the final plan.

Monitoring and review will commence as the plan is implemented. Strategies and objectives will be reviewed and evaluated periodically and status reports will be prepared. A formal plan review will occur in the 10th year of implementation.

1.5 Alberta's Provincial Parks System

The Plan for Parks (2009) outlines the strategic direction for the Alberta Parks system, and acknowledges the environmental, cultural and economic importance of parks to the people of Alberta. It aligns the management of Alberta's parks with the Land-Use Framework, which guides land-use management and decision-making at the regional scale.

1.5.1 Alberta Parks Strategic Direction

Alberta's Plan for Parks provides the high level management direction for the Parks program. The Plan addresses the need to provide strategic direction in order to effectively manage Alberta's parks in the face of challenges such as urbanization, recreational pressures, population growth, and maintaining biodiversity. Alberta's Plan for Parks states a vision for the Parks program:

"Alberta's parks inspire people to discover, value, and enjoy the natural world and the benefits it provides for current and future generations"

This vision emphasizes the social benefit of parks, as well as the importance of conserving parks for future generations. This strategic vision applies to all parks within the Alberta system, as the system is a sum of its parts and each park contributes to this vision.

Management of Alberta's parks is aligned with the Government of Alberta's strategic direction for land management. Alberta's Plan for Parks and the Land-Use Framework (2008) share the following overall desired outcomes:

- People friendly communities and recreational opportunities
- Healthy ecosystems and environment
- Sustainable prosperity supported by our land and natural resources

These three desired outcomes are not ranked by priority. They are inter-related and must be achieved together to meet the expectations of Albertans.

Alberta Parks has adopted four overarching goals that are indicative of the integration of several outcomes that parks and protected areas contribute to land management. The common goals of outdoor recreation/healthy living, learning/stewardship, protection/conservation, and tourism/community are linked to the desired outcomes in Alberta's Plan for Parks.

Conservation & Protection: Parks conserve Alberta's natural heritage and associated cultural heritage for current and future generations.

Learning & Engagement: Parks offer an opportunity to learn about, appreciate and care for Alberta's natural and cultural heritage.

Outdoor Recreation & Healthy Living: Parks provide diverse, enjoyable outdoor recreation opportunities that contribute to healthy lifestyles.

Tourism & Community: Parks foster sustainable, nature-based experiences for Albertans and visitors that contribute to the economic and social fabric of Alberta.

The four program goals span the breadth of the Alberta Parks program, and are achieved through the delivery of management objectives and actions across the entire parks system. In other words, no single park can achieve all of these program goals; they are achieved broadly across the span of the entire system.

1.5.2 Legislation, Regulation & Policy

Legislation, regulation and policy are three forms of over-arching guidance that provide direction to any planning and management within the provincial parks system. Alberta's provincial parks system spans eight classifications of parks managed according to three pieces of legislation: the Provincial Parks Act, the Wilderness Areas, Ecological Reserves, Natural Areas and Heritage Rangelands (WAERNAHR) Act and the Willmore Wilderness Park Act. These three pieces of legislation and their associated regulations define major areas of intent, responsibility and operating parameters for all eight classifications of parks. All planning, management and operational actions must be in alignment with these legislation and regulations.

Table 1 in Appendix A illustrates these three pieces of legislation, the eight classifications of parks and the purpose of those classifications.

Policies are created to interpret the legislation and provide clear direction, guidance and set limits on a variety of issues related to park management. There are three levels of policies that provide guidance to the provincial park system: program policy statements, procedures and directives. Program policy statements clarify the approach taken in managing specific activities within parks (such as trapping). Procedures and directives explain how to operationalize specific activities within parks (such as the use of remote cameras).

Other pieces of provincial and federal legislation, regulation, and policy also help guide the management of the provincial parks system. Legislation that directs the management of public land, industrial activities, fish and wildlife, endangered species, invasive species, water protection and use, and many others are also important in the effective management of the provincial parks system within the broader landscape. The specific legislative and policy relevant to LHCPP is outlined in section 1.8.

1.5.3 Natural Regions Framework

One of the core purposes of the Alberta Parks system is to preserve the natural landscapes, features and processes that represent and sustain the province's environmental diversity. The Natural Regions Framework (Natural Regions Committee, 2006) describes the environmental diversity and landscape classification hierarchy that divides the province into ecological units based on landscape patterns and natural characteristics, including landform features, hydrology, climate, geology, soils and vegetation. The Conservation Framework for Alberta Parks builds on this framework and serves as a tool to help measure progress towards completing a network of representative protected areas (Alberta Parks, 2015)

Natural regions provide the big picture of Alberta's landscapes and they are the largest mapped ecological units in our classification system. Each individual natural region contains landscape patterns with a mix of vegetation, soils and landform features that differ from the other natural regions. Alberta is divided into six natural regions: Boreal Forest, Rocky Mountains, Foothills, Canadian Shield, Parkland and Grassland. These six natural regions are further subdivided into 21 Natural Subregions. Subregions are composed of areas with similar landscape patterns within a natural region that are distinct from other subregions in that natural region. Different criteria, matched

to the range and scale of natural features that occur within the natural region are used to separate the subregions.

On a finer scale, the hierarchy is then divided into three nested levels of natural history themes: natural landscape types; natural landscape components; and, natural features. These are the key working levels of the classification. They provide a practical scale for describing the full range of Alberta's natural diversity. Natural landscape types are significant and highly recognizable landforms or ecosystem complexes within a subregion. Natural landscape components are still relatively broad features: usually a vegetation type, wetland type or landform grouped within a natural landscape type. Natural features identify a specific aspect such as a geologic feature, ecological community or species commonly associated with the natural landscape component. Together with natural regions and subregions, natural history themes make up a five-level hierarchical classification system. For example, moving from finest scale up to the broadest, western painted turtle is a natural feature within the tall shrubbery natural landscape component of the valley/ridge – floor/stream natural landscape type. These are all nested within the Dry Mixedgrass natural subregion of the Grassland natural region.

A description of the Natural Landscape Types, Components and Features present at LHCPP is provided in section 3.0[1].

1.5.4 Alberta's Protected Areas Contributions to National Conservation Initiatives

In 2010, as part of worldwide efforts to safeguard biodiversity and the benefits it provides to people, the Conference of the Parties for the Convention on Biological Diversity (CBD) adopted a Strategic Plan for Biodiversity 2011-2020. This plan includes 20 ambitious global biodiversity targets, known as the 'Aichi Targets', to be achieved by 2020, aimed at reversing the decline of biodiversity. Aichi Target 11 specifically commits countries to increase the size and quality of their networks of protected areas and other conservation areas to include at least 17 per cent of terrestrial areas and inland waters.

As one of 195 state parties that are signatory to the CBD, Canada committed to establishing national targets in support of the Aichi Biodiversity Targets. In 2015, Canada adopted a suite of 19 national targets known as the "2020 Biodiversity Goals and Targets for Canada". Recognizing that protected and conservation areas are the cornerstones of any effort to conserve biodiversity, Canada Target 1 (linked to Aichi Target 11), states: "By 2020, at least 17 percent of terrestrial areas and inland water, and 10 percent of coastal and marine areas, are conserved through networks of protected areas and other effective area-based conservation measures."

Alberta reports areas that qualify as 'Protected Areas' or 'Other Effective Area-Based Conservation Measures'[2] for Canada Target 1 to the Conservation Areas

Canada Target 1

Although Canada Target 1 commits to extending protected and conservation area networks to at least 17 per cent of terrestrial lands and inland waters by 2020, it also includes "guiding elements" intended to prioritize the work. The guiding elements indicate that the target areas and networks should be of particular importance for biodiversity and ecosystem services, effectively and equitably managed, ecologically representative and well connected and integrated into the broader landscape.

Alberta is co-leading the federal-provincial-territorial initiative known as "Pathway to Canada Target 1", developing direction and guidance towards the achievement of the target by 2020 in Canada. Alberta is also currently developing a strategy to guide our provincial contribution to Canada Target 1 that will include a strong focus not only on achievement of the area-based 17 per cent target, but also on ensuring the network is ecologically representative and effectively managed.

1 For more information: Natural Regions & Subregions of Alberta. A Framework for Alberta's Parks. *http://www.albertaparks.ca/media/6256258/natural-regions-subregions-of-alberta-a-framework-for-albertas-parks-booklet.pdf*

2 Alberta and Canada adopt the internationally accepted IUCN definition of a Protected Area: "A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values". At the time of writing the definition for 'Other Effective Conservation Measures' was being finalized internationally, and in Canada.

Reporting and Tracking System (CARTS). Each park is screened using national criteria based on IUCN standards and developed by the Canadian Council on Ecological Areas (CCEA), to evaluate and report areas. The eligible portions of each protected area that meet the standards for reporting are assigned an IUCN Protected Areas Category and included in the CARTS database. LHCPP is eligible to be reported against Canada Target 1 as a protected area. The provincial park qualifies as an IUCN Category II Protected Area: protected area managed mainly for ecosystem protection and recreation /' National Park'.

1.6 Lois Hole Centennial Provincial Park: Overview

Lois Hole Centennial Provincial Park was designated on April 19, 2005, in honour of the late Lieutenant Governor the Honourable Lois Hole. The park encompasses the former Big Lake Natural Area, which was established in 1999, and is located along the western edge of the cities of St. Alberta and Edmonton and is bordered by Parkland County to the South-west, and Sturgeon County to the North-west.

LHCPP is centered on Big Lake, located at Twp. 53–Rge 26–W4 and includes 1,974 hectares of lake and wetland complex in the Central Parkland Natural Region, which is the most densely populated natural region in Alberta.

1.6.1 Park Classification

Alberta Parks' current classification system consists of eight classes of parks and protected areas (see Appendix A). All sites are assigned to the various classes based on defensible, consistent province-wide criteria. Formerly classified as a Natural Area, the site was then expanded to incorporate recent land purchases, and in 2005, was designated as a Provincial Park under the Provincial Parks Act.

Provincial Parks are established with a primary objective for the conservation of nature (and associated cultural features) where nature-based outdoor recreation, tourism and education objectives may also be significant. Sites in this class typically provide opportunities for outdoor recreation, tourism and education, which depend on, and are compatible with, the conservation objectives.

A wide range of park experiences and uses are possible in Provincial Parks, from being international tourism destinations to providing solitude and adventure to quality time for family and friends, and to discovery and stewardship. Experiences inspire people to reconnect with nature through leisure, learning or recreational activities. Visitors can expect nature-based recreation opportunities which promote the appreciation of the park's natural and cultural features. These activities may be supported by facilities and interpretive or education programs to the extent that the activities are compatible with conservation objectives.

1.6.2 Role in the Alberta Parks System

Not all sites within the Alberta Parks system offer the same types of opportunities or have the same types of conservation potential or values. The following Role in the System Statement describes LHCPP's specific contributions to the Alberta Parks' goals outlined in section 1.5.1. The Site Significant Statement highlights the unique and special features and values present within the site.

Role in the System Statement

Lois Hole Centennial Provincial Park protects one of the largest wetlands in the central parkland natural sub-region. It is internationally recognized as an Important Bird Area for its abundant and diverse bird populations. The park's location within a busy urban landscape provides provincially significant opportunities for nature-based education and experiences that connect people to nature while supporting community engagement in environmental stewardship. The site also offers limited opportunities for low-impact, nature-based recreation and introduces Albertans to the larger system of Alberta Parks experiences and values.

Site Significance Statement

Situated in the most densely populated Natural Region in Alberta, and largely surrounded by the second largest municipal population centre in the province, Lois Hole Centennial Provincial Park conserves an important freshwater wetland ecosystem with bio-diverse riparian, aquatic, and semi-aquatic habitats surrounded by small stands of deciduous and coniferous woodlands. The park lies entirely within the Central Parkland Natural Subregion, the large majority of which has been developed for agricultural or other purposes and has only 5% of its area left in native vegetation. As a healthy, functioning wetland ecosystem, Lois Hole Centennial Provincial Park is a significant haven for a diversity of wildlife. With over 235 bird species recorded in the park, and recognized as a globally significant Important Bird Area, LHCPP provides critical habitat for several federally designated species including trumpeter swan, Sprague's pipit, and peregrine falcon.

Lois Hole Centennial Provincial Park also contains significant unusual and rare features. The delta of the lake

forms a regionally significant birds-foot delta at the mouth of the Sturgeon River. With its many distributary channels extending into the lake like claws, it is one of only three of its kind found in the province. Deltas are important for shoreline protection, and provide critical habitat to many species, including birds. Although the majority of the park is covered by water, the relatively small upland areas protected within the park contain a surprising diversity of vascular plant species, including a rare community type known as the "fern forest". The isolated patch is dominated by ostrich fern and balsam poplar, and is also the most diverse community within the park, containing approximately 84 species of vascular plants.

Bordered by four growing municipalities and within an hour drive for over a million people, the park provides a unique opportunity to experience a wetland landscape that is surrounded by a largely urban environment, but manages to retain the sense of being a natural setting. As a living legacy to the late Lieutenant Governor, Lois Hole Centennial Provincial Park serves as a platform for education and community engagement, helping people understand the interaction of an urban landscape with a natural environment. The park helps visitors to explore a unique wetland ecosystem, and fosters a sense of curiosity and appreciation for "nearby nature", encouraging visitors to discover the broader provincial parks system.

1.6.3 History and Cultural Heritage

"If we hope to preserve our way of life, the first thing we must do is rediscover our respect for the land, the water, and the entire natural world. And if we do manage to regain that respect, then we must make sure that human beings never lose it again"

– Lois Hole

Archaeological sites found within and close to the park boundary around the lake indicate that Big Lake was an important site for Indigenous peoples as long as 5,000 years ago. The recorded histories of St. Albert and other communities in the area reference the importance of Big Lake for its abundant and diverse natural resources.

Settlers from the St. Albert Mission, founded in 1861, hunted waterfowl on Big Lake and moose and deer along its shores. They fished its waters and trapped beaver and muskrat from the wetlands in the surrounding area. The lake and river provided drinking water to St. Albert residents into the 1900s. Hunting was a relatively popular recreational use of the area prior to the establishment of the Provincial Park. As residential development continued in the area, popularity gradually declined, and upon establishment of Lois Hole Centennial, hunting was prohibited on the lake. Lands owned by Ducks Unlimited to the northwest of the park are still frequented by hunters.

On May 5, 1999, Big Lake Natural Area was established through the Special Places 2000, an initiative which set out to identify places in Alberta to protect and conserve for their unique cultural, recreation or ecological values. At an area of 1,119 hectares, and bordered by four municipalities; Sturgeon and Parkland Counties, and the Cities of Edmonton and St. Albert, the park encompassed the shoreline of Big Lake. From the park's inception, the Cities of St. Albert and Edmonton and the Counties of Parkland and Sturgeon partnered with Alberta Parks to guide management of the park and surrounding lands. The focus of this partnership has been to integrate the conservation, nature-based recreation, tourism and educational interests of the five jurisdictions.

A few kilometres downstream along the Sturgeon River from Big Lake, a woman named Lois Hole and her husband Ted bought a mixed farm in St. Albert in 1952. Over the years, they involved their sons in building a strong family legacy of producing locally grown vegetables and plants to St. Albert residents. Lois Hole became well known as a successful businesswoman, best-selling author, education advocate and community supporter.

In December of 1999, Prime Minister Jean Chretien appointed Lois Hole as Alberta's 15th Lieutenant Governor. She was the second woman in Alberta's history to serve in this office. In 2004, Albertans requested that she remain in office although her term was due to end. Prime Minister Paul Martin extended it for one year so that she could preside over Alberta's centenary ceremonies in 2005. Sadly, she succumbed to cancer early that year.

On April 19, 2005, Big Lake Natural Area was replaced and expanded by Lois Hole Centennial Provincial Park. It was designated in honour of the beloved late Lieutenant Governor, the Honourable Lois Hole, and to create a lasting legacy of Alberta's centennial year.

The Hole family farm was later incorporated as Hole's Greenhouses & Gardens Ltd. It has since grown into one of the largest retail greenhouse operations in western Canada. The Hole Enjoy Centre is now located across Ray Gibbon Drive from Lois Hole Centennial Provincial Park.

1.6.4 Protected Area Management Effectiveness

Alberta's commitment to Canada Target 1 includes ensuring that protected areas are effectively managed. To this end, Alberta Parks is developing and piloting a suite of tools designed to assess values and threats and evaluate management effectiveness based on a global standard framework called protected areas management effectiveness (PAME).

A range of different tools have been developed to help inform PAME evaluations, including:

- Assessment of values and design risks at both local and system-wide scales;
- Assessment of stressors and threats;
- Evaluation of management systems and processes; and
- Evaluation of delivery of objectives according to site values.

A PAME evaluation pilot was conducted for LHCPP as part of the management planning process. It involved assessments to identify conservation and social values and assessments to determine stressors and threats to those values followed by a management effectiveness evaluation using an enhanced Management Effectiveness Tracking Tool. The results from the LHCPP PAME pilot are woven throughout the management plan; the evaluation and assessment tools, which were informed by data and expert opinion, helped to identify the site values and informed the management objectives of the plan. The evaluation also helped to identify knowledge and research gaps which will be addressed throughout the lifespan of the plan (see section 8.0).

A summary of the results of the values and threats assessments, along with a "PAME Report Card" summarizing the results of the preliminary evaluation are provided in Appendix H.

1.7 Current Use and Development

1.7.1 Access

LHCPP is accessed by road from Ray Gibbon Drive with parking for vehicles and school buses located adjacent to the John E. Poole interpretive wetland and boardwalk (*see map: Lois Hole Centennial Provincial Park: Adjacent Land Uses*). This parking lot is the only designated and official parking lot within the park, however there are several other unofficial parking areas currently in use, including:

- Kinsmen Club of St. Albert: Visitors can park at the Kinsmen club on Riel Drive in St. Albert, and walk along the trail in Red Willow Park, under the Ray Gibbon Drive underpass and into the park at the North end of the boardwalk near the BLESS viewing platform.
- 137 Ave: There is some access to the informal trails along the south shore of Big Lake at 137 Ave. and 199 St. in Edmonton. Vehicles are sometimes parked along 137 Ave, or along the road allowance leading to the wellsite in the northeast quarter of section 19.
- 231 St.: Vehicles are sometimes parked at the end of 231 St.
- Devonian Way: Vehicles are sometimes parked at the end of Hwy 60 (Devonian Way).

Access to the park from the North is currently relatively limited. A parking lot off of Meadowview Drive on the Ducks Unlimited property is used by visitors to that site, and may also facilitate access to the lake's North West shore.

There are St. Albert Transit bus stops at the Enjoy Centre and along Riel drive in close proximity to the Kinsmen club and the Red Willow park. Edmonton Transit Service runs a bus route through the Hawks Ridge, Trumpeter and Starling neighbourhoods on the south side of Big Lake.

Access to Big Lake by canoe and kayak was predominantly facilitated through an informal launch on the bank of the Sturgeon river in St. Albert's Rotary Park. In the Spring of 2017, the City of St. Albert installed a removable boat launch for canoes and kayaks in this location.

There is also a limited amount of informal access for canoe and kayak use along the banks of Atim creek at the west end of the lake. Access in this area is subject to seasonally changing water levels and ground conditions, and the environment is not consistently suitable for accessing the lake in this area.

1.7.2 Facilities and Amenities

East Day Use Area

All official park facilities are located in the immediate vicinity of the John E. Poole Interpretive Wetland at the Eastern edge of the park, adjacent to St. Albert and bordered by Ray Gibbon Drive. This area includes the Ducks Unlimited John E. Poole Interpretive Wetland boardwalk and associated interpretive signage, the wildlife viewing platform

developed by the Big Lake Environmental Stewardship Society (BLESS), and a parking lot, vault toilets, and picnic shelter constructed by Alberta Parks. The short trails in this area connect to the parking lot and day use area within the Red Willow trail system in St. Albert.

Visitor Parking
Parking is provided in the East Day Use Area to support visitor access to the John E. Poole wetland. A total of 45 standard parking spots exist on site, and there is designated space to accommodate 4 school buses.

Existing Informal Trails
In addition to the boardwalk, a main visitor attraction to the park is a network of informal, non-designated trails running from the west end of the parking lot through and adjacent to the wooded area along the south shore of the lake past 137 Ave. These trails are popular among bird watchers and other visitors looking for "rustic" walking trails in a natural setting and are used year round. They are also used by cyclists in all seasons.

Future Environmental Learning Centre Site
In 2010, the Government of Alberta signed a Memorandum of Understanding (MOU) with the City of St. Albert and Beaverbrook Developments for the donation of lands to expand the Eastern portion of the park. Under this agreement, the then Department of Tourism, Parks and Recreation agreed to develop an environmental learning facility in this area in exchange for the land donation. The MOU recognized that timing of construction of this facility is dependent on availability of provincial or other funding sources. Management objectives related to the Environmental Learning Centre are described in section 6.1.1.

1.7.3 Other Infrastructure and Dispositions
Any industrial activity occurring in parks is a result of a pre-existing commitment, approved prior to the park's establishment. Applicable to LHCPP, the Government of Alberta's policy to honour pre-existing mineral commitments are described in Alberta Energy Information Letter 2003-25.

There are 18 active dispositions within LHCPP boundaries. There are 15 industrial agreements including 4 wellsites, 11 pipelines, and 4 access roads. There is one full section and several additional small pieces of freehold mineral licenses within the park. There are 12 individual petroleum and natural gas agreements within the park, which predate park designation. Although the pre-existing mineral agreements do not currently have associated surface activity, it may occur in the future. Administration and management of industrial activity is done by granting a surface disposition. Applications for new surface dispositions for existing surface or subsurface commitments are honoured as necessary 'extensions' to an existing commitment, subject to a review through the current application and approval process. Alberta Parks works with the client and with Alberta Energy to determine if surface access within the park is necessary, or if the client should access the resource from outside the park boundary. Subsurface leases may still be purchased, but would be sold with a no-surface access addendum. This restriction prevents new surface access to new leases that were not pre-existing commitments.

Reclamation of industrial sites, once the use is extinguished and infrastructure has been removed, is a legal requirement of the disposition holder. Reclamation is the process of returning land to its former state or other productive uses; typically the goal is to restore sites back to their natural states or a desired end state as identified by Alberta Parks. The Government of Alberta and industry work together to ensure that reclamation is done to the highest possible standard and meets site-specific requirements before a reclamation certificate is granted. Alberta Parks is actively working with disposition holders to reclaim well sites, pipelines and disturbed areas.

There is a network of historic drainage canals, constructed before the area became a provincial park, running through the western part of the park, and in some areas draining into Atim Creek. The specific purpose, history and current function of the canals is presently unknown.

Two overhead power lines owned by AltaLink pass through the park. One high tension power line, situated at the east end of Big Lake passes through the park very close to the mouth of the Sturgeon River. Another power line right of way is located along the southern boundary of a parcel of recently acquired land (yet to be added to LHCPP) directly north of Edmonton Springs Golf course on the south west shore of Big Lake (*see map: Lois Hole Centennial Provincial Park: Adjacent Land Uses*).

1.7.4 Land Acquisitions
Conservation and preservation of native ecosystems on lands adjacent to the park are important and help achieve park goals. Since 1999 when Big Lake Natural Area was established, a number of land acquisitions have added almost 700 hectares to the park. These are lands that have been purchased by the Government of Alberta from private landowners, or in some cases, donated to the province.

In order to enhance ecological integrity, and also to augment the provision of nature-based recreation within the park, acquisition of lands that are adjacent to the park will be considered as opportunities arise. In partnership with the surrounding counties and cities, it was agreed that lands within the 1:100 year floodplain are a priority focus for any future land acquisition. Lands within the two cities above the flood plain that identified as suitable for park facility development were also identified as desirable park lands. It is important to note that all purchases are done on a willing seller basis, at fair market value as determined by independent appraisal. Typically, available lands are either listed by the owner on the real estate market, or in some cases, landowners have approached the Government of Alberta directly with an offer to sell.

Lands that have been or will be purchased for inclusion into the park must be legally added to the park by an Order in Council. Previously purchased lands that are not yet within the park are identified on all of the maps within this management plan as "future additions to Lois Hole".

1.7.5 Park Users

Currently there is little information available, other than anecdotal information and informal observations from community members and staff, about current park use. Visitor demographics, visitation numbers and statistics, patterns of use and associated trends represent significant social science information gaps. The need for social science monitoring and research is discussed in section 8.0

1.8 Legislative and Planning Context

1.8.1 Provincial Legislation and Policy

In addition to the Plan for Parks, decision-making and management of LHCPP will be guided by existing and upcoming Alberta Parks policies and strategies such as the Social Science Framework, Science Strategy, Inclusion Strategy and with broader government and departmental initiatives, programs and policies such as the Active Alberta Policy, Tourism Framework, the Alberta Invasive Species Program, Respect our Lakes, and the Alberta Wetland Policy (2013).

Management of LHCPP is subject to the following major provincial legislation and associated regulations:

- Provincial Parks Act
- Environmental Protection and Enhancement Act
- Historical Resources Act
- Municipal Government Act
- Public Lands Act
- Water Act
- Wildlife Act
- Alberta Land Stewardship Act

1.8.2 Applicable Federal Legislation

Federal legislation that is most relevant to the management of LHCPP includes:

- Canadian Environmental Assessment Act
- Fisheries Act
- Migratory Birds Convention Act
- Navigable Waters Protection Act

1.8.3 Municipal Legislation and Policy

As per the Municipal Government Act (MGA), municipalities have statutory plans and regulatory documents in place that provide a policy and regulatory framework to guide land use planning and management of both public and private property. These include:

Municipal Development Plan (MDP): The overarching municipal policy framework that provides context for the entire community and helps guide decision-making for future change, growth and development. A key component of an MDP is the future land use concept which sets direction for the future development of lands in the municipality.

Intermunicipal Development Plan (IDP): A shared policy framework between two or more municipalities.

Area Structure Plan and Area Redevelopment Plan (ASP/ARP): These provide direction for future development in a particular area of a municipality. At minimum they must address the sequence of development, proposed uses and population densities, the location of transportation routes and public utilities, and any other matters as set by Council.

Land Use Bylaw (LUB): Used to regulate the type, location and intensity of land use and buildings within a municipality.

Municipalities are not required to submit statutory plans to the Province for input and feedback but some may do so as part of their individual planning processes. The four adjacent municipalities are members of the Capital Region Board (CRB), a regional organization composed of 24 municipalities in the Edmonton Metropolitan Region. The CRB mandates the development of a Regional Growth Plan and a Regional Evaluation Framework that impacts land use planning and management in the member municipalities.

Each of the four adjacent municipalities has a MDP that provides policy direction for land use management and an LUB that sets accompanying regulations. Regulatory zoning of lands adjacent to LHCPP imposes restrictions on use and development on environmentally sensitive lands. Each municipality has restrictions related to development within flood plains based on Government of Alberta Flood Hazard Mapping (2017).

The MGA also allows municipalities to designate private lands as reserves and easements for more specialized use and management, including environmental reserves (ERs) and municipal reserves (MR) which are triggered during the land subdivision process. ERs provide municipalities with a tool to protect environmentally sensitive lands that are considered undevelopable and MRs are used to provide public amenities such as parks, trails, and access to waterbodies. A non-contiguous pattern of ERs and MRs have been designated along the south and southeast boundary of the park and on lands in close proximity to the park where residential subdivision has occurred (***see map: Lois Hole Centennial Provincial Park Adjacent Land Uses***). Many of these reserves serve as active buffers against environmental impacts of adjacent land uses and activities and contributed to the conservation values of the park.

1.8.4 North Saskatchewan Regional Plan and the Land Use Framework

The Alberta Land Stewardship Act sets out the legal basis for the Land-use Framework Regional Planning process in the province. The purpose of regional planning is to support the numerous policies and strategies that guide natural resource development, support economic growth and protect the environment. Regional plans integrate these policies and strategies at the regional level and provide the policy direction for decision makers at the federal, provincial and local levels.

LHCPP lies within The North Saskatchewan Region (NSR), which is located in central Alberta and has approximately 85,780 square kilometres, or just under 13 per cent of Alberta's total land base. The region is bordered by Saskatchewan to the east, British Columbia to the west, the Upper Athabasca and the Lower Athabasca regions to the north and the South Saskatchewan and Red Deer regions to the south. The region has a large and diverse landscape, which contains the Rocky Mountains, rolling foothills and prairie parkland.

Regional parks plans will be developed for each of the seven Land-use Framework planning regions in Alberta including the NSR. The NSR regional parks plan will provide broad direction for all parks within the region. All site-specific management plans, including the LHCPP management plan will be reviewed and updated as appropriate to ensure alignment with land-use framework plans.

1.8.5 Non-Statutory Plans

There are a number of non-statutory plans with applicability to the management of Big Lake and LHCPP. These plans range in geographic reach from the local and regional levels to the global scale, and range in scope from species or ecosystem, issue, or site-specific to plans that are much broader in scope and covering a diversity of management issues. These plans include:

- Important Bird and Biodiversity Areas Program
- Partners in Flight Canada
- North American Waterfowl Management Plan
- The Ramsar Convention
- Convention on Biological Diversity
- Canadian Biodiversity Goals and Targets
- North Saskatchewan Integrated Watershed Management Plan
- IUCN Global Protected Areas Programme
- Big Lake Storm water Management Plan
- Water for Life

Management activities will be aligned with these other planning initiatives and Alberta Parks will seek opportunities to partner and collaborate with agencies responsible for these plans.

2.0
LHCPP ZONING FRAMEWORK

Photo: Dragomir Drajs Vujnovic

Zoning is a tool for managing provincial parks and wildland provincial parks, as both classifications have significant recreation and conservation values, multiple objectives and management priorities. Zoning works by dividing each park into spatial units based on coarse ecological values, consistent management objectives and permitted uses. Zones help provide certainty and clarity around the area's management intent for the public, park stakeholders, Indigenous peoples and parks staff. As far as possible, the zones are described using identifiable boundaries or legal units.

A summary of the four types of zones applied in provincial parks and wildland provincial parks is as follows:

Natural Landscape Zone:

- This is the default zone. It applies to the entirety of the site unless another zone has been applied.
- The conservation of nature is the primary objective, while also allowing for a range of nature-based, low-impact outdoor recreation, tourism and learning opportunities. Trails and minor facilities such as small staging areas may be permitted in this zone.
- Incorporates most of the natural or near-natural landscapes outside of a Wilderness Zone.
- Includes wilderness areas that do not meet criteria for Wilderness Zone due to industrial commitments.

Wilderness Zone:

- Large remote areas that are free of industrial activities, are relatively undisturbed by human activities and where there are no roads.
- Typically greater than10,000 hectares in size, but smaller areas that exemplify remoteness and distance from road access may justify inclusion.
- Conservation of biodiversity is a primary focus where natural forces and processes predominate.
- Public access must be managed to a level that maintains remoteness and wilderness qualities.
- Backcountry or wilderness setting.

- Few if any facilities and designated trails kept to a minimum.

Facility Zone:
- Outlines and confines development and major facility footprint to a strictly bounded area.
- Minimizes extent of impact on natural values by curbing "development creep".
- Facility-oriented and focussed on infrastructure related to visitor experience.
- Facility zones are best limited to areas with current facility footprints or areas identified in approved or publicly developed plans that have undergone environmental review.

Special Protection Zone:
- These zones are designed for the conservation or showcasing of superlative, sensitive, unique or rare features or areas, such as natural and cultural features of provincial or greater significance.
- Uses in each Special Protection Zone will be prescribed for each site on an "as needed" basis.
- Access and/or use may be restricted or prohibited in the zone in either space or time.
- Facilities are limited to those necessary to safely experience the site, but may be entirely restricted otherwise.

Proposed zoning for LHCPP is designed to meet a number of management objectives (*see map: Lois Hole Centennial Provincial Park: Park Zoning*). The park includes two areas (purple shaded) categorized as special protection zones and three small areas (orange shaded) categorized as facility zones. The remainder of the land base within the park falls into the default (green shaded) Natural Landscape zone. The primary purpose of zoning at LHCPP is to enable the protection and adaptive management of wildlife habitat and native vegetation and to concentrate more intensive human activities or development to strategic, less sensitive areas.

2.1 LHCPP Special Protection Zones

The larger of the two special protection zones, protects sensitive and important areas for fish and wildlife. In particular, this Special Protection Zone protects the known nesting, breeding, staging, and feeding areas of a diversity of birds that depend on Big Lake for survival. The Northern lakeshore, the North Eastern portion of Big Lake where it meets the Sturgeon River, the birdfoot delta, and Atim Creek are all included within this Northern Special Protection Zone. The smaller, Southern Special Protection Zone protects the sensitive fern forest and an ecologically significant stand of native vegetation.

For further information on the Special Protection zoning, and how they will be managed to support management plan objectives, please see section 3.0.

2.2 LHCPP Facility Zones

There is a relatively small upland, developable land base within the park. Located within the populated and rapidly growing Edmonton Metropolitan Area of the Alberta Capital Region, LHCPP will experience increasing recreation pressures with the potential to threaten ecological values. Therefore, development of infrastructure to support visitor access and staging for recreation and participation in programs will be focused in three areas: East Facility Zone, South West Facility Zone, and North Facility Zone. The largest of the three, the East Facility Zone contains the existing parking lot and includes a recently acquired parcel of previously disturbed land. This is where the future environmental learning centre will be located. The South West Facility Zone offers excellent opportunities for wildlife viewing, without compromising ecological integrity. The North Facility Zone, with its proximity to Meadowview drive provides easy access to the lake from the North.

For further information on the Facility zoning, and how they will be managed to support management plan objectives, please see sections 6.0 and 7.0

3.0
CONSERVATION AND PROTECTION

"Parks are established, and are to be maintained… for the preservation of specified areas, landscapes and natural features and objects in them that are of geological, cultural, historical, archeological, anthropological, paleontological, ethnological, ecological or other scientific interest or importance"

– Alberta Parks Act, Section 3c

3.1 Conservation Values and Threats

As discussed in section 1.6.4, a Protected Areas Management Effectiveness Evaluation was done for LHCPP, as part of the management planning process. The PAME evaluation identified the significant conservation and social values and threats for the park, in addition to specific knowledge gaps that must be addressed in the short- and long term. All of the management objectives and strategies that follow in sections 3.0 to 8.0 are rooted in this LHCPP specific assessment of knowledge gaps, and values and threats. (For an overview, see the tables in Appendix H).

3.1.1 Key Conservation Values

As described in the management vision, conservation and protection of Big Lake as a "unique and important wetland ecosystem" is a main priority for management of LHCPP. In comparison to other, more remote sites within the Alberta Parks network of parks and protected areas, LHCPP does not offer as much pristine wilderness, however in the regional context, the Big Lake area plays an important ecological role. As a globally significant Important Bird and Biodiversity area, Big Lake attracts a wide diversity of migratory birds and waterfowl, and can be described as one of the best bird watching destinations in the Central Alberta region. Furthermore, it supports a diversity of rare plant species as well as several areas of intact native vegetation in an otherwise intensively cultivated region. The natural values found within LHCPP are especially significant because of their urban context: the park is often described as a natural oasis in a vastly and increasingly disturbed and populated landscape. This makes protecting those values all the more important, yet that much more challenging.

Lois Hole Centennial Provincial Park lies within the Parkland Natural Region. As the most densely populated Natural Region in Alberta, the present-day Parkland is characterized by patches of aspen and willow shrub lands mixed with native grasslands. These are underlain by black soils and surrounded by productive agricultural lands and urban landscapes.

About 100 (20%) of Alberta's rare vascular plant species are found in the Parkland Natural Region. Some are found only in this natural region, such as the marsh gentian. The wildlife species of the Parkland reflect the transitional nature of the Natural Region. Species usually thought of as boreal, such as snowshoe hare, moose, or northern flying squirrel make use of the woodlands and shrublands, alongside typical species of the grasslands such as Richardson's ground squirrel and plains spadefoot toad, which use the adjacent meadows.

The Parkland Natural Region is comprised of three Natural subregions: the Foothills Parkland to the southwest; the Central Parkland; and, the Peace River Parkland to the northwest. Lois Hole Centennial Provincial Park is located entirely within the Central Parkland. This Subregion occupies a broad, intensively cultivated and heavily populated fertile crescent in central Alberta that includes all or parts of Alberta's three largest cities. Lois Hole Centennial Provincial Park is located adjacent to the province's second largest population centre. Cropland covers about 80% of the plains and about 65% of the hummocky uplands; the remaining area is grazing land. Only 5% of the subregion remains in native vegetation.

About 10% of the Central Parkland is covered by marshes, willow shrublands and seasonal ponds. These wetlands, like the extensive marshes found at the park, are very productive and important nesting areas for species such as diving ducks, grebes, American bittern, marsh wren and black tern. Wetlands in this subregion also support populations of boreal chorus frog, wood frog and Canadian toad among many other amphibian species. Grassland birds such as the upland sandpiper, Sprague's pipit, and Baird's sparrow are common in the south but less common to the north and west where Boreal species like the broad-winged hawk and rose-breasted grosbeak are more often found. Both of the two major forest types of the Central

Where the Sturgeon River flows into Big Lake, a birdsfoot delta has formed (Sweetgrass Consultants, 1997), which is one of three to be found in Alberta. Birdsfoot deltas consist of a muddy plain with long, projecting channels that broach outward like the claws of a bird.

Establishing an environmental monitoring working group will help ensure that citizen science and community based monitoring efforts align with management objectives, and will assist in leveraging scarce resources across agencies, institutions and organizations to achieve mutual goals

Parkland are found at Lois Hole Centennial Provincial Park; aspen forests in upland areas, and balsam poplar in moister sites.

Lois Hole Centennial Provincial Park captures two natural landscape types: the Central Parkland Glaciolacustrine Landscape Type and Mineral Wetland Landscape Type[3]. Typical for these landscape types, the Big Lake ecosystem has clay, silt, sand, peat, muck and marl on extensive low-lying land on the north and west sides of the lake and supports extensive stands of emergent vegetation, with stands of mature aspen, birch and white spruce along the south shore (AMEC, 2002). LHCPP includes one regionally significant special landform: the Sturgeon River Delta. Representation of these Natural Landscape Types and regionally significant landform highlights the significance of LHCPP within the subregion and its role in supporting biodiversity and ecological processes.

Completing a system of parks and protected areas that represents the natural diversity of Alberta is a core mandate of the Parks Division. Progress toward that end is measured against a conservation framework for protected areas that identifies representation targets for Natural Landscape Types within Alberta's 21 Natural Subregions. The framework identifies 204 targets to achieve minimum representation[4]. Overall, natural landscape targets within the Central Parkland Natural Subregion are less than 50% achieved. As one of 31 parks and protected areas within the subregion, and one of only 23 that conserve representative examples of landscape types typical of this subregion, LHCPP

3 For more information on Alberta's Natural Landscape Types, see: *http://www.albertaparks.ca/albertaparksca/management-land-use/building-the-parks-system/scientific-framework/natural-landscape-types/*

4 For more information on the Alberta Parks Scientific Framework: *http://www.albertaparks.ca/albertaparksca/management-land-use/building-the-parks-system/scientific-framework.aspx#ThemeTargetsProgress*

represents a significant contribution to the protection of Central Parkland themes. The park contains 4 of the 13 natural landscape types, including Glaciolacustrine deposits and excellent representation of the 3 freshwater themes. LHCPP protects the third largest example of all upland Glaciolacustrine deposits found in the protected areas network in this subregion, a “gap” in the system, as few examples of this landscape type remain in the province today. The lake itself is the second largest example of this theme in the Central Parkland protected areas network, although Big Lake is deeper and more permanent than its larger counterpart, Beaverhill Lake. LHCPP also protects a small proportion of the freshwater mineral wetland theme in the Central Parkland, as well as part of the Sturgeon River, which is representative of the major river theme. Table 1 in Appendix B provides a summary of the Natural Landscape Type representation at LHCPP.

An ecosystems-based approach to management (see Guiding Principles, section 1.3) will support the conservation and protection of natural and cultural values within the park. Protecting the ecosystem means not only maintaining viable and sustainable populations of the native plants and wildlife species through maintaining natural habitats, but also supporting the integrity of the natural ecological processes and both the biotic and abiotic systems that support biodiversity and people. Biological, hydrological, geological, geographical, cultural, historical, prehistorical and spiritual factors all must be considered to ensure the long-term conservation of the site’s unique and important values.

3.1.2 Key Ecological Threats

As outlined in Appendix H, the majority of the most significant known threats to conservation values at LHCPP come from adjacent land-use activities or influences outside of the park boundary. The types of threats occurring inside the park boundary with the most potential to negatively impact conservation values include:

- human disturbance to wildlife and ecological function through recreation activities
- pollution (including solid waste, light, air, and noise pollution)

The types of threats occurring adjacent to the park with the most potential to negatively impact conservation values include:

- Residential & Commercial Development
- Agriculture
- Transportation & Service Corridors
- Water management
- Invasive Species
- Pollution (including solid waste, light, air, and noise pollution)

Identified knowledge gaps related to internal current and potential threats include climate change and severe weather, invasive species, human disturbance, biological resource use, and various types of pollution. Knowledge gaps are addressed in section 8.0.

3.2 Environmental Monitoring

Over the years, there have been many research and monitoring programs initiated by many different agencies and organizations in and around Big Lake. A more coordinated approach is needed in order to align efforts and effectively fill knowledge gaps. Establishing an environmental monitoring working group will help ensure that citizen science and community based monitoring efforts align with management objectives, and will assist in leveraging scarce resources across agencies, institutions and organizations to achieve mutual goals. The environmental working group will engage a diversity of groups, agencies and institutions involved in research and monitoring in the Big Lake area, including many of the stakeholders listed in section 4.3. A monitoring plan will identify indicators which will enable

the monitoring community and park managers to detect changes in the environment and respond with management action. The monitoring plan will set up a system through which the impacts of key identified threats and stressors on the ecosystem and throughout the watershed can be monitored through a consistent set of tools and processes. In addition to enabling partnerships with formal research programs and academic institutions, the monitoring plan will integrate citizen science through established citizen monitoring platforms such as e-Bird, NatureLynx and others. A preliminary list of known knowledge gaps is included in section 8.0.

3.2 Objectives	Strategy
Support ongoing and collaborative environmental monitoring	Establish a multi-stakeholder LHCPP environmental monitoring working group to identify and address information gaps, develop monitoring plans and ensure alignment of all monitoring efforts at LHCPP
	Through the environmental monitoring working group, develop a collaborative environmental monitoring plan guided by the identified stressors, threats and knowledge gaps identified through the PAME assessment.
	Align LHCPP environmental monitoring with broader Government of Alberta monitoring programs, including system-wide monitoring for Alberta Parks

3.3 Ecosystem Function and Biodiversity

'Ecosystem function' is the term used to define the natural processes taking place in an ecosystem. Ecosystem functions relate to the structural components of an ecosystem (e.g. water, soil, atmosphere and biota) and how they interact with each other, within ecosystems and across ecosystems. Operational ecosystem functions have intrinsic value for maintaining ecological integrity, as well as for supporting biodiversity and the wide variety of ecosystem services on which humans and other living organisms depend for survival.

Some of the major ecological functions that are ongoing within LHCPP and immediate surroundings are:

- water regulation
- nutrient regulation
- soil retention
- pollination of crops and native vegetation
- waste treatment and assimilation
- disturbance regulation
- soil formation
- supporting habitats
- maintenance of biodiversity

Land-use activities and the alteration of surrounding landscapes continue to pose threats to ecological functions and the capacity of LHCPP to provide ecological services. Identified threats to the ecological integrity of LHCPP include increased nutrient loads, disruption of water cycles, invasion by non-native organisms, presence of noise, light, and chemical pollutants, and climate change. Management efforts at LHCPP will focus on achieving a more holistic and deeper understanding of the threats to ecological

function and to taking appropriate, collaborative, and timely action to minimize and reduce the impact of these threats. Restoration of previously disturbed areas including riparian areas and wetlands (see section 3.6.3) and upland areas will be a key management action and will involve community based organizations for conducting assessments, replanting native vegetation and doing ongoing monitoring and stewardship.

One of the best ways to protect ecosystem functionality is through conserving and protecting biodiversity. As is characteristic of the central parkland sub region, the land surrounding LHCPP has been almost completely altered by human activities and land development, and the park now represents an island of natural habitat within a highly disturbed matrix. This isolation from other larger natural undisturbed areas, poses a significant further threat to biodiversity through habitat fragmentation and the associated stresses to a variety of species. Management actions will be focused on preventing further biodiversity loss within the park due to the cumulative environmental effects of surrounding land uses.

3.3 Objectives	Strategy
Maintain and restore ecological function and biodiversity	Restore and naturalize disturbed areas including riparian and upland areas
Restrict access to ecologically sensitive areas	Use temporary, seasonal, or longer-term closure of ecologically sensitive areas as needed for management purposes
Protect terrestrial and aquatic ecosystems from human disturbance	Restrict visitor access to the park to designated trail systems and facilities, supported through signage, education, and enforcement
	Develop targeted education to park visitors and adjacent land owners about the LHCPP zoning framework, area closures, and how to minimize disturbance
	Support enforcement of area closures through Community Volunteer Stewardship program (see Objective 4.4).

3.3.1 Flora

Native vegetation is scarce in the Central Parkland: less than 5% native vegetation remains due to the high productivity of the soils for agriculture. Compared to the broader landscape, the land and vegetation it supports within LHCPP are relatively undisturbed.

Flora and vegetation within this site reflect the topography of the land with its large shallow water body, seasonal flooding, and high water tables. The vast majority of upland and riparian vegetation is of low growth, not surpassing 2m in height. Trembling aspen is the dominant tree species on the better drained uplands along the southwest and east ends of the park, mixed with or replaced by balsam popular on moister soils. Paper birch and white spruce occur sporadically in small stands. The only other tree species present include Manitoba maple, green ash and black spruce. Highbush cranberry, wild rose, chokecherry, red osier dogwood, raspberry, and snowberry dominate the shrub layer of the uplands, while various forbs, most prominent being wild sarsaparilla and ostrich fern (the latter one

being a significant component of a rare plant community) , and few grass and sedge species occupy the understory.

As upland gradually transitions towards the open water, the predictable series of plant species replace each other, responding to the water depth. Meadow willow, and to the lesser extent sandbar, Bebb's and pussy willows dominate areas not colonized by more water-loving grass and grass-like species which dominates moist, open areas. Some transitional areas between the willows and grass/glass-like areas are heavily colonized by invasive non-native species such as creeping thistle, tufted vetch, and hemp nettle. Invasive non-native species are addressed in section 3.5. Reed canary grass forms a broad band on saturated soils and shallow water around the lake. As water deepens, reed canary grass tends to be replaced by sedges such as slough sedge, water sedge, and bottle sedge. Sweetflag, cattail, and giant bur-reed occupy deeper waters, while hardstem bulrush tends to form isolated island-like stands throughout the open water, up to 120cm deep. The rare sedge, River Bulrush, forms colonies in water up to 1m deep. This species will be further discussed below. Forbs commonly associated with this area include western willow Aster, field mint, and stinging nettle.

Common aquatic plants of the LHCPP (rooted in water and producing most vegetation above the water surface, submerged, or floating species) include duckweed, bladderwort, sweetflag, water smartweed, slough Sedge, and hardstem bulrush.

A recent vegetation study has identified over 240 taxa of vascular plants and seven main community types within LHCPP (Patchell, 2013). See Appendix B for detailed list of vascular plant taxa as reported by Patchell, 2013. The following community types have been noted:

- Balsam Poplar / Highbush Cranberry/ Ostrich Fern forest
- Balsam Poplar / Wild Raspberry forest
- Trembling aspen–balsam poplar / Red-osier Dogwood / Wild Sarsaparilla mixed forest
- Trembling Aspen/ Choke Cherry/ Wild Sarsaparilla forest
- Kentucky bluegrass–Canada anemone upland meadow
- Meadow willow / reed canary grass shrubby wet meadow
- Slough sedge–Bottle sedge wet meadow

Locally known as the "fern forest", a balsam poplar/ highbush cranberry/ ostrich fern forest is located at the east end of the park. The smaller of the two special protection zones (purple shaded areas on the map entitled Lois Hole Centennial Provincial Park: Park Zoning) protects this fern forest. It is ranked S1S2 by Alberta Conservation Information Management System (ACIMS) and is thus considered to be of conservation concern. Ostrich fern accounts for about 65 percent of the vegetation cover. The community is characterized by high species richness (84 species documented), though most species, other than the ostrich fern occur in low numbers and/or cover. The community is dissected by small, unmarked trails frequented by hikers, cyclists and wildlife such as moose and whitetail deer. It is also influenced by beaver activity, which can sometimes cause significant damage to the fern community through flooding and changes in the canopy cover.

A Balsam poplar / wild raspberry forest occurs at the southwest area of the park. It is characterized by small regenerating balsam poplar trees and many charred, standing, dead balsam poplars as evidence of a past forest fire. Wild raspberries are a common throughout the site, with red-osier dogwood, prickly rose, and buckbrush occurring in larger patches.

A trembling aspen–balsam poplar / Red-osier dogwood / wild sarsaparilla mixed forest occupies drier areas north of the fern forest. Beaked hazelnut, red-osier dogwood, saskatoon, pin cherry, and wild raspberry with the understory of wild sarsaparilla characterize this diverse plant community.

Trembling aspen/ choke cherry/ wild sarsaparilla forest stands occur in upland habitat along the south shore of the lake and are fairly diverse, with 50 species of various covers being documented within one documented stand.

A Kentucky bluegrass–Canada anemone upland meadow occurs in transition area between low-lying areas of the Atim Creek delta and upland habitats to the south. It shows very low species richness (16 species), and a high proportion of invasive species (predominantly creeping thistle), comprising total vegetation cover of approximately 30 percent. With decreasing elevation, this site transitions rapidly to wet meadow communities, reflecting the changes in the water table.

Meadow willow is the most common willow along the shores of the lake and also forms island-like patches near the Atim Creek Delta. Reed canary grass dominates the meadow willow / reed canary grass community, accompanied by a high cover of creeping thistle (roughly 30 percent). Other native species occur in smaller numbers and reflect the transition to other, neighboring plant communities.

A Slough Sedge–Bottle Sedge community covers large expanses of inundated, low-lying areas of the Atim Creek delta. Water sedge is the only prominent grass-like species in addition to slough and bottle sedges in this community characterized by low species diversity with only 12 species found in one of the sampled stands.

Although non-native invasive plants, primarily creeping thistle, perennial saw thistle, tufted vetch, and hemp nettle are found in upland communities listed above, they do not seem to be abundant or posing a significant threat to native vegetation. Non-native invasive plants are of significant concern in lowland communities, such as Kentucky bluegrass–Canada anemone upland meadows and meadow willow / reed canary grass community.

Alberta Parks will partner with organizations such as the Alberta Habitat Management Society (a.k.a. Cows and Fish) to conduct Riparian Health Inventories and develop recommendations for restoration of disturbed areas. The East Facility Zone (*see map: Lois Hole Centennial Provincial Park: Park Zoning*) also includes a parcel of cultivated land which will be naturalized/restored through planting native vegetation.

3.3.1 Objectives	Strategy
Manage native plant communities (terrestrial and aquatic) to conserve their extent, health, and biodiversity	Based on Riparian Health Inventory process (see objective 3.6.3), develop long term monitoring plans for riparian health
	Include in environmental monitoring plan (see objective 3.2) a native plant monitoring plan that involves, at pre-determined intervals, repeating permanent plot sampling on upland areas and permanent transect sampling along shoreline areas to monitor vegetation changes over time

3.3.2 Fauna

The Big Lake area has long been a highly valued destination as a site that hosts an abundance and diversity of wildlife. Habitat conditions in the park are particularly favourable for muskrat, beaver, coyote and white-tailed deer among many other mammal species. A diversity of amphibians including the wood frog and boreal chorus frog, reptiles, and fish are also found in the Big Lake area. See Appendix B for detailed list of species and their status. Numerous historical attempts to protect the area are evidence that it has long been considered significant due to its suitability to support species richness as well as large numbers of individuals, and particularly birds. Big Lake is recognized as one of the twenty most important waterfowl habitat units in the province of Alberta (Sweetgrass Consultants, 1997).

In the late 1990s and early 2000s, Big Lake and part of the wetlands west of the lake were protected as Big Lake Natural Area. Following the establishment of the natural area, Big Lake was recognized as a Category 4, globally significant Important Bird and Biodiversity Area, because it supports a large nesting colony of Franklin's gull, migrating flocks of tundra swans and a diversity of ducks, grebes, and shorebirds. A total of 235 species of birds may be found in the Big Lake area, 129 of which breed in the area (AMEC 2002). In 2005, Big Lake and most of the flood zone west of the lake was established as a provincial park. The most important reason for establishing the provincial park was to protect wildlife occurring in this area and maintain status of Big Lake as an Important Bird and Biodiversity Area.

Photo: Dragomir Drajs Vujnovic

The Important Bird and Biodiversity Area (IBA) Program is an international conservation initiative coordinated by BirdLife International. The Canadian co-partners for the IBA Program are Bird Studies Canada and Nature Canada and the Alberta IBA program is coordinated by Nature Alberta. A set of criteria have been developed for IBAs in Canada (Moore and Couturier, 2011) that outline the various designation categories and numerical thresholds associated with IBA sites. Category 4 IBAs are areas that support large numbers of single or mixed species that are vulnerable as a consequence of their congregative behavior(s). Sites must be regularly used during breeding or non-breeding seasons and could include foraging, roosting, rafting, migratory stopover sites, and aerial bottlenecks.

There have been many studies on the impacts of various human activities on a wide diversity of water birds at various life history stages (Carney and Sydeman, 1999). In order to maintain the status of Big Lake as an IBA, management efforts will focus on the removal or mitigation of potential human disturbances to birds, particularly during nesting and staging. Another major priority is to address any potential or current degradation of aquatic and terrestrial habitats that water birds utilise within LHCPP.

One of the most effective management tools for mitigating disturbance to nesting or staging birds, or for protecting other ecologically sensitive areas will be temporary or seasonal area closures through Ministerial Order or other mechanisms as appropriate. As outlined in section 2.1, special protection zones have been identified where there are areas in the park that are of particular importance to wildlife species or are sensitive to disturbance. Closures may include but will not be limited to special protection zones and may occur on a temporary, seasonal or longer-term basis dependent on threats and potential impacts to biodiversity. In the case of water-based recreation such as canoeing and kayaking, a bird and biodiversity monitoring plan will include disturbance thresholds after which heightened management action is needed. If monitoring efforts detect increased levels of disturbance or ecological threats due to the presence of water-based recreation, more restrictive management tools may be used such as:

- longer-term and/or more regular or permanent partial closures of Big Lake to recreation
- longer-term and/or more regular or permanent full closures of Big Lake to recreation
- restriction of the number of watercraft allowed on Big Lake at a time

- restriction of the types of watercraft allowed on Big Lake
- other tools as appropriate

Coordinated communications with community organizations and municipalities along with targeted education to various park user groups will support compliance with these management initiatives.

There have been many studies about birds within the park, however there is still a significant information need regarding population characteristics and factors influencing the variety of bird species in the park. Although LHCPP is in close proximity to the three large urban centres, there is little information about species occurrences and populations for the rest of vertebrate and invertebrate groups, which make up the majority of biodiversity found at LHCPP. Furthermore, while LHCPP is largely made up of aquatic habitat, there are significant wetland and riparian areas that have not been surveyed for biodiversity. To protect biodiversity within the park, these knowledge gaps must be addressed.

3.3.2 Objectives	Strategy
Maintain status of Big Lake as an Important Bird and Biodiversity Area (IBA) according to Canadian IBA Criteria	Explore opportunities to collaborate with Nature Alberta, BLESS and other interested parties to develop a LHCPP bird and biodiversity monitoring working group (as a subset of the LHCPP environmental monitoring working group) and plan to guide monitoring efforts
	Support and guide community engagement in monitoring and stewardship efforts through Community Volunteer Stewardship Program (see Objective 4.4)
Mitigate the impacts of water-based recreation on birds	Restrict motorized boat access to Big Lake through Federal Legislation[5]
	Within the bird and biodiversity monitoring plan (see above), develop thresholds for water-based recreation after which additional measures will be taken to protect birds and prevent disturbance
	Develop targeted education to water based recreationalists about the LHCPP zoning framework and how to minimize disturbance through water-based recreation
Prevent the negative impacts of light and noise pollution on wildlife	Develop targeted education to key target audiences to promote light and noise pollution abatement best practices in the surrounding communities

3.3.3 Human Wildlife Conflict

While LHCPP has been valued for bringing nature to the doorstep of many communities, its proximity to several major urban centers presents the potential for human-wildlife conflict. Presence of keystone species such as beaver, apex predators including coyotes, and large ungulates like moose in close proximity to residential neighbourhoods pose many management challenges due to the potential for property damage, habituation of wildlife, disturbance to wildlife, among many other issues.

5 For more information, see Vessel Operation Restriction Regulations under the Canada Shipping Act (http://laws-lois.justice.gc.ca/eng/regulations/sor-2008-120/)

At LHCPP, there have been reports of people feeding wildlife within the park, which is problematic from both a public safety perspective and an animal health perspective. The healthy population of beavers within the park is posing challenges with respect to water management both within the park and on adjacent lands. Careful planning involving the application of best management practices and expert knowledge as well as public education will help address human wildlife conflict and support the sustainable co-existence of humans and wildlife around the park.

3.3.3 Objectives	Strategy
Prevent human wildlife conflict	Develop a beaver management plan with support and input from experts and in alignment with municipal and other relevant beaver management policies
	Incorporate education outcomes related to promoting respectful and responsible recreation in wildlife habitat in Education and Outreach strategy (see Objective 6.1)
	Prevent and manage human wildlife conflict situations according to departmental policies and available best management practices

3.3.4 Species of Conservation Concern

Six vascular and one non-vascular plant taxa of conservation concern (as per ACIMS 2017) have been documented within the park boundaries (Patchell, 2013): River Bulrush S1G5, Thimbleweed S3G5, Leafy pondweed S2G5 , Smooth Sweet Cicely S3G5, Golden Saxifrage S4G3 (W), False Dragonhead S3G4G5 (W), Leskea polycarpa S1G4G5.

Though its global populations are considered secure (G5), river bulrush is very rare in Alberta. This species has a high conservation value within LHCPP because patches are large and perennial, and can thus be expected to persist in the current locations for many years if left undisturbed. Fragments of rhizome from large patches may also serve as a source for spreading of this plant to other suitable habitat in the park. Its stems are brittle and have been reported to be intolerant of mechanical damage caused by boating and wading activities (Patchell 2013).

Golden saxifrage colonizes moist, shaded soil, often near flowing water. It is uncommon throughout its range, and it forms small colonies in moist depressions and seepages in forested areas of the LHCPP. The persistence of this plant in the park is linked to availability of habitat, and efforts should be made to protect the habitat in its natural state.

False dragonhead is a conspicuous, showy plant. It is uncommon throughout its range, but global populations are secure. Individual plants grow scattered throughout moist woods and thickets near the lakeshore in LHCPP. The conspicuous flowers and single stems make these plants susceptible to picking. Public education that emphasizes the importance of not picking the flowers in the park may be critical for long term survival of the species in the park.

Smooth sweet cicely is rare in Alberta, but common throughout its range in North America. Within the park, this plant is locally abundant, growing in moist balsam poplar forests, often bordering trails. Its inconspicuous appearance and the fact that it is locally abundant safeguard this species against over-picking, though extreme care should be taken if there are plans on widening any of the trails where it occurs.

A comprehensive non-vascular plant survey has not been conducted within LHCPP, thus there is no list of non-vascular plants for the park. One moss of conservation concern, Leskea polycarpa has been documented in the balsam poplar stand with willow and ostrich fern understory at the east end of the park. It grows in several locations along approximately 100m of the watercourse in a dried-up stream channel on small pieces of rotting wood at water level.

According to the best available knowledge, the Little Brown Myotis, listed under the federal SAR Act as endangered species, breeds within LHCPP. There are also a number of other species of conservation concern which are listed as "undetermined", "sensitive" and "may be at risk" in the 2015 General Status of Alberta's Wild Species, and which breed and spend critical periods of their lives in the park (see Appendix D). Peregrine Falcon, an occasional visitor, as well as the Canada Warbler, a regular but rare fall migrant in the park, are two of the species listed as Species at Risk. Peregrine Falcon and Canada Warbler are listed as Species of Concern and Threatened under SAR Act, while Western Grebe and Peregrine Falcon are listed as threatened under the Wildlife Act. This long list of species of conservation concern is a clear indication of the importance of establishing effective management tools to conserve habitats and protect them from further disturbance.

It is also important to note that there is a breeding population of Trumpeter Swans in close proximity to LHCPP. If LHCPP is managed in a way to minimize human disturbances, there is a good chance of attracting this species, which is currently listed as "sensitive" (Government of Alberta, 2015) to nest in this park.

Due to the lengthy process of assessing some of the species designated as 'may be at risk', additional species may be listed under the federal or provincial legislation in the future. Furthermore, current knowledge of species of conservation concern exists predominantly for vertebrate species, and there are significant knowledge gaps to be addressed about the status and presence of other taxa.

3.3.4 Objectives	Strategy
Identify and protect rare and globally significant ecosystems, rare and globally significant plant species and areas of special ecological concern	Maintain a list of known rare species and globally significant species
	Update provincial database (ACIMS) to include locations of significant species and communities
Protect current and future Species at Risk identified through Federal SARA and Alberta Wildlife Act	Apply appropriate management strategies for identified species of concern
	Identify opportunities to enhance or restore critical habitat for species of conservation concern
	Conduct comprehensive surveys to address knowledge gaps of species of conservation concern other than vertebrate species

3.4 Ecological Connectivity

Human development fragments wildlife habitat, which threatens wildlife populations by restricting movement and reducing habitat quality. Especially in a highly developed region such as the Central Parkland subregion, corridors are important conservation and management tools to maintain ecological connectivity and function (Beier and Noss, 1998). LHCPP acts as part of a regional corridor together with the Sturgeon River Valley, which is linked upstream to the Red Willow Urban Park system in St. Alberta, and downstream to the North Saskatchewan River Valley system (see Lois Hole Centennial Provincial Park: Adjacent Land Uses map). LHCPP lands, along with pieces of undisturbed municipal reserve and other conservation lands facilitate movement of birds and terrestrial wildlife including ungulates and other mammals across the landscape. There are two major types of connectivity that are represented within the LHCPP – aquatic and upland corridor connectivity, both of which have major ecological implications.

Aquatic corridors and free-flow of water within the LHCPP are mostly unobstructed, and besides beaver dams, which act as natural temporary semipermeable barriers, there are no human made structures that prevent water connectivity.

Although much of the riparian and upland habitats around Big Lake are not within the LHCPP boundary, the park still has important role in maintaining wildlife corridors and connectivity in this region. Maintaining these corridors and ensuring their functionality is very important in light of the major development happening adjacent to the park boundary. Recent research has shown that there is an increased importance of even small protected areas in maintaining local biodiversity and acting as safe refugees within matrices of heavily human altered habitats. However, research is also showing that if not well planned and managed, wildlife corridors could act as population sinks and actually increase mortality for species such as moose, deer, and various carnivores (Haddad et al., 2014). Restoring, maintaining and effectively managing wildlife corridors will require involvement and support from all stakeholders as well as ongoing research and monitoring to prevent existing or restored wildlife corridors from becoming population sinks.

3.4 Objectives	Strategy
Identify and maintain ecological connectivity corridors	Work with adjacent land managers to identify connectivity corridors and ensure they are maintained

3.5 Invasive Species

Globally, invasive species are the second greatest threat to biodiversity after habitat loss (International Union for Conservation of Nature 2000). Invasive species degrade habitats, reduce health of ecosystems and environments, threaten native species and plant communities, limit recreational experience and satisfaction, and increase management costs.

3.5.1 Invasive Plant Management

Under the Weed Control Act, the Government of Alberta regulates plants that are referred to as “weed” species. The related Weed Control Regulation (2010) lists two categories of weed species: Noxious and Prohibited Noxious. However, some species that are not listed also pose serious threats to the natural biodiversity and ecological integrity of LHCPP (e.g. invasive agronomics, invasive ornamentals and aquatic invasive plants). Prohibited Noxious weeds must eliminated immediately. It is therefore

necessary to focus on prevention, early detection, rapid response and eradication. There are more weeds listed on the Prohibited Noxious list than on the Noxious list, as many of these species have not yet established themselves in Alberta. Noxious weeds must be controlled and contained to prevent their spread and expansion. It is therefore necessary to focus on monitoring, containment, control and adaptive management.

By using an integrated ecosystem approach, Alberta Parks strives to understand threats and vectors, prevent introduction, halt spread, initiate containment and control or eradicate invasive plant species that have the potential to negatively impact LHCPP. Prevention of invasive species establishment and spread is an ongoing part of all park operations and developments, including its specific inclusion in the environmental review process.

3.5.2 Aquatic Invasive Species

Aquatic Invasive Species (AIS) are a major threat to the economy, tourism and recreation. They destroy natural lake ecosystems and fisheries. The management of their impacts could cost millions of dollars each year. The species of greatest concern in Alberta are the Quagga Mussel and Zebra Mussel, and the aquatic plants known as Flowering Rush and Eurasian Watermilfoil.

Although weeds have not been reported from aquatic habitats within the park, at least four Prohibited Noxious Weeds, flowering rush (Botomus umbellatus), purple loosestrife (Lythrum salicaria), Eurasian water milfoil (Myriophyllum spicatum and yellow iris (Iris pseudoacorus) could be introduced from nearby horticultural plantings or through ballast water from infested areas.

AIS are primarily spread through the transportation of watercraft from infected waters to unaffected areas. Education to ensure that watercraft users “clean, drain, and dry” their boat and disinfect equipment before departing a water body has been identified as a key prevention strategy. Alberta Environment and Parks has developed a comprehensive monitoring, inspection and education program that is addressing the risk of Aquatic Invasive Species through prevention. Alberta’s “Clean, Drain, Dry” and “Don’t Let it Loose” campaigns[6] target specific audiences of Albertans with key messaging to prevent the spread and invasion of various high-risk aquatic invasive species. As new threats from invasive species are being identified, for example whirling disease, the Government of Alberta is continually responding and adapting with new management actions and prevention programs.

3.5 Objectives	Strategy
Manage and monitor invasive species according to Government of Alberta policies, legislation and best practices	Develop an Integrated Weed Management program for LHCPP, including mechanical, chemical and biological control measures.
	Upon detection of new invasive plan species, mobilize resource rapidly to contain or eradicate the invasion.
	Incorporate education outcomes related to the prevention of invasive species spread in Education and Outreach strategy (see Objective 6.1)

6 For more information: “Alberta Environment and Parks Invasive Species Program” *http://aep.alberta.ca/fish-wildlife/invasive-species/default.aspx* Alberta Environment and Parks Invasive Species Programs).

Use the Community Volunteer Stewardship Program (see Objective 4.4) to prevent and manage invasive species and to support education efforts
Work with other federal and provincial government agencies, community organizations and municipalities to monitor and manage invasive species in region

3.6 Water Resources

Centered on a wetland ecosystem within the Sturgeon River watershed and in the eastern portion of the Atim Creek drainage basin, LHCPP is comprised of roughly 59% water. Effective management of water resources – both from a quality and quantity perspective – is of critical importance. In terms of watershed management, one predictor of watershed health is the level of disturbance on the land base. This measure of "watershed naturalness" highlights the strong connection between land management and surface water quality and drainage patterns. The level of disturbance within the Sturgeon River watershed is 71% overall, but drops to 4.6% within the LHCPP park boundary. Similarly, within the Atim subwatershed, the overall disturbance level is 80% versus 2.4% disturbance within the park. (*see map: Lois Hole Centennial Provincial Park: Watershed Disturbance*)

The ecological conservation values and associated nature appreciation, education, and recreation opportunities available at this park are directly related to water quality and quantity at Big Lake.

The comparison of disturbance within and outside the park boundary reinforces a prevalent issue for park management: the long-term health of natural resources at LHCPP – and especially in the case of water resources, is largely influenced by activities occurring outside the park boundary. Partnerships, collaboration, and alignment with other water management, monitoring and research, planning efforts and initiatives are therefore critical to achieving water resource management objectives. The ecological conservation values and associated nature appreciation, education, and recreation opportunities available at this park are directly related to the water quality and quantity at Big Lake. Therefore stakeholder engagement and collaboration for the sustainable management and stewardship of water resources is one of the highest priorities at LHCPP.

3.6.1 Surface Water Drainage and Water Quantity

Big Lake is shallow, with a typical summer depth of 1.0 to 1.2m. The lowest recorded water levels were 0.3m, and the highest historic water levels were 4.1m (AMEC, 2002). The 2006 Lakewatch study report noted that the general pattern of declining water levels in Alberta lakes in recent decades will be of concern for Big Lake since it is very shallow (Alberta Lake Management Society, 2006). The maximum depth of the lake measured during the 2006 study was .75m.

Surface water quantity at Big Lake is affected by the following hydrological processes: inflows, outflows, evaporation, withdrawals, and groundwater recharge or discharge. Natural climate variability, the impacts of climate change and human development activities can all influence the magnitude and timing of the hydrologic components of the Big Lake water balance, producing seasonal and annual water level changes to the water body.

The two main sources of inflow to Big Lake are the Sturgeon River and Atim Creek. Big Lake receives inflow from a total contributing area of 2,188 km2 (AMEC, 2002). The overall Sturgeon River watershed has a relatively flat gradient with many small wetlands that effectively reduce and capture runoff. The shore areas along the north and west sides of the lake are flat, and small increases in water level translate to large areas of inundation. Big Lake is also located in a groundwater discharge area, which may contribute to maintaining extensive wet habitat conditions around the extended shore zone of Big Lake and the adjacent uplands. Average annual evaporation from the lake surface is estimated to be 666mm, and the average annual precipitation is 488mm (Environment Canada Climate Normal, Edmonton Stony 2017)).

Big Lake is heavily influenced by the Sturgeon River and the water levels of the three upstream main stem lakes. The river system is very unique, having 4 on stream lakes, which greatly increases management challenges.

Human activities in the Big Lake basin have the potential to either reduce or increase natural inflow. There are a number of active Water Act Authorizations for Big Lake or tributaries associated with Big Lake. Authorized water uses throughout the Sturgeon watershed include stock watering, irrigation, domestic supply, flood control, storm water management, and other activities.

The development pressures surrounding Big Lake put stress on the natural drainage systems. A study conducted by the Big Lake Basin Task Force (Associated Engineering, 2004), identified a number of drainage and flooding issues at Big Lake, which can be attributed to the combination of land use activities and natural topography of the area. These include:

- flooding along Atim Creek and around Big Lake
- drainage problems in tributary streams
- increasing runoff due to development
- encroachment of private lands and developments into the floodplains of the drainage system
- poor water quality in Big Lake and in St. Albert

In addition to the Big Lake Basin Task Force study, other water drainage studies within the Sturgeon watershed have contributed to the development of recommendations to address the water management challenges listed above and to conserve the water balance at Big Lake (Alberta Environment, 1994 and NSWA, 2016). These recommendations include limiting withdrawals based on the estimated annual flow rates, floodplain protection, planning and management guidelines, and storm water management guidelines to name a few. The North Saskatchewan Watershed Alliance (NSWA) is also working on an Integrated Watershed Management plan in collaboration with municipal representatives, and this plan will address the key threats and management issues facing Big Lake and the broader Sturgeon River basin.

The flooding regime within the park has been partially impacted by the creation of an extensive system of constructed channels within the floodplain area south of Atim Creek, and around the golf courses on the north side of the lake. To improve ecosystem functioning of the lake and the wetlands, it is desirable to restore the natural flood regime of Big Lake over time.

On an ongoing basis over the past 20 years, Alberta Environment and Parks has been working with adjacent land owners to address water drainage issues, particularly along the low lying south west shore of Big Lake. The combination of development within the floodplain, the presence of a network of manmade drainage canals and the damming activity of a healthy population of beavers all have impacted surface water drainage patterns. Depending on annual water levels and snow fall conditions, spring melt combined with beaver activity has posed challenges for land owners due to flooding on their lands. A hydrological assessment, which will involve mapping of the constructed canals and beaver dams throughout the south west portion of Big Lake, comparison of current water levels and drainage patterns to historical flooding and drainage patterns using air photos, and documenting an inventory of adjacent land owner water management issues will provide recommendations to inform a West Big Lake water management plan. This water management plan will support the primary objectives of ecological conservation and restoration of natural flooding regimes, will align with and support the beaver management policy as per objective 3.3.3, and will provide guidance in addressing ongoing drainage issues within the park and on adjacent lands.

3.6.2 Water Quality

Water quality monitoring at Big Lake has been sporadic, and the most recent water quality study was done in 2006 as part of the Alberta Lake Management Society's Lakewatch program (ALMS, 2006). The lake is very shallow, polymictic[7], nutrient rich and very productive (hypereutrophic). Nutrient concentrations and algal biomass at Big Lake are higher than average compared to other Alberta lakes, which are naturally nutrient rich.

Natural succession processes, such as sedimentation and the build-up of plant and animal matter on the lake bottom over time have resulted in infilling of the lake. Lake infilling and water quality conditions have also been affected by upstream and local agricultural land use, commercial and residential land development, outflow from upstream sewage lagoons, and maintenance of the many golf courses in the watershed which have contributed fertilizers, nitrates and pesticides to surface water runoff (AMEC, 2002). Due to its downstream position within the Sturgeon River basin, water quality will likely continue to be poor at Big Lake.

3.6 Objectives	Strategy
Monitor and enhance water quality and quantity in Big Lake	Support water quality/quantity related recommendations developed in other existing watershed & water management plans including the Sturgeon River Integrated Watershed Management Plan
	Through the Environmental Monitoring working group (see Objective 3.2), and in collaboration with the SRWA, municipalities, Government of Alberta, and other stakeholders and academic institutions as appropriate, develop a water quality/quantity monitoring plan for Big Lake
	Facilitate collaborative participation involving BLESS and other stakeholders in the Alberta Lakewatch monitoring program to generate up-to-date water quality data for Big Lake
	Address nutrient loading in Big Lake through promotion of best management practices on adjacent lands (see Objective 3.9)

7 Polymictic lakes are lakes where the water column mixes completely several times throughout the summer. Because of the frequent mixing of the water column the water temperature and dissolved oxygen concentration is relatively the same at all depths.

Address ongoing drainage issues on adjacent lands to LHCPP, particularly in the western portion of Big Lake	Conduct hydrological assessment in partnership with Alberta Environment and Parks regional resource management team, NSWA and other partners and experts as appropriate
	Conduct ecological assessment to determine ecological impacts of various water management options including naturalizing or breaching constructed canals
	Develop a West Big Lake water management plan based on hydrological assessment and in support of ecological conservation objectives
	Implement West Big Lake water management plan recommendations in collaboration with AEP Water Approvals

3.6.3 Riparian Areas and Wetlands

Riparian areas and wetlands have diverse functions and provide important ecosystem services. Functioning riparian areas and wetlands can filter surface water runoff, limiting inputs of nutrients and suspended solids to the aquatic environment, reduce flood magnitude, contribute to natural regulation of downstream flow, help improve water quality, and maintain biodiversity (Fitch and Ambrose, 2003). As an Important Bird and Biodiversity area, Big Lake's riparian and wetland areas are extremely important habitat for a wide diversity of birds and other species including fish, wildlife, and invertebrates.

Extensive land development around Big Lake has threatened the health and impacted the natural functioning of riparian areas and wetlands in the area, which has contributed to the water quality and drainage challenges described above. Riparian health evaluations provide a standard method to assess the presence, scale, and magnitude of issues and problems. Cows and Fish (also known as the Alberta Riparian Habitat Management Society) has a long track record of success in working with land managers and community organizations to conduct riparian health inventories, followed by the development of management recommendations to restore and improve riparian and wetland health. Cows and Fish also emphasizes importance of education and community engagement in stewardship activities as key factors in restoring and maintaining the long term health of riparian areas and wetlands.

3.6.3 Objectives	**Strategy**
Protect and enhance the integrity of riparian areas and wetlands within and in proximity to LHCPP	Work with Cows and Fish, NSWA, BLESS and other stakeholders to identify priority areas for riparian health inventories
	Conduct strategic riparian health inventories in collaboration with Cows and Fish and other stakeholders as appropriate to establish baselines and to inform the development of long-term monitoring plans for riparian health
	Based on riparian health inventory recommendations, build capacity among all land managers in the Big Lake area for the adoption of best management practices to improve riparian and wetland health

3.7 Climate Change

Climate change is recognized as a critical threat to biodiversity that impacts ecosystems and individual species. One of the main climate change effects that could compromise ecological and recreation values at LHCPP is an increased severity and frequency of severe weather events. Planning of infrastructure and programing must take this potential risk into consideration and build resiliency into design in the face of uncertainty and unpredictable change.

Parks and protected areas play important roles as natural solutions to climate change. Some of these roles include protection of ecosystems services, protection of habitat to provide climate refugia for plants and animals, and increasing resiliency of ecosystems.

3.7 Objectives	Strategy
Adapt to, mitigate, and prevent the negative impacts of climate change	Align management practices with provincial climate change strategies
	Reduce environmental impacts by incorporating sustainable practices across all aspects of park operations and developments
	Where practical and appropriate, incorporate energy efficiency and green building design principles
	Encourage visitors to minimize energy use and vehicle travel within the parks and adopt sustainable practices
	Design and locate infrastructure, facilities and programs considering the potential impacts of severe weather events

3.8 Cultural Heritage and Historic Resources

Since 1973, the Historical Resources Act has provided legislation that enables the preservation, study, interpretation and promotion of the appreciation of historic resources in Alberta. Under the Act "historic resources" are the tangible expressions of heritage. They include sites, structures and objects that are valued for their "…palaeontological, archaeological, prehistoric, historic, cultural, natural, scientific or esthetic interest…" (Historical Resources Act RSA 2000, Section 1(e)). The effective protection of historic resources requires preservation at two levels: the preservation of the physical remains (e.g. artifacts, structures, residues, etc.) and the preservation of site contexts. For archaeological, historic and traditional land use sites, the physical remains provide the direct evidence of human activities within a landscape, the time periods during which they take place and the cultural affiliations of the people practicing them. For palaeontological sites, the physical remains provide information about ancient environments, their flora and fauna. For all historic resources, however, it is the contextual information that gives meaning to these physical remains by showing the interconnected relationships they have on a site, regional or national level.

In addition to the Historical Resources Act (RSA 2000), the tools used to protect historic resources in Alberta include: (1) databases of known archaeological, historical and traditional use sites; (2) Alberta Culture and Tourism's referral-review and Historic Resources Impact Assessment processes (to understand the relationship between historic resources and potential development impacts); and

(3) project planning tools, such as the Listing of Historic Resources and Historic Resource Baseline Assessments.

To date, three archaeological sites have been recorded fully within the Park, while another two sites lie partially within the Park. These sites represent small ancient Indigenous campsites around the margins of Big Lake that were occupied during periods prior to Euro-Canadian contact. They provide evidence of the fact that areas of higher potential for historic resource sites lie along raised landforms adjacent to the Sturgeon River, Atim Creek and other well-defined drainages within and around the Park. No areas of palaeontological, historic structure or Aboriginal traditional use sites have yet been identified in the Park to date.

Where development within the Park is required, the Historic Resources Management Branch of Alberta Culture and Tourism should be consulted to determine any requirements relative to the Historical Resources Act. The Listing of Historic Resources, found on the Alberta Culture and Tourism website can assist with providing information about areas within the Park with or adjacent to recorded historic resource sites of higher interpretive potential. Consultation with the Historic Resources Management Branch will assist in determining other areas of historic resource site potential where no investigation has yet been conducted.

3.8 Objectives	Strategy
Protect historic resources for the purposes of scientific study and visitor appreciation	Work with the Historic Resources Management Branch to define strategies for the protection of historic resources
Ensure that development within the Park complies with all Historical Resources Act requirements.	Work with the Historic Resources Management Branch to define the process for ensuring that development plans are reviewed and Historical Resources Act approval is achieved for all development projects with Historical Resources Act requirements.

3.9 Adjacent Land Use and Development

LHCPP has significant external pressures due to its location within a highly developed, and rapidly growing urban region. As one of the most significant threats to conservation identified through the PAME assessment, adjacent land use and development must be managed collaboratively and in a way that compliments all conservation and protection objectives identified in this section. Much of the land around Big Lake is privately owned, which poses challenges for access to the lake, as well as for conservation and management of ecological values across the landscape. The current adjacent land uses include agriculture, residential, recreation and conservation with a range of municipal policies in place and planning tools available to manage environmentally sensitive lands and allow appropriate recreational activities. The north side of the park is adjacent to agricultural operations, golf courses and conservation areas while the south side is adjacent to country residential and recreational development (*see map: Lois Hole Centennial Provincial Park: Municipal Zoning/Land Use Overlay*).

Sturgeon County lands adjacent to LHCPP are currently zoned for agriculture, recreation and conservation. The Sturgeon County Municipal Development Plan applies an overlay that identifies Big Lake as being part of a regional network of natural areas, wildlife habitats and wildlife corridors with associated best management practices and development regulations (MDP, 2014). The planning

overlay acts as a conservation buffer to mitigate impacts from development and the MDP identifies future plans and studies that will help with future decision-making. The long-term protection of these adjacent lands from the impacts of intensive urban development is significant.

Parkland County lands adjacent to LHCPP are addressed within the County's Big Lake Area Structure Plan (ASP) which primarily identifies residential and recreational land uses, including the provision of a linked open space network using municipal reserve (MR) dedications and a possible future regional trails system (2013). A large portion of the lands adjacent to the west side of LHCPP fall under the Atim Creek / Big Lake Floodplain Overlay, a planning tool that limits the types of new developments that may be allowed. The Environmental Conservation Master Plan (2014) identifies Big Lake as an Environmentally Sensitive Area that provides critical habitat for waterfowl and other wildlife and imposes a 100-meter planning buffer around the lake. The County also has policies and programs in place that support and enable environmental education, stewardship and conservation including the Dark Sky Policy, the Alternative Land Use Services program, the Green Acreages program, and the Naturalization of Municipal Land Policy.

The City of St. Albert lands adjacent to LHCPP contain very little urban development and fall within the City's Designated Flood Line Map, an area where new development is prohibited. The lands are zoned Urban Reserve with special regulations to ensure any future development, where permitted, will not negatively impact environmentally sensitive lands (City of St. Albert Land Use Bylaw 2015). The City addresses water and land management through a range of non-statutory plans, policies and programs including the Environmental Master Plan (2014), a strategic document that draws on existing plans and policies to provide a framework for management of air, land, water and people. An annual Report on the Environment provides an update on how well the City has achieved goals and targets set in the Environmental Master Plan. The Red Willow Park: West Master Plan Update identifies Big Lake as a significant environmental resource that plays an integral role within the Sturgeon River watershed. An update of the plan is currently under way and the LHCPP management team is identified as a stakeholder.

The City of Edmonton lands adjacent to LHCPP are addressed within an ASP and an Area Redevelopment Plan (ARP). The North Saskatchewan River Valley ARP provides overarching policy direction to protect the North Saskatchewan River Valley and ravine system and enable the development of a continuous open space system, connected through a network of trails and open spaces, to meet urban recreation needs (2014). It encompasses the portion of Big Lake within the City's municipal boundaries and identifies areas for environmental protection and recreation use. Big Lake ASP, a more focused mixed-use development plan, identifies development for five medium and low density residential neighbourhoods, three of which have more detailed Neighbourhood Structure Plans (NSPs) (2014). The NSPs incorporate open space planning that includes buffers between development and environmentally sensitive lands like wetlands, including Big Lake. The City has also taken a strategic approach to open space planning and management through Breathe: Edmonton's Green Network Context (2016), a comprehensive plan based on environmental, health and recreational principles and policies from existing federal, provincial, regional and municipal plans and policies.

One of the largest potential threats to conservation at LHCPP is changes in surface water drainage due to land disturbance associated with residential and commercial development and agriculture in the adjacent municipalities. An intergovernmental task force, including representatives from the four adjacent municipalities, was put together to address existing and future drainage patterns and flooding concerns associated with increasing development. The task force produced a storm water management plan which identifies major issues related to drainage and flooding, such as a lack of clear understanding of the impacts of agricultural and urban development (Big Lake Storm water Management Plan 2004). The plan also makes recommendations to mitigate impacts from land use activities and development, many of which, such as flood plain mapping with development restrictions, have been implemented. The LHCPP management plan process has provided a renewed opportunity to increase understanding about Big Lake basin, share information and resources, and align policies and practices.

Three main outcomes were identified from a Municipal Excellence Workshop held during the draft management plan preparation stage:

- Continue to maintain relationships with municipalities through existing initiatives, like the Sturgeon River Watershed Group Steering and Technical Committees;
- Meet annually to discuss and re-affirm shared management objectives and progress towards protecting and enhancing park health; and

- Share resources related to land use planning within the watershed using a shared platform.

The four municipalities have collaborated on several inter-municipal plans and initiatives in the past and currently work together for watershed stewardship as part of the Sturgeon River Watershed Alliance (SRWA) steering committee. Alberta Parks will work with the SRWA steering committee and will facilitate other opportunities to maintain communication and collaboration between parks and municipal staff to influence and support environmental stewardship of land adjacent to LHCPP.

3.9 Objectives	Strategy
Encourage and build capacity for conservation efforts and initiatives on adjacent public and private lands that enhance the integrity of ecological and water resources	Build capacity for the implementation of best practices to improve and protect riparian, wetland and watershed health
	Create a buffer between the park and adjacent land developments; work with municipalities and/or developers to naturalize and create habitat within Municipal reserve lands
	Explore and create opportunities for ongoing networking, information and resource sharing, and collaboration between Alberta Parks and four municipalities surrounding Big Lake

4.0 COMMUNITY ENGAGEMENT

Photo: Dragomir Drajs Vujnovic

"Fostering happy and productive relationships with friends, family, and neighbours is critical for building trust and a broader sense of community. In a world where dissociation from nature tends to nurture self-centeredness and can contribute to social breakdown, nature acts as a connecting force."

(Canadian Parks Council, 2014)

Parks play an extremely important role in connecting people with nature and bringing communities together, both of which help address the broader social issues challenging society. LHCPP represents "nearby-nature" for thousands of residents in the Alberta Capital Region and is therefore well positioned to provide many benefits of nature connection such as nurturing healthy citizens, supporting a productive and innovative workforce, developing safe and inclusive communities, inspiring feelings of national and provincial pride, and providing children with the best opportunities to succeed (CPC, 2014). LHCPP has the potential to be an important social and cultural resource through fostering connections between people and nature and bringing about many positive community outcomes. Alberta Parks is committed to engaging and facilitating an active, resilient, and diverse community around and within the park. By forging strong partnerships with a variety of external organizations, Alberta Parks will not only be able to attract new and diverse audiences of visitors to experience the park, but will also create a network of stewards for the long-term conservation and protection of LHCPP.

4.1 The Public Engagement Continuum

The Alberta Parks approach to engaging Albertans in parks is to build both "experiences of a lifetime and a lifetime of experiences". This approach recognizes that Albertans interact with parks in a variety of different ways, and public engagement is seen as a continuum:

Figure 1: The Public Engagement Continuum

People may first discover parks through an experience of a lifetime, such as a camping trip, interpretive program, or hike. However, due to the high number of returning, local visitors, our engagement with the public must go beyond single visits and engage people for a lifetime of experiences – as children, youth, parents, seniors, and in the legacies they leave after they pass on.

Ultimately, the goal of Alberta Parks is to engage people at LHCPP for the primary purpose of creating a lasting connection with nature that will result in a strong, life-long stewardship ethic. The highest public engagement priorities at this site are to support a large number and a wide diversity of audiences participating in outdoor, nature-based experiences, education programs and stewardship activities. By engaging in these activities, Alberta Parks will help participants build the knowledge, attitudes, skills and behaviours that create an environmentally literate citizenry. Secondary goals for public engagement are to bring about the host of community health, wellness, and social benefits that result from connecting people with nature. Figure 2 below depicts the unique public engagement orientation for LHCPP and reflects the relatively high emphasis and investment that will be placed on developing partnerships and supporting ongoing and active stewardship at the park. There will be much less emphasis at LHCPP on attracting a large base of one-time visitors to the park.

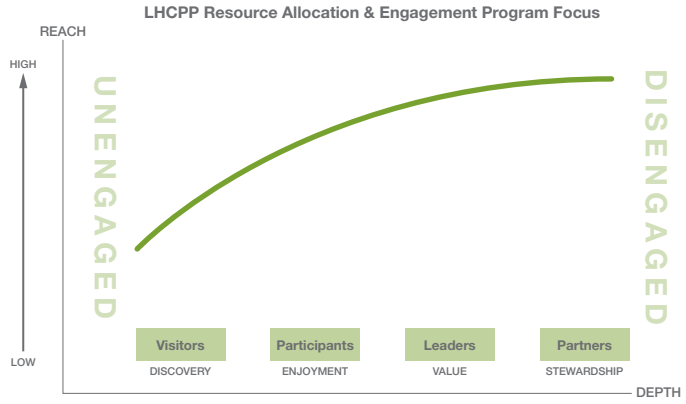


Figure 2: LHCPP Public Engagement Orientation

Alberta Parks will deliver on these priorities by designing and developing supportive infrastructure and collaboratively designing and delivering environmental education and stewardship programming that is customized for specific target audiences.

Alberta Parks will evaluate the success of these public engagement efforts. Rather that tallying up the number of visitors to the park each year, more robust measures of success will be developed to include qualitative and quantitative indicators such as the number and diversity of community groups engaged, the impacts of programs on visitors, and the behavioural outcomes that result from participation in educational programming or stewardship activities at the park.

4.2 Infrastructure for Community Engagement and Education

The development of an Environmental Learning Centre (ELC) will be a key tool to support education programming to a wide range of target audiences. Planning considerations for the ELC are discussed in section 6.1.1. Additional infrastructure and nature trail development will be complementary to the ELC and will provide a wide range of opportunities year-round for a diverse audience of park visitors, program participants and community partners. Although it supports many of the objectives related to section 4.0 Community Engagement and 6.0 visitor experience, infrastructure development is discussed in section 7.0 outdoor recreation and healthy living.

4.3 Key Stakeholders and Partners

Big Lake has a long history of collaboration that has resulted in the recognition of LHCPP as a significant site for its abundant ecological values, and for the many opportunities and benefits it provides to the community

and Albertans. Shared stewardship, co-operation and partnerships with other departments and governments, adjacent landowners, the private sector, volunteers and not-for-profit organizations have been critical to the ongoing successful conservation, planning, management and operations of the park. This section provides a summary of the key existing partnerships involved in the day-to-day collaborative management of LHCPP.

4.3.1 Big Lake Environmental Support Society

The Big Lake Environmental Support Society (BLESS) was founded in 1991, and is a registered non-profit organization. BLESS' main objective is the conservation of Big Lake and surrounding wetlands through public education, stewardship and environmental monitoring.

BLESS nominated Big Lake for consideration under the Alberta Special Places 2000 program. The Government of Alberta subsequently designated Big Lake as a Natural Area, and appointed BLESS as the official steward of the Big Lake Natural Area under the Alberta Parks Volunteer Stewardship Program.

Since its inception, BLESS has played an active role in support of the conservation and protection of Big Lake, and continues to run environmental education special events, programs and initiatives. BLESS has also worked collaboratively on an ongoing basis with Alberta Parks and the four municipalities surrounding Big Lake to facilitate environmental monitoring, to promote environmental stewardship, and to communicate to various audiences about the significance of Big Lake as a globally recognized Important Bird and Biodiversity Area. In partnership with a number of stakeholders, BLESS constructed and maintains a viewing platform on Big Lake at the mouth of the Sturgeon River.

4.3.2 Ducks Unlimited

Ducks Unlimited and Alberta Parks have a common interest in increasing public awareness and understanding of the value of the wetland ecosystems in the park. To facilitate nature-appreciation and outdoor environmental education opportunities for Albertans, Ducks Unlimited invested over $1 million in the John E. Poole interpretive wetland to construct a boardwalk, trails and interpretive signage within the park, which opened to the public in 2011. Through a Memorandum of Agreement, Ducks Unlimited and Alberta Parks have collaborated to support access to the interpretive wetland by the public and school groups, and to maintain the associated infrastructure. The John E. Poole interpretive wetland provides a unique opportunity for area residents, visitors, and students of all ages to experience, understand and appreciate the aquatic ecosystems that characterize the park. Ducks Unlimited continues to support and partner with community-based organizations, schools and other educational institutions to enable wetland-focused formal and non-formal education programming at Big Lake.

Ducks Unlimited owns approximately 160 hectares of land on the North West shore of Big lake. Permitted activities on that land parcel include non-motorized recreation and hunting. The Big Lake property is also part of DU's Volunteer Marshkeeper program, which engages local citizens in stewardship, monitoring and documenting observations about site conditions, wildlife sightings, potential threats and other management issues.

4.3.3 Municipal Stakeholders

In recommending the establishment of Big Lake as a protected area in 1999, the Special Places Local Committee stressed the importance of strong, effective partnerships with the four surrounding municipalities to the future conservation of the area. LHCPP has historically been managed as a shared asset, and efforts have been made to integrate conservation and recreation planning initiatives at the regional scale, while coordinating and co-operating for day-to-day park operations in key areas.

To build and support local capacity for environmental sustainability initiatives, Alberta Parks is working through the respective municipal partners, to engage developers and builders in adjacent neighbourhoods, and to help promote environmental best management practices.

4.3.4 The Enjoy Centre and the Hole Family

Bill and Jim Hole, sons of the late Lieutenant Governor Lois Hole own land adjacent to the park, and east of Ray Gibbon Drive, where they operate a large commercial facility called the Enjoy Centre. The Enjoy Centre is a unique, multi-use facility featuring a greenhouse, spa, yoga studio, café, and a number of sustainable living, health and wellness oriented retail stores.

The Hole family has expressed an interest in working in partnership with Alberta Parks to engage the community in the park and to promote low-impact recreation opportunities and environmental stewardship. The proximity, design and philosophy of the Enjoy Centre make it complementary to the community engagement objectives of LHCPP.

4.3.5 The Alberta Resource Recovery Centre (ARRC) Working Group

The Alberta Resource Recovery Centre is a project situated downstream from LHCPP, a distance of approximately 8 km down the Sturgeon River and 1.5 km away from Riverlot 56 Natural Area. The project seeks to advance community sustainability through innovative solutions to water, nutrient and energy management, stakeholder education, promotion of environmental stewardship, and integration into urban spatial planning. The working group includes representation from international academic, industry, government, and Indigenous communities. The ARRC is situated on 180 hectares of infill urban lands, and is bounded by the University of Alberta Research Station, Sturgeon River and City of St. Albert.

Alberta Parks and the ARRC Working Group have identified a number of potential synergies to serve mutually beneficial outcomes. In partnership with municipal stakeholders, there is potential for ARRC lands to contribute to an integrated trail system spanning from areas west of Big Lake north-eastward down the sturgeon river valley. Recognizing the critical importance to the Alberta Parks/AEP mandate of building environmental literacy among Albertans – that is, supporting the adoption of environmentally sustainable attitudes and behaviours – future partnerships with the ARRC for environmental education will support many management objectives at LHCPP. Finally, the technology that will be put in place at the ARRC site will contribute to the LHCPP's ability to "model how biodiversity and urban development can exist in harmony, and facilitate community engagement in environmental stewardship" and directly supports the ecological conservation and protection objectives identified in section 3.0.

4.3.6 Nature Alberta

As the provincial coordinator of the Important Bird and Biodiversity Areas program, Nature Alberta acts as provincial liaison to the Canadian coordinating bodies (Nature Canada and Bird Studies Canada), and supports stewardship and monitoring of the 43 IBAs found in Alberta. Nature Alberta has partnered with BLESS and Alberta Parks to promote Big Lake as an IBA through educational programming and special events. There are many opportunities to build on this work through the development of new educational materials and establishment of coordinated monitoring efforts that utilize the IBA Canada protocol and tools developed by Bird Studies Canada.

4.3.7 Formal and Non-Formal Education Institutions, Organizations and Educators

LHCPP has long been a destination for formal education classes (including K-12 and post-secondary) seeking outdoor curriculum-linked field studies. The site is also frequently used by groups and organizations such as boy scouts and girl guides, and is a destination for environmental education programming run by non-profit organizations such as Inside Education. There are many opportunities to expand and formalize these partnerships, and programming will be designed in collaboration with school boards, teachers, educators and other institutions such as the John Janzen Centre to meet the unique needs of the diversity of groups.

4.3.8 Post-Secondary Academic Institutions and Researchers

Big Lake has provided many opportunities for post-secondary academic field research for institutions such as the University of Alberta and the Northern Alberta Institute of Technology among others. To address the many knowledge gaps that have been identified related to the management of LHCPP and in support of the objectives identified in section 3.0, Alberta Parks will seek opportunities for ongoing research and monitoring partnerships with external academic institutions and researchers as per the Alberta Parks Science Strategy (2010).

4.3.9 North Saskatchewan Watershed Alliance

Big Lake is situated within Atim Creek and Sturgeon River sub-watersheds of the North Saskatchewan Watershed. As one of the eleven Watershed Planning and Advisory Councils (WPAC), Alberta Environment and Parks has worked closely with the North Saskatchewan Watershed Alliance (NSWA) to monitor watershed health and undertake collaborative planning and management initiatives in support of the Water for Life Strategy. Continued collaborations and partnerships with the NSWA and with the Sturgeon River Watershed Subcommittee will support alignment of efforts and leveraging of resources and expertise for stewardship of Big Lake and the surrounding watershed.

4.4 Partnerships and Collaboration

There are many opportunities to build on and enhance partnerships with community organizations to deliver on the objectives outlined in this management plan. Alberta Parks is committed to nurturing new and existing strategic partnerships and collaborations with community-based organizations to leverage resources and align efforts in support of the overall LHCPP vision.

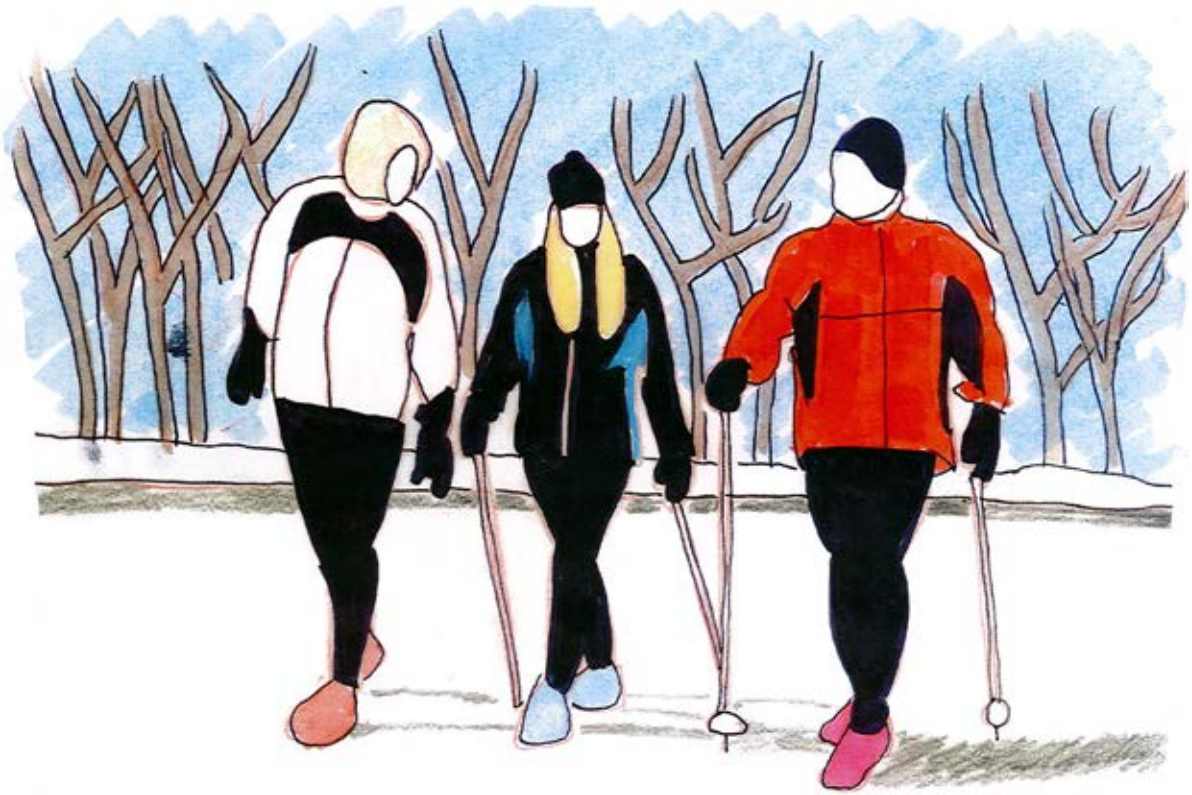
The main mechanism for ongoing community engagement at LHCPP will be through the establishment of two collaborative multi-stakeholder working groups. An Environmental Monitoring Working Group (see Objective 3.2) will bring together individuals and organizations involved in environmental monitoring in the Big Lake area in order to coordinate and align monitoring efforts, set research and monitoring priorities, and develop monitoring strategies, plans, and protocols. An Education and Outreach Working Group will bring together individuals and organizations involved in environmental education or public/stakeholder engagement activities at the park in order to build environmental literacy and facilitate volunteer stewardship. This Working Group will enable collaboration between organizations on programs, events, and initiatives, sharing of resources, and development of strategies for education and outreach at LHCPP.

There are several examples across the province where Alberta Parks has entered into formal partnerships with community organizations to develop and deliver various types of programs operating within parks and protected areas. The mutually beneficial outcomes of these arrangements include:

- Leveraging of limited resources
- Access to networks of people, resources, expertise and funding
- Positive community outcomes including economic development and social, health and wellness benefits

Fish Creek Provincial Park and Glenbow Ranch Provincial Park are two examples of provincial parks in proximity to urban centres which have established partnerships with non-profit societies for program delivery. The “Park Watch” stewardship program run by the Friends of Fish Creek Park Society is an example of a program that has great potential at LHCPP. In collaboration with provincial and local organizations dedicated to stewardship capacity-building, such as the Land Stewardship Centre and others, Alberta Parks will explore options for developing a Community Volunteer Stewardship program that will provide opportunities for local citizens and community volunteers to participate in monitoring, education and stewardship efforts that support all of the conservation and protection objectives identified in section 3.0.

The desired future state at LHCPP is for Alberta Parks to provide the space, infrastructure and oversight that enable community-driven and community-led initiatives to actively support the management intent and vision of the park. Going forward, a strategic approach to community engagement at LHCPP will incorporate, as appropriate, key successful elements of other existing models in other parks and will be tailored to the unique characteristics and needs of the site and community stakeholders.



The desired future state at LHCPP is for Alberta Parks to provide the space, infrastructure and oversight that enable community organizations to be active in the park in ways that support the management intent and vision of the park.

4.4 Objectives	Strategy
Identify and create opportunities for enhanced community engagement in the park through collaboration between AB parks and community-based organizations	Involve community organizations including academic and educational institutions in LHCPP Environmental Monitoring Working Group (See Objective 3.2)
	Establish and involve community organizations in LHCPP Education and Outreach Working group.
	Explore feasibility of developing a Community Volunteer Stewardship program similar to programs existing in other areas through a memorandum of agreement with one or more community based organizations.
	Identify new community organizations to partner with for program delivery such as nature based preschools and health care professionals.
	Develop multi-use Environmental Learning Centre and infrastructure within facility zones to support engagement of diverse community groups in the park
Engage in local communities	Respond to requests from organizations and groups, and provide information, representation, and other forms of support as needed and as appropriate.
	Where possible and appropriate, take an active role in local events, meetings, community activities and community initiatives.
Maintain open and productive dialogue with local communities regarding the ongoing management of LHCPP	Conduct regular community engagement activities
	Consider local perspectives and impacts to communities in decisions related to the operations and development of LHCPP.
	Use public information channels such as the LHCPP website, social media and Parks Day events to highlight and promote programs and activities that contribute to the LHCPP vision and objectives and to communicate about park management.

5.0
INDIGENOUS PEOPLES

The strong connection between the Indigenous peoples of North America and the land predates written history. For generations, First Nations and Métis have practiced a long tradition of hunting, gathering food and medicines, and have relied on the land and natural resources for subsistence and to maintain cultural and spiritual practices.

Indigenous values include the respectful use of natural resources in consideration of future generations, the protection and reverence of areas for their spiritual and cultural significance, and care and stewardship for the land, plants and animals. The Indigenous worldview recognizes the human role as belonging to the land, and people are viewed as one element of a fully integrated environment. Traditional knowledge, in the form of narratives, place names, and ecological wisdom was passed down through oral tradition from generation to generation. Embedded within landscapes, this oral tradition has preserved the Indigenous relationship to the land and therefore parks and protected areas can contribute to the long-term preservation of Indigenous cultural heritage (Buggey, 1999).

These values support the overall vision and management intent for LHCPP, and offer a holistic approach that complements and enhances scientific approaches to ecology, conservation and natural resource management. These values naturally align with a desirable state for LHCPP that sees human development and activities existing in harmony with nature.

In the Central Alberta region, Alberta Parks, with the assistance of other Government of Alberta departments, has worked with, and will continue to work with Treaty 6 First Nations and Métis communities to identify traditional use and culturally significant sites within parks and protected areas. There are several First Nations and Métis communities in proximity to LHCPP including Alexander First Nation, Enoch Cree Nation #440, Paul First Nation, and several Métis locals within Metis Nation of Alberta Association Zone 4. Alberta Parks is committed to continued relationship-building and ongoing communication and cooperation with these communities.

Collaboration with Indigenous communities can contribute to the development of meaningful educational and recreational opportunities for visitors, including the use of Indigenous names for sites, and the development of interpretive materials and experiences that allow visitors to understand and appreciate the park's landscape from the Indigenous perspective.

While hunting and trapping is prohibited within LHCPP, a key priority is to maintain First Nations treaty rights to fish at Big Lake. Given the ecological values present at LHCPP, there may be interest among Indigenous communities in maintaining or enhancing the practise of other traditional activities including collecting materials, conducting ceremonies, and gathering food and medicine. Respecting First Nations constitutionally protected rights and Indigenous traditional use activities requires commitment to understanding First Nations and Métis needs and practices, and to providing a welcoming environment where traditional use activities can be practiced. This requires education of field staff, land managers and the public through active cultural awareness education programs. It also requires the development of relationships and mechanisms to facilitate communication and Indigenous access to the park.

To inform park operations and development, Alberta Parks is dedicated to establishing an open and ongoing relationship with Indigenous communities in the vicinity of LHCPP, maintaining a spirit of collaboration on issues of mutual interest. In collaboration with other departments, Alberta Parks will continue to support and collaborate in Indigenous collection and documentation of traditional land use information and traditional ecological knowledge, which will be used, as deemed appropriate and as desired by Indigenous communities, to assist in ongoing management and stewardship of LHCPP now and in the future.

5.0 Objectives	Strategy
Identify opportunities to recognize and share Indigenous culture and history	Work with Indigenous communities to develop and deliver programs and services as part of the visitor experience.
Protect Indigenous ceremonial and cultural sites.	Utilize Historic Resource Impact Assessments and Traditional Ecological Knowledge/Traditional Land Use studies to protect sites and, where appropriate, apply buffers.
	Where Traditional Ecological Knowledge/Traditional Land Use information is not available, consult Indigenous communities on provincial park infrastructure activities that significantly expand beyond the existing footprint.
	Explore funding opportunities to continue with collection of traditional ecological knowledge and land use.
Explore opportunities for Indigenous participation in LHCPP operational activities, programming and future management planning.	Maintain open communications and working relationships with First Nations and Métis communities and seek opportunities for Indigenous engagement or involvement as appropriate, based on successful models and strategies such as the Indigenous Guardians Program[8].

8 The Indigenous Guardians Program is a project of the Indigenous Leadership Initiative: *http://www.ilinationhood.ca/*

6.0
VISITOR EXPERIENCE

"Imagine a world in which all children grow up with a deep understanding of the world around them. Where obesity is reduced through nature play. Where anti-depressants and pharmaceuticals are prescribed less and nature prescribed more. Where children experience the joy of being in nature before they learn of its loss. Where they can lie in the grass on a hillside for hours and watch clouds become the faces of the future. Where every child and every adult has the human right to a connection with the natural world, and shares the responsibility to care for it."

– Richard Louv

The great potential of LHCPP to contribute to transformative outdoor and environmental learning opportunities among a diversity of Albertans cannot be overemphasized. Compared to other urban areas, including Calgary, the Capital Region is relatively under served with environmental and outdoor learning opportunities. While many visitors may be attracted to the park as an opportunity for a family gathering or a walk in a natural setting, visits to LHCPP can easily become much deeper experiences. Through an inclusive and welcoming environment, targeted programming and intentionally designed facilities, Alberta Parks and community partners can increase the likelihood of transforming park visitors into life-long stewards of nature.

6.1 Environmental Literacy Programming, Planning and Design

A primary goal of environmental education programs is to foster environmental literacy, which is the capacity to "think, plan and act" with the environment in mind. Programming in natural environments can also help foster healing and habits conducive to healthy living. An environmentally literate citizenry is critical to our survival as a species, and the importance of shared stewardship among all Albertans is acknowledged in the 2017-2020 Alberta Environment and Parks Business Plan (AEP, 2017) as a key factor in meeting province-wide environmental outcomes. To realize the public engagement vision outlined in Figure 2, a customized suite of education and interpretive programs must be developed in order to meet target audiences where they are at and support their growth and development.

As explained in section 3.0, the long-term health and integrity of the Big Lake ecosystem and watershed is largely dependent upon land-use activities outside of the park boundary. For example, improving water quality and minimizing nutrient loading in Big Lake relies on restoration and protection of riparian areas and wetlands surrounding the lake. Similarly, mitigating the impacts of residential development on the many species of birds that rely on Big Lake requires that people in the adjacent subdivisions take action to minimize all forms of disturbance such as light pollution. There are also many opportunities for homeowners to proactively support conservation by creating wildlife habitat and supporting ecological restoration through yard management practices such as "naturescaping" or eco-friendly landscape design. Land and home owners and land-use decision makers in the surrounding communities are therefore an important target audience for environmental literacy programs.

Another very important target audience is youth both within and outside of formal education settings. The wetlands within LHCPP serve as an ideal outdoor classroom, giving students opportunities for hands-on and inquiry-based learning related to a wide variety of subject areas and at all levels ranging from preschool through to post-secondary. Many school groups are already using the site – in particular the John E. Poole interpretive wetland – for curriculum linked experiential field studies. LHCPP's facilities and education program potential present an opportunity to formalize outdoor wetland experiences as part of the curriculum for all schools in proximity to the site.

Compliance with site-specific regulations and with management initiatives, such as seasonal area closures, is another priority for environmental education at LHCPP. In order to enable voluntary compliance, the preferred approach will be to work with the community to create the social norms that will effectively reinforce positive behaviors. By providing, in a variety of formats, positive messaging, tools, and information, visitors will be guided toward the behaviours and actions that will help protect the park's valuable and sensitive resources.

Acting alone, Alberta Parks is limited in its ability to effectively reach all of the target audiences identified at LHCPP. There is a wide range of organizations, groups, and institutions that are well-suited to reach key audiences through a variety of program delivery methods. The establishment of an Education and Outreach Working Group will support communication and collaboration between Alberta Parks and community groups, and will inform the development of the necessary infrastructure, and other resources or support where possible to enable those community initiatives to flourish and to align park management objectives.

There are many opportunities for homeowners to proactively support conservation by creating wildlife habitat and supporting ecological restoration through yard management practices such as naturescaping or eco-friendly landscape design.

It is worth noting here that, social science research can greatly contribute to the development of programming and infrastructure that supports environmental literacy outcomes and the development of appropriate visitor services, as well as achieving all of the people-oriented management objectives outlined in this management plan. The application of social science research and theory at LHCPP is discussed in section 8.0.

6.1.1 Environmental Learning Centre

The development of multi-purpose facility on site at LHCPP that models sustainable and innovative design will greatly enhance the ability of Alberta Parks and partners to deliver high-quality, high-impact environmental education programming. It is also a key resource in facilitating the type of community gatherings and events that will support a thriving, active, and diverse community of park stewards as outlined in section 4.0. A stakeholder workshop held in 2012 identified a number of design recommendations for the Environmental Learning Centre (ELC) at LHCPP[9] including incorporating a central meeting hall and classroom space with visual and physical access to the park, plus administrative and building support space.

"Easy access to the facility by all users was expressed as an important aspect of the facility as was allowing for good views to the exterior from inside…This will reinforce the visitor's experience of always being connected to the environment, even while indoors." (GEC Architecture, 2013)

Since 2012, the overall vision for the Environmental Learning Centre has remained relatively unchanged, and community support for the initiative has remained high. New opportunities have been identified, such as the potential to partner with the Alberta Climate Change office for facility design and future use. Planning considerations for the ELC will be updated accordingly to ensure alignment between the ELC facility and the proposed East Facility Zone development plans outlined in section 7.1.2. It will be important to ensure that the suite of facilities and infrastructure offered at LHCPP are complementary and make the best use of available resources and space, while supporting park management objectives to the maximum extent possible.

Moving forward, Alberta Parks will work with the Alberta Climate Change office to update the feasibility study for the ELC prior to developing a business case to seek support for proceeding with its development.

6.1 Objectives	Strategy
Build environmental literacy among diverse target audiences and foster appreciation and caring for nature through intentional, collaboratively developed nature-based educational and interpretive programming.	In collaboration with the LHCPP Education and Outreach Working Group, develop an Education and Outreach Strategy that identifies literacy outcomes, key target audiences, program delivery approaches, and resource and infrastructure needs.

9 2012/2013 Environmental Learning Centre Visioning Workshop Document available upon request

Guided by the Education and Outreach Strategy, collaborate with community partners in developing/producing educational materials, products and programs.
Explore leveraging funding partnerships, develop Business Case and submit funding request for development of Environmental Learning Centre.
Develop day-use area within the East Facility Zone and specially designed infrastructure within facility zones to support outdoor environmental education programming
Explore opportunities for the park to support key curriculum outcomes in formal education system. Work with the Department of Education and school districts to facilitate incorporation of outdoor learning opportunities at LHCPP as part of annual program of studies.
Collaborate with Indigenous communities to develop interpretive material to communicate the significance of the area from Métis and First Nations perspectives, if desired.

6.2 Public Safety, Information and Regulatory Compliance

Providing welcoming, accurate, timely and relevant information is critical for public safety, regulatory compliance and to facilitate an overall positive visitor experience. This information is communicated through a suite of non-personal and personal information services. Current wayfinding signage in LHCPP will be assessed and redeveloped to ensure that it is accurate, current and consistent in messaging and branding. Clear and well-placed regulatory signage and other media are critical to the positive visitor experience and the protection of the environment. Examples of important regulatory messages include warnings about fines associated with illegal garbage dumping, off-highway vehicle (OHV) prohibitions in the park, notices of temporary or seasonal area closures, ecological dangers of introducing invasive species and public safety hazard warnings.

New information including trail and zoning maps and information on services, facilities and programs will be incorporated into various media. Information kiosks and signage will be developed at access points to all three facility zones. Alberta Parks will work with municipalities and other community partners to disseminate information through their networks on an ongoing basis.

Ongoing issues with illegal and non-compliant activities within the park including, garbage dumping, dogs off-leash, and the use of OHVs threaten and compromise the sensitive ecological values in the park, as well as visitor experience. As both a precursor and companion to conservation enforcement activities undertaken by Alberta Parks' enforcement staff, face-to-face education and communication are a critical aspect of curbing irresponsible and destructive behavior, and creating the social norms that will contribute to voluntary compliance. While enforcement staff have the necessary training and authorities to enforce relevant legislation and policies, everyone has a role to play in public education and in reporting problem behavior.

6.2 Objectives	Strategy
Provide accurate, relevant, consistent, timely and current information for park visitors.	Develop new maps that provide effective wayfinding and identify available services and activities.
	Develop information kiosks at all three facility zones to house visitor information.
	Guided by the Education and Outreach Strategy, develop and implement new and improved public safety and regulatory information and wayfinding products. Explore the feasibility of developing information dissemination tools that incorporate new media and technologies such as virtual and augmented reality.
	Ensure online information services are effective and current.
	Provide park visitor information products in strategic locations within surrounding communities (i.e. Enjoy Centre, BLESS cabin).
	Establish a social media presence to encourage visitor feedback, information sharing and peer-to-peer marketing.
	Establish a network for disseminating park information, programs and services through various media.
Enhance Alberta Parks and volunteer steward presence at LHCPP for face-to-face education opportunities	Design Community Stewardship Program (see objective 4.4) to include face-to-face education to promote stewardship and regulatory compliance
	Guided by Education and Outreach strategy, design and develop tools and materials to support personal and non-personal communication of key messaging in support of regulatory compliance

6.3 Accessibility and Inclusion

Everyone belongs outside: connecting with nature is important for the quality of life of all people (Alberta Parks, 2008). Alberta Parks is committed to removing barriers to equitable participation and enjoyment of parks by people of all abilities and backgrounds. In order to address the needs of people with disabilities ranging from mobility challenges to visual and hearing impairment, as well as other cultural and socio-economic barriers to participation in programming or recreation at LHCPP, Alberta Parks will undertake systematic review of all existing and new infrastructure developments for accessibility and inclusion. This review will identify problem areas and assist in developing recommendations to improve accessibility and to reach out to new audiences including new Canadians. The Education and Outreach Strategy described in section 6.1 will identify new and under-represented audiences to engage at LHCPP, along with strategies to remove participation barriers for these audiences.

Everyone belongs outside: Connecting with nature is important for the quality of life of all people.

6.3 Objectives	Strategy
Ensure that people of all abilities and backgrounds can participate in nature-based experiences and outdoor recreation at LHCPP	Review all existing and new infrastructure developments and improve accessibility
	Form strategic partnerships with community-based organizations to reach new and under-represented audiences of Albertans

6.4 Fostering Connection to Place

Any given space is transformed into “place” when humans ascribe to it meaning and believe it has value (Wolf et al., 2014). Parks and green spaces, particularly those that are close to where many people live, work, and play, are often preferred and meaningful places. They offer restorative and healing benefits, opportunities for recreation, and support a diversity of social and cultural activities that bring communities together for celebration, learning or other activities that can create lasting memories and emotional connection to the site. Research shows that the proximity of neighbourhoods to nature not only encourages social bonding between people, resulting in a host of positive community outcomes (Westphal, 2003), but fostering emotional connection to nearby and familiar natural spaces encourages the adoption of lasting pro-environmental behaviours (Vaske and Kobrin, 2001). Alberta Parks will foster emotional connection to LHCPP by enabling use of the site by diverse groups of people at all stages of life to celebrate and commemorate life events both big and small.

Alberta Parks will foster emotional connection to LHCPP by enabling use of the site by diverse groups of people at all stages of life to celebrate and commemorate life events both big and small.

6.4 Objectives	Strategy
Foster emotional connection to place in support of long-term stewardship of LHCPP	Explore opportunities for the development of infrastructure, programming and partnerships that foster emotional connection to LHCPP among diverse audiences of visitors

6.4.1 Special Events

Appropriate special events delivered by community-based organizations can support the overall park vision and engagement objectives by creating a sense of connection to place, attracting new park users, generating revenue, and developing and enhancing collaborative efforts and partnerships.

In order to ensure that community-hosted special events support the overall LHCPP management vision and objectives, a permitting process is in place. Special events are authorized at LHCPP only where a valid permit has been issued by Alberta Parks.

In general, special events may be permitted when:

- They do not unduly disrupt general public access or use of the trails or facilities
- They support park goals and objectives
- They do not create conflict or present risks to natural or cultural resources
- They contribute to the financial, social, environmental or cultural sustainability of the park

6.4.1 Objectives	Strategy
Ensure compliance with Alberta Parks special events permit system.	Ongoing enforcement and public education of Alberta Parks regulatory system for special events permitting.
	Partner and collaborate with community organizations to promote special events that support LHCPP vision and objectives.
Enable special events at LHCPP that support the park vision and objectives while protecting sensitive ecological values from human-caused disturbance.	Update and refine special event permit screening criteria to align with LHCPP management vision and objectives.

6.4.2 The Role of LHCPP at End of Life

Parks provide physical, emotional and spiritual support at end of life (Carruthers Den Hoed and Jakubec, 2015) and provide people who are grieving or dying with the healing and comforting power of nature. In addition to developing a memorial and dedication bench program, Alberta Parks will explore other opportunities to collaborate with caregivers, health care providers, and other community organizations to help people nearing the end of life to receive comfort from nature at LHCPP.

6.4.2 Objectives	Strategy
Support the use of LHCPP as a resource for people who are dying or grieving	In collaboration with community partners, and based on successful program models in operation at other Alberta Parks sites, develop a memorial & dedication program
	Explore other opportunities to design programs to support nature-based end-of-life experiences LHCPP

6.5 Marketing and Promotion

Marketing is the primary means of informing potential visitors of the variety of experiences they can enjoy at LHCPP. Current and potential park visitors will be identified in the Education and Outreach Strategy (see objective 6.1), which will also determine the best means to connect these visitors with the opportunities and services offered in the park.

It should also be recognized that as a "nearby nature" destination, LHCPP has the potential to act as a "gateway" to other provincial parks sites by creating a convenient, familiar, and appealing opportunity for new audiences of Albertans to discover the Alberta Parks experience. This speaks to the importance of clearly communicating the unique Alberta Parks brand and associated messaging to all LHCPP visitors.

6.5 Objectives	Strategy
Promote the Alberta Parks brand within LHCPP and promote LHCPP to new visitors	Incorporate targeted marketing strategies into the Education and Outreach Strategy

7.0
OUTDOOR RECREATION AND HEALTHY LIVING

"Parks provide the best places for Canadians to experience all of nature's powerful benefits. We also believe that Canada's park systems are a vital part of the solution to broader social issues challenging us as a country — nurturing healthy Canadians and curbing the rising costs of health care, ensuring a productive and innovative workforce, stimulating a strong economy, developing safe inclusive communities, inspiring feelings of national and provincial pride, and providing our children with the best opportunities to succeed."

– The Canadian Parks Council

Spending time in nature contributes positively to our physical, mental and emotional health. As per the Active Alberta Policy (2011), Alberta Parks has a key role to play in providing opportunities for healthy living and recreation to Albertans. The proximity of LHCPP to major urban centres has the potential to connect large numbers of Albertans to nature for the many health and wellness opportunities provided by "nearby nature". The landscape and natural features of the park make it an ideal location for visitors of all ages, whether they are accessing the park from neighbouring communities, or are attracted from further distances.

7.1 Low-Impact Nature-Based Recreation on Land

The park is currently being used in all seasons, with the primary recreational activity being walking in non-designated, non-official nature trails, especially in the summer and fall. The park is also used in the winter for snowshoeing and cross-country skiing, and for walking in the spring months when access is not limited by wet conditions. Unofficial trails through the wooded areas of the park are also currently being used by mountain bikers in the winter.

Recreational activities within LHCPP will be encouraged or supported through programming and infrastructure or permitted only where they do not significantly negatively impact the park's conservation and protection objectives (see section 3.0). Recreation objectives for LHCPP emphasize low-impact, nature-based recreation: activities that engage visitors in outdoor experiences for the purpose of connecting with nature and gaining the health and wellness benefits it provides. LHCPP is a day-use only park, and overnight use is not permitted. The use of OHVs including snowmobiles and quads is also prohibited within the park boundary.

Recognizing that LHCPP protects some of the last remaining riparian and upland native vegetation in the Central Parkland subregion, all access to the park will be restricted to formal designated trails to protect native vegetation. Pedestrian and cyclist access to areas outside of designated trails will be discouraged through face-to-face education, signage and other educational materials as appropriate. Ecologically sensitive areas will continue to be closed on a temporary or seasonal basis as needed. Public education will be undertaken in partnership with key stakeholders in order to manage visitor expectations and to bring recreational users on side with stewardship objectives.

Recreation objectives for LHCPP emphasize low-impact, nature-based recreation: activities that engage visitors in outdoor experiences for the purpose of connecting with nature and gaining the health and wellness benefits it provides.

7.1.1 Trails Planning

There are existing informal trails concentrated along the South shore of Big Lake, near the existing parking lot in the East Facility Zone. Most of the development in the park will consist of formalizing a network of trails to support nature appreciation on foot. The majority of the trails within the park will be built to a “nature trail” standard (see Appendix D), with the exception of a few paved portions as needed that will facilitate trail connections to the larger regional system of trails. Trails over wet areas or in areas prone to regular flooding may be constructed on raised platforms. Trails will be developed within and extending from each of the three park facility zones. Nature trails will generally be designed as “loops” with interpretive signage or infrastructure to facilitate self-guided nature walks, and to enable guided programming where appropriate. Trail development, as with any kind of infrastructure development within Alberta Parks is subject to a standard environmental review process designed to prevent and mitigate adverse environmental impacts.

While cycling will not be restricted on nature trails, the nature walk experience will be emphasized, and visitor communications and education will encourage respect for other park visitors and the natural environment. Signage will prompt cyclists to dismount before accessing interpretive nature trail loops, and bike racks will be provided at strategic locations. Trails will be designed to be used year round, and will provide opportunities for hiking as well as snowshoeing and cross country skiing in winter. Where possible Alberta Parks will work strategically with adjacent land owners and municipalities to facilitate trail connections and integrate trails planning across the larger regional scale. This collaborative trails planning approach will accommodate recreationists using the park as a travelling corridor to access the Red Willow trail system in St. Albert from areas to the South and West of Big Lake and vice versa.

The feasibility of a trail going all the way around Big Lake is dependent on a feasibility study and on an environmental impact analysis, and would be subject to future land acquisitions or formal agreements with adjacent land owners.

In the short- term, trail development and formalization will be prioritized for the area adjacent to the East Facility Zone.

7.1.1 Objectives	Strategy
Develop a network of nature trails	Develop low-impact nature trails within and extending from the three facility zones
	Integrate trails planning with municipal planning processes, and explore partnerships for trail and staging area development with land developers and municipalities.
	Explore feasibility of future trail connections to create a continuous trail around Big Lake.
	Finalize mapping and assessment of existing non-designated trails; identify trails for closure and identify trails to formally develop into designated trails.

7.1.2 Facility Zone Development

As outlined in section 2.0, the three facility zones in LHCPP were chosen based on their suitability to support the presence of human activities in relatively large numbers, without seriously compromising ecological values. In addition to the Environmental Learning Centre that is planned for the East Facility Zone, the types of facility and infrastructure developments that will be considered for any of the three facility zones at LHCPP will support the community engagement, environmental education, and low-impact nature-based recreation objectives for the park, and could include:

Bird Blind at Gaetz Lakes Bird Sanctuary

- Interpretive trails, boardwalks, viewing platforms and bird blinds
- Picnic shelters
- Parking Lots
- Nature-based play structures

Three different options for infrastructure development were considered by the planning team for the East Facility Zone including: 1) a campground built to Alberta Parks guidelines, 2) a multi-use day use area, and 3) a network of nature trails accompanied by restoration of disturbed land. In order to evaluate these options for the purposes of developing a final recommendation, the planning team identified all of the management objectives that are either supported by or in some way affected by development of this facility zone. The management objective categories were assigned a weighting based on the management priorities for LHCPP. Where possible, indicators were developed for each of these objectives and were used as criteria to assess the degree to which the different options support or do not support each of the management objectives. The evaluation matrix used by the planning team to score and assess the three development options is included in Appendix F.

In general, given the primary importance of protecting sensitive ecological values and accommodating human activities for the purpose of environmental learning, community engagement, and nature-based recreation, it was determined that a day-use area is the most suitable fit for the limited land available for development at LHCPP in general, and within the East Facility Zone specifically. Compared with the other two options, the day-use area concept provided the most versatile use of the available space within the East Facility Zone with the potential to engage larger and more diverse audiences in the types of year-round experiences that support the park vision, while minimizing negative environmental impacts.

7.1.2 Objectives	Strategy
Develop infrastructure within facility zones that facilitate low-impact recreation to connect diverse groups of people to nature for environmental learning, health and wellness	Develop a day-use area including a network of reservable and non-reservable group picnic shelters, nature trails, a nature-based playground and parking within the East Facility Zone.
	Explore feasibility of board walks, viewing platforms, bird blinds, interpretive signage and other suitable infrastructure to support nature appreciation, environmental education and low-impact recreation opportunities within each of the three facility zones

7.2 Water-Based Recreation

Visitors currently use Big Lake for kayaking or canoeing and access is predominantly from the removable boat launch installed by St. Albert in the Sturgeon River at Rotary Park. There are a number of canoe and kayak clubs and guiding operations that are active within Edmonton and St. Alberta that also use Big Lake for guided day trips or lessons.

As outlined in section 3.0 Big Lake is an Important Bird and Biodiversity Area, and much of the area of Big Lake is significant habitat for a variety of migratory and non-migratory bird species. Special protection zoning on Big Lake (*see map: Lois Hole Centennial Provincial Park: Park Zoning*) highlights the importance of protecting areas for staging, feeding, nesting, and moulting – times when birds are most sensitive to disturbance. There is a considerable amount of research that has demonstrated that birds are sensitive to human disturbance from water-based recreation. It is clear that the ecosystem is likely to not be able to tolerate any level of motorized boat recreation. There is also considerable evidence showing the negative impact on a variety of bird species from non-motorized water-based recreation in the form of canoeing, kayaking or other forms of non-motorized water-based recreation (see section 3.3.2).

Accessing Big Lake by canoe, kayak or other non-motorized watercraft provides opportunities to connect people to nature and provide the types of transformative environmental literacy building experiences that are discussed in section 6.0. This situation poses a real challenge in balancing the need to minimize ecological disturbance while facilitating the social, economic and environmental benefits to be gained from bringing people in contact with wildlife.

The most suitable locations for water-based recreation are in the areas of Big Lake identified as "Natural Landscape" zone in the zoning map. The portions identified as "special protection zones" are considered sensitive and Alberta Parks will not support or encourage water-based recreation in these areas. Targeted education and communication to water-based recreationalists will raise awareness and build knowledge, skills, and literacy around how to be a responsible paddler in order to minimize disturbance to birds and habitat. There is potential for regular, seasonal closures within the purple special protection zone, so education efforts will need to raise awareness among paddlers about the potential for such closures to impact their recreation plans. Education to promote responsible recreation and timely communication about conditions and area closures will be done using the best available communication and social networking platforms, and in partnership with community organizations and the City of St. Albert.

Assuming that canoers and kayakers at Big Lake are generally motivated by the pursuit of nature-based experiences for photography or general appreciation of wildlife, it is expected that this audience will also be motivated to comply with conservation and protection guidelines and recommendations. If they want to preserve their recreation opportunities for the future, water-based recreationists including guides and club leaders are expected be active and willing participants in stewardship activities and demonstrate respect for wildlife and habitat.

It should be noted that if the monitoring program explained in section 3.2 detects changes in the bird populations and if negative impacts from water- or land- based recreational use at Big Lake are observed, more restrictive management tools may need to be implemented which could conflict with park visitors' recreation expectations and plans.

7.2 Objectives	Strategy
In suitable areas, provide opportunities for non-motorized water-based recreation that connect people to nature	Targeted education programming and messaging to communicate to water-based recreationalists about how to be responsible and to protect birds
	Partner with the City of St. Albert to promote non-motorized watercraft access to Big Lake at Rotary park on the Sturgeon River.

7.3 Nature Play

An international group of researchers and stakeholders from the fields of education, health, child development and parks recently released the following position statement on Active Outdoor Play:

"Access to active play in nature and outdoors – with its risks – is essential for healthy child development. We recommend increasing children's opportunities for self-directed play outdoors in all settings – at home, at school, in child care, the community and nature" (Tremblay et Al, 2015)

The statement is based on research findings showing that:

- Children are more curious about, and interested in, natural spaces than prefabricated play structures
- Children who engage in active outdoor play in natural environments demonstrate resilience, self-regulation and develop skills for dealing with stress later in life
- Outdoor play that occurs in minimally structured, free and accessible environments facilitates healthy development and builds positive social skills

Early childhood has been shown to be a critical time to address "nature deficit disorder", the phenomenon first described by Richard Louv (2005) where humans, especially children, are spending less time outdoors resulting in a wide range of behavioural problems. During these early years especially, it is important to foster a lifelong connection to the natural world. LHCPP provides a great opportunity for parents, caregivers, and early childhood educators to allow young children to explore the outdoors and engage in unstructured nature play in a safe, but natural setting.

There has been considerable research into the benefits of connecting children and nature, as well as the most effective ways to foster meaningful experiences for children in outdoor settings. A key approach is to create nature play and learning places, "where children play and learn by engaging with and manipulating diverse natural elements, materials, organisms, and habitats, through sensory,

LHCPP provides a great opportunity for parents, caregivers, and early childhood educators to allow young children to explore the outdoors and engage in unstructured nature play in a safe, but natural setting.

fine motor and gross motor experiences" (Moore, 2014). Alberta Parks will seek expertise and apply current research findings and guidelines in order to create environments that facilitate direct, hands-on engagement with nature in the everyday lives of children.

7.3 Objectives	Strategy
Foster nature-based, unstructured play for children, parents, and community groups in a safe but natural setting	Develop nature playground based on current research findings on nature play and environmental literacy within the East Facility Zone with connection to nature trail loops and day use area

LHCPP will engage people in activities that boost mental and physical health, will facilitate social and cultural gatherings and celebrations, and will foster a sense of belonging and bonding that supports thriving, safe, and happy communities.

7.4 Community Wellness

Alberta Health defines wellness as a measure of physical, mental and social health, and as the ability of people and communities to reach their best potential in the broadest sense. As a relatively large and natural area on the doorstep of so many urban communities, LHCPP can offer a wide range of wellness benefits to diverse groups of people. The park provides many different opportunities for families and individuals to maintain an active lifestyle, to engage in learning and stewardship opportunities that boost mental and physical health, and to gather together for celebrations, social networking and to foster a sense of belonging and bonding that is at the foundation of thriving, safe, and happy communities.

7.4 Objectives	Strategy
Facilitate opportunities for community groups and families to gather in a natural setting for celebration, recreation and other wellness-promoting activities	Develop and support programming, and develop facilities and infrastructure, including a multi-use day-use area in the East Facility Zone
	Explore partnerships with health and wellness organizations to promote the use of the park as a wellness resource
Promote the use of active and environmentally sustainable modes of transportation to the park	Promote public transit, install bike racks, integrate trail planning facilitating access to the park from neighbouring communities

8.0
RESEARCH, MONITORING AND ADAPTIVE MANAGEMENT

Alberta Parks strives to apply traditional knowledge as well as scientific and evidence-based information in the management of its parks. Ongoing research in the natural and social sciences ensures that Alberta Parks maintains updated knowledge about LHCPP and shares it with partners and stakeholders in order to effectively and collaboratively manage the park. As per the Alberta Parks Science Strategy (2010) and the draft Alberta Parks Social Science framework, ongoing monitoring and research of wildlife, plant communities, physical and ecological processes, as well as human activities, attitudes and influences will provide the evidence that is needed to adapt management practices to achieve the management intent for LHCPP. The park-specific approach to environmental monitoring at LHCPP is described in section 3.2. It is important to note that this local monitoring approach will be complimented by a system-wide monitoring approach involving Alberta Parks and the Environmental Monitoring and Science Division of Alberta Environment and Parks. This system wide approach will support the development of standardized indicators for monitoring similar processes and phenomena across the wider system of parks in Alberta, as well as establishing consistent and appropriate monitoring methodology. Sites that serve as scientific benchmarks will be critical for this system-wide monitoring program, and LHCPP, like many provincial parks in Alberta, has the ability to fill this role.

As outlined in section 4.0, to achieve desired research outcomes, collaboration with a range of research partners at universities, colleges, non-government organizations and government agencies is essential. Partnering with other researchers opens parks as laboratories for pragmatic research, and enables the park and its visitors to benefit from the results. Research permitting processes consider the appropriateness of all research proposals for LHCPP, including impacts to the environment and visitors, and the potential outcomes for parks management. In addition to partnering with formal research programs, Alberta Parks encourages non-intrusive citizen science through established citizen monitoring platforms such as e-Bird, NatureLynx and others.

8.1 Monitoring and Adaptive Management

The development of a park management plan does not in and of itself guarantee that LHCPP will achieve the management vision. Based on current and available knowledge, the objectives and strategies identified in the management plan represent Alberta Parks' and key stakeholders' knowledge on the most appropriate activities and initiatives that will bring about the desired future state at LHCPP. In order to be successful over the long term, systematic monitoring of progress will need to take place. Adaptive management will make use of new information and feedback gathered from a number of sources and will involve adjusting time and resource allocation and updating or refining management objectives and strategies as needed. Monitoring will rely on the development and measurement of indicators associated with each objective and strategy in the management plan. Trends and changes in measured indicators will help gauge progress in achieving desired outcomes. A preliminary set of examples of measurement indicators for the management plan objectives is included in Appendix G. The indicators will be further developed early in management plan implementation. Adaptive management is one aspect of ongoing evaluation to ensure that the investment of efforts and resources is having impact in the real world.

8.2 Protected Areas Management Effectiveness

As discussed in section 1.5.4, LHCPP is one of over 250 sites within the Alberta Parks system of parks and protected areas that is helping Canada, as a Party to the United Nations Convention on Biodiversity, to meet its commitment to achieving Canada Target[10]. In addition to protecting at least 17% of terrestrial and inland water by 2020, part of Alberta's commitment to Canada Target 1 is to ensure that protected areas are effectively managed. To fulfill this commitment, Alberta Parks is currently developing a suite of tools as part of its own Protected Area Management Effectiveness (PAME) program designed to assess values and threats and evaluate management effectiveness based on a global standard framework.

Using the preliminarily developed tools available, a management effectiveness evaluation was done for LHCPP in parallel to the early stages of management plan development. The evaluation began with comprehensive and formalized assessments of conservation and social values and threats. These assessments assisted in identifying knowledge and research gaps and aided in the development of management objectives for the park. The tables in Appendix H summarize the results from these preliminary PAME assessments, with references to the specific sections of the management plan where each of the categories of values and threats are addressed.

The knowledge gained from the conservation and social values and threats assessments helped to inform a subsequent Management Effectiveness Evaluation. The

10 For more information: *Pathway to Canada Target 1*

Management Effectiveness Evaluation consisted of a survey with 32 questions related to different components of park management based on an internationally standardized management effectiveness framework. The "report card" outlined in Table 3 of Appendix H represents a simplified assessment of the LHCPP Management Effectiveness Evaluation.

8.3 Knowledge Gaps

8.3.1 Social Science

Conservation is about people as much as it is about nature, species or ecological process. Social science theory, analytic tools, and research can contribute significantly to evidence-based decision making and adaptive management at LHCPP.

There are significant information gaps related to the park user experience that need to be addressed in order to develop suitable programming and infrastructure to meet the objectives outlined in the management plan. As per the regional social science research priorities identified in the Alberta Parks draft Social Science Framework, the types of social science research questions to be pursued at LHCPP include:

- What are the use and user characteristics of visitors to LHCPP?
- What degree of human use can be allowed before negative environmental impacts are observed?
- How are societal trends affecting and being affected by visitor use of LHCPP?

The application of well-tested social science research tools ranging from trail counters to quantitative and qualitative survey instruments will help create a better understanding of who is using LHCPP, for what purposes, in what specific locations, and how their attitudes or behaviours may be influenced by experiences they have at LHCPP.

Additional social science research priorities will be identified through implementation of management objectives related to community engagement, visitor experience and outdoor recreation & healthy living.

8.3.2 Natural Sciences

A number of knowledge gaps and research needs related to conservation values and threats were identified through the PAME assessment (see Appendix H) and through the management planning process including:

- natural ecological functions and disturbance regimes including flood cycle
- Hydrologic function including lotic connectivity and drainage patterns
- The current and potential impacts of natural system modifications such as fire and fire suppression
- The current and potential impacts of various types of pollution including household sewage, urban waste water and industrial effluents
- Biological resource use
- The impacts of climate change and severe weather
- The impacts of water-based recreation and other human-caused disturbances on bird populations
- Species occurrences and populations of vertebrate species other than birds, and invertebrate species
- Location and extent of ecological connectivity corridors

The establishment of an environmental monitoring working group and development of a monitoring plan will address these knowledge gaps on a priority basis over the next 10 years. Additional knowledge gaps will be identified and added to the monitoring plan as needed.

8.0 Objectives	Strategy
Encourage and conduct research in and about LHCPP	Applications for Research and Collection permits will use established permitting processes in accordance with restrictions, requirements and priorities set by Alberta Parks staff, while considering impacts on natural and cultural values and visitor experience.
	Encourage research and surveys of rare and globally significant species and plant communities in alignment with the environmental monitoring plan for LHCPP (see Objective 3.2)
	Develop partnerships with academic and research organizations to conduct research that informs park management.
	Encourage research opportunities to help identify and implement best management practices.
	Encourage social science research to inform program and facility development, and to address management issues related to management objectives

9.0 IMPLEMENTATION AND REVIEW

Upon review and approval, this management plan will be implemented by the Government of Alberta with support from its partners. Alberta Parks will undertake a prioritization of the objectives and strategies outlined in this management plan to identify the timing and resource requirements to implement management actions over the next ten years. Collaboration with government agencies, Indigenous communities and stakeholder groups will be critical to achieving these priorities. In addition, Alberta Parks will conduct further consultation with the public, Indigenous communities and stakeholders as needed. It must be reiterated that the success of implementation efforts rely on participation from the entire community surrounding Big Lake. Education and capacity building initiatives are just as important as direct management and monitoring efforts. All management objectives and strategies rely on ongoing engagement of key stakeholders and Indigenous communities in management activities that will ensure the long-term success and support of this management plan in supporting the shared management vision.

As outlined in section 8.0, continual evaluation and reviews will be conducted to assess if objectives and strategies are being achieved, and to adapt planning efforts accordingly. A formal review will occur in the 10th year.

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MAPS

Lois Hole Centennial Provincial Park
Municipal Zoning/Land Use Overlay

1:35,000

km 0 0.5 1 2

Secured Lands
- Protected Area Boundary
- Future Additions to Lois Hole

Municipal Zoning/Land Use
- Conservation/Recreation
- Agriculture/Nature Conservation
- Residential
- Urban Fringe
- Commercial/Industrial/Business
- Agriculture
- Atim Creek/Big Lake Overlay (Parkland County)
- Zoning Info not Represented^

Recreational Amenities
- Access/Parking
- Day Use Shelter
- Boardwalk
- Viewpoint
- Environmental Learning Centre - ELC (Proposed)
- Canoe Launch (Informal)
- Boardwalk
- Multiple-Use Trail

Produced April 28, 2017 by Parks Division, Alberta Environment and Parks
Base data provided by the Government of Alberta under the Alberta Open Government License of November 2014.

* Several portions of the Lois Hole Centennial Provincial Park boundary are defined by "bank of lake" and will require survey to determine exact location.

^Zoning/land use data are not depicted within the cities of Edmonton and St. Albert except for key areas immediately adjacent to Lois Hole Centennial Provincial Park where data were available at time of printing. Differences in zoning names/classes exist between the four jurisdictions shown on this map. Classes have been generalized for display.

Alberta | Alberta Parks

Twp 54 Rge 26 W 4
Twp 54 Rge 25 W 4
Sturgeon County
St. Albert
Ray Gibbon Drive
Meadowview Drive
Sturgeon R.
Big Lake
Proposed Location (ELC)
Lois Hole Centennial Provincial Park
Sturgeon County
Parkland County
Atim Creek
Twp 53 Rge 27 W 4
Twp 53 Rge 26 W 4
Parkland County
Potential Boundary Adjustment per Survey of Bank June 2015
* Bank of Lake to be Determined by Survey
Sturgeon County
Edmonton
Planned 137 Ave. Continuation
Twp 53 Rge 25 W 4
Starling Neighbourhood
Trumpeter Neighbourhood
Hawks Ridge Neighbourhood
Edmonton
Anthony Henday Drive
Winterburn Road (215 St.)
199 St.
231 St.
Yellowhead Trail
Hwy. 16
Wagner Natural Area
44
16
60
216

Lois Hole Centennial Provincial Park
Park Zoning

1:35,000

0 0.5 1 2 km

Secured Lands
- Protected Area Boundary
- Future Additions to Lois Hole

Park Zones
- Facility
- Natural Landscape
- Special Protection
- Wilderness (Not Present)

Recreational Amenities
- Access/Parking
- Day Use Shelter
- Boardwalk
- Viewpoint
- Environmental Learning Centre - ELC (Proposed)
- Canoe Launch (Informal)
- Boardwalk
- Multiple-Use Trail

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Alberta Alberta Parks

Twp 54 Rge 26 W 4
Twp 54 Rge 25 W 4
Sturgeon County
St. Albert
Roy Calvin Drive
Sturgeon County
St. Albert
Big Creek
North West Facility Zone
Meadowview Drive
Sturgeon R.
Big Lake
Proposed Location (ELC)
Lois Hole Centennial Provincial Park
East Facility Zone
* Bank of Lake to be Determined by Survey
St. Albert
Edmonton
Sturgeon County
Parkland County
Twp 53 Rge 27 W 4
Twp 53 Rge 26 W 4
Atim Creek
Lois Hole Centennial Provincial Park
Sturgeon County
Parkland County
Big Lake
Sturgeon County
Edmonton
Twp 53 Rge 25 W 4
Starling Neighbourhood
Planned 137 Ave. Continuation
Trumpeter Neighbourhood
Edmonton
Hawks Ridge Neighbourhood
Potential Boundary Adjustment per Survey of Bank June 2016
* Bank of Lake to be Determined by Survey
231 St.
Winterburn Road (215 St.)
199 St.
Anthony Henday Drive
Yellowhead Trail
South West Facility Zone
Parkland County
Hwy. 16
Edmonton
Parkland County
Wagner Natural Area
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Environment and Parks, Government of Alberta

Lois Hole Centennial Provincial Park
Regional Context

1:60,000

km 0 1 2 4

Secured Lands
- Protected Area Boundary
- Future Additions to Lois Hole

Recreational Amenities
- Access/Parking
- Day Use Shelter
- Boardwalk
- Viewpoint
- Environmental Learning Centre - ELC (Proposed)
- Canoe Launch (Informal)

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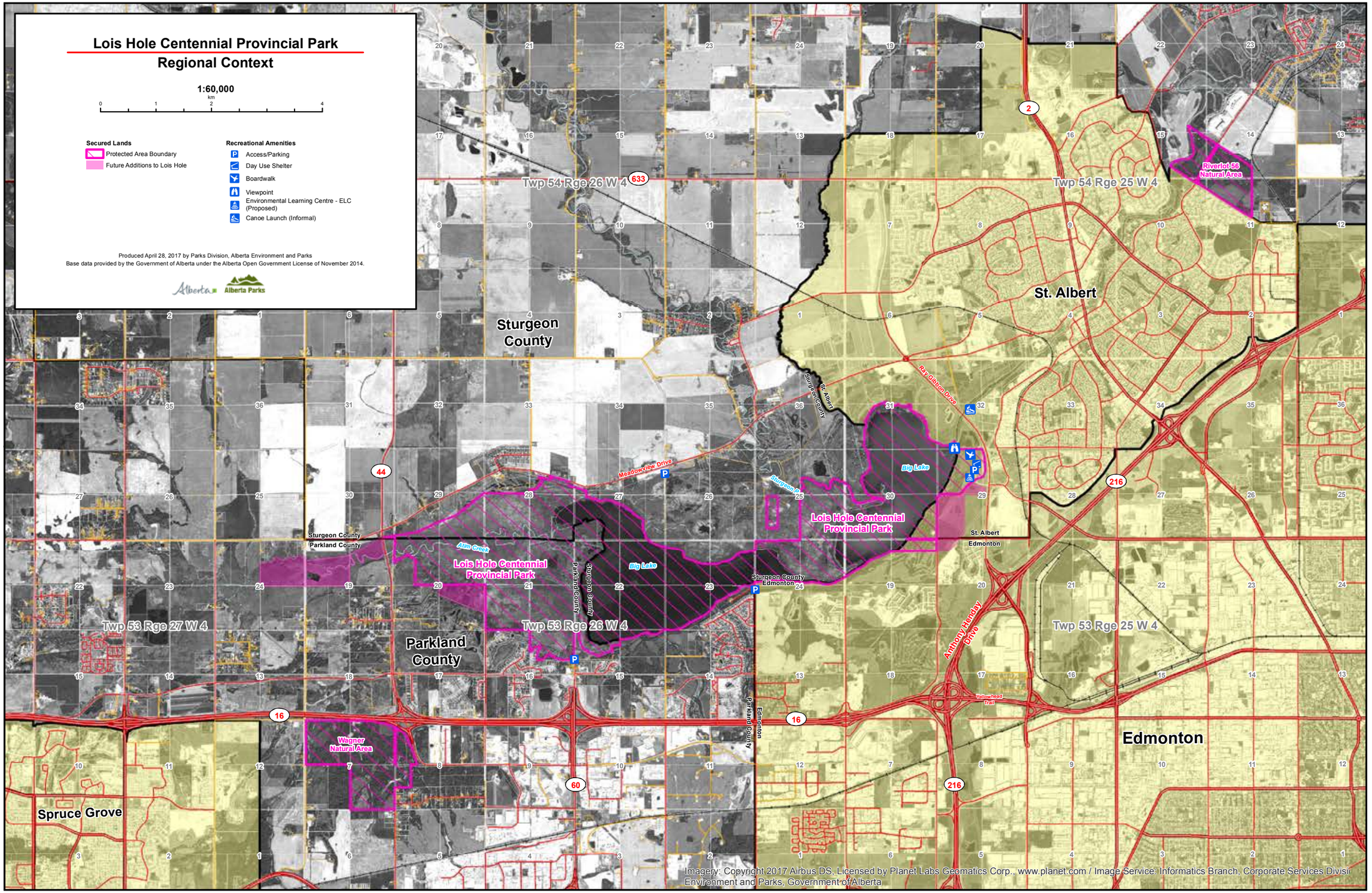
Alberta Alberta Parks



Lois Hole Centennial Provincial Park
Adjacent Land Uses

1:35,000

km 0 0.5 1 2

Secured Lands
- Protected Area Boundary
- Future Additions to Lois Hole

Municipally Owned Lands
- Environmental Reserve
- Municipal Reserve
- Reserve
- Other Municipal Lands

Adjacent Lands - Under Other Management
- Other Provincial Crown Land
- Conservation Lands
- Golf Course

Recreational Amenities
- Access/Parking
- Day Use Shelter
- Boardwalk
- Viewpoint
- Environmental Learning Centre - ELC (Proposed)
- Canoe Launch (Informal)
- Boardwalk
- Multiple-Use Trail

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* Several portions of the Lois Hole Centennial Provincial Park boundary are defined by "bank of lake" and will require survey to determine exact location.

Alberta Alberta Parks

Twp 54 Rge 26 W 4
Twp 54 Rge 25 W 4
Sturgeon County
St. Albert
Roy Gibbon Drive
Sturgeon R.
St. Albert
Sturgeon County
Sandpiper Golf & Country Club
Meadowview Drive
JR Golf Course
Big Lake
Proposed Location (ELC)
Ducks Unlimited
Lois Hole Centennial Provincial Park
Sturgeon County
Parkland County
Alim Creek
Twp 53 Rge 27 W 4
Twp 53 Rge 26 W 4
Lois Hole Centennial Provincial Park
Big Lake
Sturgeon County
Edmonton
* Bank of Lake to be Determined by Survey
St. Albert
Edmonton
Twp 53 Rge 25 W 4
Starling Neighbourhood
Planned 137 Ave. Continuation
Deer Meadows Golf Course
Edmonton Springs Golf Resort
Parkland County
Potential Boundary Adjustment per Survey of Lake June 2015
* Bank of Lake to be Determined by Survey
Trumpeter Neighbourhood
Edmonton
Hawks Ridge Neighbourhood
Winterburn Road (215 St.)
231 St.
199 St.
Anthony Henday Drive
Glendale Golf & Country Club
Dragon's Head
Yellowhead Trail
Parkland County
Edmonton
Hwy. 16
Wagner Natural Area
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Environment and Parks, Government of Alberta

Newton Lake Natural Area
Opal Natural Area
Opal NA (PNT)
Redwater
Lac La Nonne Natural Area
Mayerthorpe
Legal
Majeau Lake Natural Area
Pembina River Natural Area
George Lake Natural Area
Kakina Lake Natural Area
Bon Accord
Gibbons
Prefontaine Brock Lakes Natural Area
Morinville
Park Court Natural Area
Fort Saskatchewan
Onoway
Lily Lake Natural Area
Bilby Natural Area
Alberta Beach
Matthews Crossing Natural Area
St. Albert
Dussault Lake Natural Area
Isle Lake Natural Area
Smithfield NA (PNT)
Lois Hole Centennial Prov. Park
Kilini Creek NA (PNT)
Wagner Natural Area
Wabamun
Spruce Grove
Edmonton
Sherwood Park
Wabamun Lake NA (PNT)
Stony Plain
Spring Lake
Sundance Natural Area
Sherwood Park Natural Area
Pembina River Moon Lake Natural Area
Clifford E. Lee Natural Area
Devon
Beaumont
St. Francis NA (PNT)
Genesee Natural Area
Burtonsville Island Natural Area
Thorsby Natural Area
Leduc
Calmar
Coyote Lake NA (PNT)
Telfordville NA (PNT)
Easyford Natural Area
Rocky Rapids Natural Area
Coyote Lake Natural Area

Lois Hole Centennial Provincial Park Watershed Disturbance

- Natural/little to no impact
- Moderate Can be Reclaimed
- Hard surface. Hard to reclaim

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Cadastral-Dispositions data provided by Alberta Data Partnerships.
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sub 1m imagery supplied by Government of Alberta and Valtus Imagery Services.

1:320,000 0 3.5 7 14 km

Alberta Parks

APPENDICES

Appendix A: Provincial Parks Classification System

Table 1: Current legislation governing Alberta Parks

Legislation	Classification	Purpose
Provincial Parks Act	Provincial Park	For the conservation of nature (and associated cultural features and ecosystem services) while allowing for outdoor recreation, tourism and education opportunities that are compatible with conservation objectives
	Wildland Provincial Park	For the conservation of nature (and associated cultural features and ecosystem services), while allowing for backcountry or wilderness recreation opportunities that are compatible with conservation objectives and experiencing nature in a relatively undisturbed state; hunting is permitted
	Provincial Recreation Area	For the provision or support of outdoor recreation and tourism opportunities, often providing access to lakes, rivers, reservoirs and adjacent Crown land
Wilderness Areas, Ecological Reserves, Natural Areas and Heritage Rangelands Act	Wilderness Areas	For the strict conservation of natural wilderness in an undisturbed state where visitors have opportunities for non-consumptive, nature-based outdoor recreation
	Ecological Reserves	For the strict conservation of nature in an undisturbed state, for scientific research and/or education
	Heritage Rangelands	For the conservation of Alberta's native grasslands, using carefully managed grazing via long-term leases to maintain the native grassland ecology
	Natural Areas	For the conservation of nature in sites of local significance and provision of opportunities for low-impact, nature-based outdoor recreation, nature appreciation and education
Willmore Wilderness Park Act	Willmore Wilderness Park	For the conservation of Willmore's wilderness in an undisturbed state.

Parkland - Central Parkland Natural Landscape Type Representation

			Upland Systems											Freshwater Systems					
Natural Landscape Type:			Moraine	Stagnant Ice Moraine	Fluted Moraine	Ice Thrust Moraine	Glaciolacustrine Deposits	Eolian Deposits	Glaciofluvial Deposits	Fluvial Deposits	Colluvial Deposits	Bedrock	Preglacial Fluvial Deposits	Glaciers	Alkali Wetland	Mineral Wetland	Organic Wetland / Deposits	Lake	Major River (km)
Site *(sites in italics represent >1 NSR)*	Class	Area of Site in NSR (sqkm)																	
Lois Hole Centennial	PP	17.9736	0.00	0.00	0.00	0.00	9.55	0.00	0.00	0.00	0.00	n/a[4]	n/a	n/a	0.00	0.09	n/a	8.33	1.93
Total area of IUCN[1] PA[2]s in NSR[3]:		***460.9004***																	
Total Protected (sqkm)			**2.24**	**47.97**	**1.10**	**0.00**	**86.68**	**87.55**	**7.42**	**13.01**	**46.23**	**0.00**	**0.00**	**0.00**	**3.37**	**10.72**	**0.35**	**151.84**	**28.06**
Number of Sites with >0 sqkm of theme			3	8	2	0	11	6	6	6	5				3	15		8	6
5% Target			***280***	***965***	***460***	***75***	***480***	***75***	***90***	***70***	***75***				***15***	***30***		***60***	***160***
% of Target Protected			0.80%	4.97%	0.24%	0.00%	18.06%	116.73%	8.25%	18.59%	61.64%				22.49%	35.72%		253.07%	17.54%

1: International Union for Conservation of Nature
2: Protected Areas
3: North Saskatchewan Region
4: Not applicable. These systems are not present within the central parkland subregion.

			TOTALS				
Site *(sites in italics represent >1 NSR)*	Class	Area of Site in NSR (sqkm)	Total Area (All Themes)	No. of Landscape Types	Atypical landscapes (sqkm)	Total (GIS) Area of Site (sqkm)	Anthropogenic / Disturbed Area
Lois Hole Centennial	PP	17.9736	17.97	4	0.00	17.9736	0.15
Total area of IUCN[1] PA[2]s in NSR[3]:		***460.9004***					
Total Protected (sqkm)			**458.13**	**79**	**0.35**	**626.08**	**3.35**
Number of Sites with >0 sqkm of theme			79				
5% Target			***2675***	***4.98%***	Target at % of NSR		
% of Target Protected			17.1%				

LOIS HOLE CENTENNIAL PP SPECIES LIST: AMPHIBIANS (5)

		Latin Name	Common Name	ACMIMS S Rank	2015 General Status
		AMBYSTOMATIDAE			
AAAAA01142	AMBYSTOMATIDAE	Ambystoma mavortium	Barred Tiger Salamander	S4	Secure
		BUFONIDAE			
AAABB01030	BUFONIDAE	Anaxyrus boreas	Western Toad	S3S4	Sensitive
AAABB01080	BUFONIDAE	Anaxyrus hemiophrys	Canadian Toad	S3	May Be At Risk
		HYLIDAE			
AAABC05130	HYLIDAE	Pseudacris maculata	Boreal Chorus Frog	S5	Secure
		RANIDAE			
AAABH01200	RANIDAE	Lithobates sylvaticus	Wood Frog	S5	Secure

LOIS HOLE CENTENNIAL PP SPECIES LIST: BIRDS (238)

		Latin Name	Common Name	ACMIMS S Rank	2015 General Status
		GAVIIDAE			
ABNBA01030	GAVIIDAE	Gavia immer	Common Loon	S5B, S5M	Secure
		PODICIPEDIDAE			
ABNCA02010	PODICIPEDIDAE	Podilymbus podiceps	Pied-billed Grebe	S4B	Sensitive
ABNCA03010	PODICIPEDIDAE	Podiceps auritus	Horned Grebe	S3B	Sensitive
ABNCA03020	PODICIPEDIDAE	Podiceps grisegena	Red-necked Grebe	S5B	Secure
ABNCA03030	PODICIPEDIDAE	Podiceps nigricollis	Eared Grebe	S4B	Secure
ABNCA04010	PODICIPEDIDAE	Aechmophorus occidentalis	Western Grebe	S3B	At Risk
		PELECANIDAE			
ABNFC01010	PELECANIDAE	Pelecanus erythrorhynchos	American White Pelican	S2S3B	Sensitive

		PHALACROCORACIDAE			
ABNFD01020	PHALACROCORACIDAE	Phalacrocorax auritus	Double-crested Cormorant	S4S5B	Secure
		ARDEIDAE			
ABNGA01020	ARDEIDAE	Botaurus lentiginosus	American Bittern	S3S4B	Sensitive
ABNGA04010	ARDEIDAE	Ardea herodias	Great Blue Heron	S3B	Sensitive
ABNGA04040	ARDEIDAE	Ardea albus	Great Egret	SNA	Accidental
ABNGA06030	ARDEIDAE	Egretta thula	Snowy Egret	SNA	Accidental
ABNGA11010	ARDEIDAE	Nycticorax nycticorax	Black-crowned Night-Heron	S2B	Sensitive
		THRESKIORNITHIDAE			
ABNGE02020	THRESKIORNITHIDAE	Plegadis chihi	White-faced Ibis	S1S2B	Sensitive
		ANATIDAE			
ABNJB02010	ANATIDAE	Cygnus columbianus	Tundra Swan	S5M	Secure
ABNJB02030	ANATIDAE	Cygnus buccinator	Trumpeter Swan	S2S3B	Sensitive
ABNJB03040	ANATIDAE	Anser albifrons	Greater White-fronted Goose	S5M	Secure
ABNJB04010	ANATIDAE	Chen caerulescens	Snow Goose	S5M	Secure
ABNJB05030	ANATIDAE	Branta canadensis	Canada Goose	S5B	Secure
ABNJB09010	ANATIDAE	Aix sponsa	Wood Duck	SUB	Secure
ABNJB10010	ANATIDAE	Anas crecca	Green-winged Teal	S4S5B	Secure
ABNJB10060	ANATIDAE	Anas platyrhynchos	Mallard	S5B	Secure
ABNJB10110	ANATIDAE	Anas acuta	Northern Pintail	S5B	Secure
ABNJB10130	ANATIDAE	Anas discors	Blue-winged Teal	S5B	Secure
ABNJB10140	ANATIDAE	Anas cyanoptera	Cinnamon Teal	S4B	Secure
ABNJB10150	ANATIDAE	Anas clypeata	Northern Shoveler	S5B	Secure
ABNJB10160	ANATIDAE	Anas strepera	Gadwall	S5B, S5M	Secure
ABNJB10170	ANATIDAE	Anas penelope	Eurasian Wigeon	SNA	Accidental
ABNJB10180	ANATIDAE	Anas americana	American Wigeon	S5B	Secure
ABNJB11020	ANATIDAE	Aythya valisineria	Canvasback	S4B	Secure
ABNJB11030	ANATIDAE	Aythya americana	Redhead	S5B	Secure
ABNJB11040	ANATIDAE	Aythya collaris	Ring-necked Duck	S5B	Secure
ABNJB11060	ANATIDAE	Aythya marila	Greater Scaup	SUB, S5M	Secure
ABNJB11070	ANATIDAE	Aythya affinis	Lesser Scaup	S5B	Secure
ABNJB16010	ANATIDAE	Clangula hyemalis	Long-tailed Duck	SUM	Secure
ABNJB17020	ANATIDAE	Melanitta perspicillata	Surf Scoter	SUB, S4M	Secure

ABNJB17030	ANATIDAE	Melanitta fusca	White-winged Scoter	S3S4B	Sensitive
ABNJB18010	ANATIDAE	Bucephala clangula	Common Goldeneye	S5B	Secure
ABNJB18020	ANATIDAE	Bucephala islandica	Barrow's Goldeneye	S4B	Secure
ABNJB18030	ANATIDAE	Bucephala albeola	Bufflehead	S5B, S5M	Secure
ABNJB20010	ANATIDAE	Lophodytes cucullatus	Hooded Merganser	2S3B	Secure
ABNJB21010	ANATIDAE	Mergus merganser	Common Merganser	S5B, S5M	Secure
ABNJB21020	ANATIDAE	Mergus serrator	Red-breasted Merganser	SUB, SUM	Secure
ABNJB22010	ANATIDAE	Oxyura jamaicensis	Ruddy Duck	S5B	Secure
		ACCIPITRIDAE			
ABNKC01010	ACCIPITRIDAE	Pandion haliaetus	Osprey	S4B	Sensitive
ABNKC10010	ACCIPITRIDAE	Haliaeetus leucocephalus	Bald Eagle	S4B, S5M	Sensitive
ABNKC11010	ACCIPITRIDAE	Circus cyaneus	Northern Harrier	S4B	Secure
ABNKC12020	ACCIPITRIDAE	Accipiter striatus	Sharp-shinned Hawk	S4B	Secure
ABNKC12040	ACCIPITRIDAE	Accipiter cooperii	Cooper's Hawk	S4B	Secure
ABNKC12060	ACCIPITRIDAE	Accipiter gentilis	Northern Goshawk	S3S4B	Sensitive
ABNKC19070	ACCIPITRIDAE	Buteo swainsoni	Swainson's Hawk	S4B	Secure
ABNKC19110	ACCIPITRIDAE	Buteo jamaicensis	Red-tailed Hawk	S5B	Secure
ABNKC19120	ACCIPITRIDAE	Buteo regalis	Ferruginous Hawk	S2S3B	At Risk
ABNKC19130	ACCIPITRIDAE	Buteo lagopus	Rough-legged Hawk	S5N	Secure
ABNKC22010	ACCIPITRIDAE	Aquila chrysaetos	Golden Eagle	S3B, S4N	Sensitive
		FALCONIDAE			
ABNKD06020	FALCONIDAE	Falco sparverius	American Kestrel	S5B	Sensitive
ABNKD06030	FALCONIDAE	Falco columbarius	Merlin	S5	Secure
ABNKD06070	FALCONIDAE	Falco peregrinus	Peregrine Falcon	S2S3B	At Risk
ABNKD06080	FALCONIDAE	Falco rusticolus	Gyrfalcon	S3N	Secure
		PHASIANIDAE			
ABNLC01010	PHASIANIDAE	Perdix perdix	Gray Partridge	SNA	Exotic
ABNLC03010	PHASIANIDAE	Alectoris chukar	Chukar	SNA	Exotic
ABNLC07010	PHASIANIDAE	Phasianus colchicus	Ring-necked Pheasant	SNA	Exotic
ABNLC11010	PHASIANIDAE	Bonasa umbellus	Ruffed Grouse	S5	Secure
ABNLC13030	PHASIANIDAE	Tympanuchus phasianellus	Sharp-tailed Grouse	S3S4	Sensitive

		RALLIDAE			
ABNME01010	RALLIDAE	Coturnicops noveboracensis	Yellow Rail	S2S3B	Undetermined
ABNME05030	RALLIDAE	Rallus limicola	Virginia Rail	SUB	Undetermined
ABNME08020	RALLIDAE	Porzana carolina	Sora	S5B	Sensitive
ABNME14020	RALLIDAE	Fulica americana	American Coot	S5B	Secure
		GRUIDAE			
ABNMK01010	GRUIDAE	Grus canadensis	Sandhill Crane	S4B, S5M	Sensitive
		CHARADRIIDAE			
ABNNB02010	CHARADRIIDAE	Pluvialis squatarola	Black-bellied Plover	S5M	Secure
ABNNB02030	CHARADRIIDAE	Pluvialis dominica	American Golden-Plover	S1B, S5M	May Be At Risk
ABNNB03060	CHARADRIIDAE	Charadrius semipalmatus	Semipalmated Plover	SUB	Secure
ABNNB03090	CHARADRIIDAE	Charadrius vociferus	Killdeer	S5B	Secure
		RECURVIROSTRIDAE			
ABNND01010	RECURVIROSTRIDAE	Himantopus mexicanus	Black-necked Stilt	S2S3B	Sensitive
ABNND02010	RECURVIROSTRIDAE	Recurvirostra americana	American Avocet	S5B	Secure
		SCOLOPACIDAE			
ABNNF01020	SCOLOPACIDAE	Tringa melanoleuca	Greater Yellowlegs	S3S4B, S5M	Secure
ABNNF01030	SCOLOPACIDAE	Tringa flavipes	Lesser Yellowlegs	S5B, S5M	Secure
ABNNF01070	SCOLOPACIDAE	Tringa solitaria	Solitary Sandpiper	S5B, S5M	Secure
ABNNF02010	SCOLOPACIDAE	Tringa semipalmata	Willet	S4B	Secure
ABNNF04020	SCOLOPACIDAE	Actitis macularia	Spotted Sandpiper	S5B	Secure
ABNNF06010	SCOLOPACIDAE	Bartramia longicauda	Upland Sandpiper	S3B	Sensitive
ABNNF08020	SCOLOPACIDAE	Limosa haemastica	Hudsonian Godwit	S3M	Secure
ABNNF08040	SCOLOPACIDAE	Limosa fedoa	Marbled Godwit	S5B	Secure
ABNNF09010	SCOLOPACIDAE	Arenaria interpres	Ruddy Turnstone	SUM	Secure
ABNNF11020	SCOLOPACIDAE	Calidris canutus	Red Knot	SUM	May Be At Risk
ABNNF11030	SCOLOPACIDAE	Calidris alba	Sanderling	S4M	Secure
ABNNF11100	SCOLOPACIDAE	Calidris minutilla	Least Sandpiper	SUM	Secure
ABNNF11110	SCOLOPACIDAE	Calidris fuscicollis	White-rumped Sandpiper	SUM	Secure
ABNNF11120	SCOLOPACIDAE	Calidris bairdii	Baird's Sandpiper	S5M	Secure
ABNNF11130	SCOLOPACIDAE	Calidris melanotos	Pectoral Sandpiper	S5M	Secure

ABNNF11170	SCOLOPACIDAE	Calidris alpina	Dunlin	S4M	Secure
ABNNF11190	SCOLOPACIDAE	Calidris himantopus	Stilt Sandpiper	S4M	Secure
ABNNF14010	SCOLOPACIDAE	Tryngites subruficollis	Buff-breasted Sandpiper	S3M	Secure
ABNNF15010	SCOLOPACIDAE	Philomachus pugnax	Ruff	SNA	Accidental
ABNNF16010	SCOLOPACIDAE	Limnodromus griseus	Short-billed Dowitcher	SUB	Undetermined
ABNNF16020	SCOLOPACIDAE	Limnodromus scolopaceus	Long-billed Dowitcher	S5M	Secure
ABNNF18030	SCOLOPACIDAE	Gallinago delicata	Wilson's Snipe	S5B	Secure
ABNNF20010	SCOLOPACIDAE	Phalaropus tricolor	Wilson's Phalarope	S5B	Secure
ABNNF20020	SCOLOPACIDAE	Phalaropus lobatus	Red-necked Phalarope	SUB, S5M	Secure
ABNNF20030	SCOLOPACIDAE	Phalaropus fulicarius	Red Phalarope	SNA	Accidental
		LARIDAE			
ABNNM03020	LARIDAE	Leucophaeus pipixcan	Franklin's Gull	S4B	Secure
ABNNM03050	LARIDAE	Chroicocephalus philadelphia	Bonaparte's Gull	S3B	Secure
ABNNM03100	LARIDAE	Larus delawarensis	Ring-billed Gull	S5B	Secure
ABNNM03110	LARIDAE	Larus californicus	California Gull	S5B	Secure
ABNNM03120	LARIDAE	Larus argentatus	Herring Gull	S3B	Secure
ABNNM03200	LARIDAE	Larus hyperboreus	Glaucous Gull	SUM	Secure
ABNNM08070	LARIDAE	Sterna hirundo	Common Tern	S4B, S5M	Secure
ABNNM08090	LARIDAE	Sterna forsteri	Forster's Tern	S2S3B	Sensitive
ABNNM10020	LARIDAE	Chlidonias niger	Black Tern	S4B	Sensitive
		COLUMBIDAE			
ABNPB01010	COLUMBIDAE	Columba livia	Rock Dove	SNA	Exotic
ABNPB04040	COLUMBIDAE	Zenaida macroura	Mourning Dove	S5B	Secure
		STRIGIDAE			
ABNSB05010	STRIGIDAE	Bubo virginianus	Great Horned Owl	S5	Secure
ABNSB06010	STRIGIDAE	Bubo scandiacus	Snowy Owl	S4N	Secure
ABNSB07010	STRIGIDAE	Surnia ulula	Northern Hawk Owl	S4	Secure
ABNSB12040	STRIGIDAE	Strix nebulosa	Great Gray Owl	S4	Sensitive
ABNSB13010	STRIGIDAE	Asio otus	Long-eared Owl	S4B	Secure
ABNSB13040	STRIGIDAE	Asio flammeus	Short-eared Owl	S3B	May Be At Risk
ABNSB15010	STRIGIDAE	Aegolius funereus	Boreal Owl	S4	Secure

ABNSB15020	STRIGIDAE	Aegolius acadicus	Northern Saw-whet Owl	S5B	Secure
		CAPRIMULGIDAE			
ABNTA02020	CAPRIMULGIDAE	Chordeiles minor	Common Nighthawk	S3S4B	Sensitive
		TROCHILIDAE			
ABNUC45010	TROCHILIDAE	Archilochus colubris	Ruby-throated Hummingbird	S5B	Secure
		ALCEDINIDAE			
ABNXD01020	ALCEDINIDAE	Megaceryle alcyon	Belted Kingfisher	S4B	Secure
		PICIDAE			
ABNYF05010	PICIDAE	Sphyrapicus varius	Yellow-bellied Sapsucker	S5B	Secure
ABNYF07030	PICIDAE	Picoides pubescens	Downy Woodpecker	S5	Secure
ABNYF07040	PICIDAE	Picoides villosus	Hairy Woodpecker	S5	Secure
ABNYF07090	PICIDAE	Picoides arcticus	Black-backed Woodpecker	S3	Sensitive
ABNYF07110	PICIDAE	Picoides dorsalis	Three-toed Woodpecker	S4	Secure
ABNYF10020	PICIDAE	Colaptes auratus	Northern Flicker	S5B	Secure
ABNYF12020	PICIDAE	Dryocopus pileatus	Pileated Woodpecker	S4	Sensitive
		TYRANNIDAE			
ABPAE32010	TYRANNIDAE	Contopus cooperi	Olive-sided Flycatcher	S3B	May Be At Risk
ABPAE32050	TYRANNIDAE	Contopus sordidulus	Western Wood-Pewee	S3S4B	May Be At Risk
ABPAE33030	TYRANNIDAE	Empidonax alnorum	Alder Flycatcher	S5B	Sensitive
ABPAE33070	TYRANNIDAE	Empidonax minimus	Least Flycatcher	S5B	Sensitive
ABPAE35020	TYRANNIDAE	Sayornis phoebe	Eastern Phoebe	S4B	Sensitive
ABPAE35030	TYRANNIDAE	Sayornis saya	Say's Phoebe	S5B	Secure
ABPAE52060	TYRANNIDAE	Tyrannus tyrannus	Eastern Kingbird	S4S5B	Sensitive
		ALAUDIDAE			
ABPAT02010	ALAUDIDAE	Eremophila alpestris	Horned Lark	S3S4B, S2N	Secure
		HIRUNDINIDAE			
ABPAU01010	HIRUNDINIDAE	Progne subis	Purple Martin	S4B	Sensitive
ABPAU03010	HIRUNDINIDAE	Tachycineta bicolor	Tree Swallow	S5B	Secure
ABPAU07010	HIRUNDINIDAE	Stelgidopteryx serripennis	Northern Rough-winged Swallow	S4B	Secure
ABPAU08010	HIRUNDINIDAE	Riparia riparia	Bank Swallow	S4B	Sensitive
ABPAU09010	HIRUNDINIDAE	Petrochelidon pyrrhonota	Cliff Swallow	S5B	Secure

ABPAU09030	HIRUNDINIDAE	Hirundo rustica	Barn Swallow	S3B	Sensitive
		CORVIDAE			
ABPAV01010	CORVIDAE	Perisoreus canadensis	Gray Jay	S5	Secure
ABPAV02020	CORVIDAE	Cyanocitta cristata	Blue Jay	S5	Secure
ABPAV09010	CORVIDAE	Pica hudsonia	Black-billed Magpie	S5	Secure
ABPAV10010	CORVIDAE	Corvus brachyrhynchos	American Crow	S5B	Secure
ABPAV10110	CORVIDAE	Corvus corax	Common Raven	S5	Secure
		PARIDAE			
ABPAW01010	PARIDAE	Poecile atricapillus	Black-capped Chickadee	S5	Secure
ABPAW01040	PARIDAE	Poecile gambeli	Mountain Chickadee	S5	Secure
ABPAW01060	PARIDAE	Poecile hudsonicus	Boreal Chickadee	S5	Secure
		SITTIDAE			
ABPAZ01010	SITTIDAE	Sitta canadensis	Red-breasted Nuthatch	S4	Secure
ABPAZ01020	SITTIDAE	Sitta carolinensis	White-breasted Nuthatch	S4	Secure
		CERTHIIDAE			
ABPBA01010	CERTHIIDAE	Certhia americana	Brown Creeper	S3S4B	Sensitive
		TROGLODYTIDAE			
ABPBG09010	TROGLODYTIDAE	Troglodytes aedon	House Wren	S5B	Secure
ABPBG10010	TROGLODYTIDAE	Cistothorus platensis	Sedge Wren	S3B	Sensitive
ABPBG10020	TROGLODYTIDAE	Cistothorus palustris	Marsh Wren	S5B	Secure
		REGULIDAE			
ABPBJ05010	REGULIDAE	Regulus satrapa	Golden-crowned Kinglet	S5B	Secure
ABPBJ05020	REGULIDAE	Regulus calendula	Ruby-crowned Kinglet	S5B	Secure
		TURDIDAE			
ABPBJ15030	TURDIDAE	Sialia currucoides	Mountain Bluebird	S4B	Secure
ABPBJ16010	TURDIDAE	Myadestes townsendi	Townsend's Solitaire	S5B	Secure
ABPBJ18090	TURDIDAE	Catharus minimus	Gray-cheeked Thrush	SUB, SUM	Undetermined
ABPBJ18100	TURDIDAE	Catharus ustulatus	Swainson's Thrush	S5B	Secure
ABPBJ18110	TURDIDAE	Catharus guttatus	Hermit Thrush	S5B	Secure
ABPBJ20170	TURDIDAE	Turdus migratorius	American Robin	S5B	Secure
ABPBJ22010	TURDIDAE	Ixoreus naevius	Varied Thrush	S5B	Secure

		MIMIDAE			
ABPBK01010	MIMIDAE	Dumetella carolinensis	Gray Catbird	S5B	Secure
ABPBK06010	MIMIDAE	Toxostoma rufum	Brown Thrasher	S4B	Secure
		MOTACILLIDAE			
ABPBM02050	MOTACILLIDAE	Anthus rubescens	American Pipit	S5B, S5M	Secure
ABPBM02060	MOTACILLIDAE	Anthus spragueii	Sprague's Pipit	S3S4B	Sensitive
		BOMBYCILLIDAE			
ABPBN01010	BOMBYCILLIDAE	Bombycilla garrulus	Bohemian Waxwing	S4B, S5M	Secure
ABPBN01020	BOMBYCILLIDAE	Bombycilla cedrorum	Cedar Waxwing	S5B	Secure
		LANIIDAE			
ABPBR01020	LANIIDAE	Lanius excubitor	Northern Shrike	SHB,S5N	Secure
ABPBR01030	LANIIDAE	Lanius ludovicianus	Loggerhead Shrike	S3B	Sensitive
		STURNIDAE			
ABPBT01010	STURNIDAE	Sturnus vulgaris	European Starling	SNA	Exotic
		VIREONIDAE			
ABPBW01160	VIREONIDAE	Vireo solitarius	Blue-headed Vireo	S5B	Secure
ABPBW01210	VIREONIDAE	Vireo gilvus	Warbling Vireo	S5B	Secure
ABPBW01230	VIREONIDAE	Vireo philadelphicus	Philadelphia Vireo	S5B	Secure
ABPBW01240	VIREONIDAE	Vireo olivaceus	Red-eyed Vireo	S5B	Secure
		PARULIDAE			
ABPBX01040	PARULIDAE	Oreothlypis peregrina	Tennessee Warbler	S5B	Secure
ABPBX01050	PARULIDAE	Oreothlypis celata	Orange-crowned Warbler	S5B	Secure
ABPBX01060	PARULIDAE	Oreothlypis ruficapilla	Nashville Warbler	S3B	Secure
ABPBX03010	PARULIDAE	Setophaga petechia	Yellow Warbler	S5B	Secure
ABPBX03030	PARULIDAE	Setophaga magnolia	Magnolia Warbler	S4B	Secure
ABPBX03040	PARULIDAE	Setophaga tigrina	Cape May Warbler	S3B	Sensitive
ABPBX03060	PARULIDAE	Setophaga coronata	Yellow-rumped Warbler	S5B	Secure
ABPBX03100	PARULIDAE	Setophaga virens	Black-throated Green Warbler	S3S4B	Sensitive
ABPBX03210	PARULIDAE	Setophaga palmarum	Palm Warbler	S5B	Secure
ABPBX03220	PARULIDAE	Setophaga castanea	Bay-breasted Warbler	S3B	Sensitive
ABPBX03230	PARULIDAE	Setophaga striata	Blackpoll Warbler	S5B, S5M	Secure
ABPBX05010	PARULIDAE	Mniotilta varia	Black-and-white Warbler	S4B	Secure

ABPBX06010	PARULIDAE	Setophaga ruticilla	American Redstart	S5B	Secure
ABPBX10010	PARULIDAE	Seiurus aurocapilla	Ovenbird	S5B	Secure
ABPBX10020	PARULIDAE	Parkesia noveboracensis	Northern Waterthrush	S5B	Secure
ABPBX11020	PARULIDAE	Oporornis agilis	Connecticut Warbler	S4B	Secure
ABPBX11030	PARULIDAE	Geothlypis philadelphia	Mourning Warbler	S4B	Secure
ABPBX12010	PARULIDAE	Geothlypis trichas	Common Yellowthroat	S5B	Sensitive
ABPBX16020	PARULIDAE	Cardellina pusilla	Wilson's Warbler	S5B	Secure
ABPBX16030	PARULIDAE	Cardellina canadensis	Canada Warbler	S3S4B	At Risk
ABPBX24010	PARULIDAE	Icteria virens	Yellow-breasted Chat	S3S4B	Secure
		THRAUPIDAE			
ABPBX45050	THRAUPIDAE	Piranga ludoviciana	Western Tanager	S3S4B	Sensitive
		CARDINALIDAE			
ABPBX61030	CARDINALIDAE	Pheucticus ludovicianus	Rose-breasted Grosbeak	S5B	Secure
		EMBERIZIDAE			
ABPBX94010	EMBERIZIDAE	Spizella arborea	American Tree Sparrow	S2B, S4M	Secure
ABPBX94020	EMBERIZIDAE	Spizella passerina	Chipping Sparrow	S5B	Secure
ABPBX94030	EMBERIZIDAE	Spizella pallida	Clay-colored Sparrow	S5B	Secure
ABPBX95010	EMBERIZIDAE	Pooecetes gramineus	Vesper Sparrow	S5B	Secure
ABPBX99010	EMBERIZIDAE	Passerculus sandwichensis	Savannah Sparrow	S5B	Secure
ABPBXA0040	EMBERIZIDAE	Ammodramus leconteii	Le Conte's Sparrow	S5B	Secure
ABPBXA0070	EMBERIZIDAE	Ammodramus nelsoni	Nelson's Sharp-tailed Sparrow	S4B	Secure
ABPBXA2010	EMBERIZIDAE	Passerella iliaca	Fox Sparrow	S5B	Secure
ABPBXA3010	EMBERIZIDAE	Melospiza melodia	Song Sparrow	S5B	Secure
ABPBXA3020	EMBERIZIDAE	Melospiza lincolnii	Lincoln's Sparrow	S5B	Secure
ABPBXA3030	EMBERIZIDAE	Melospiza georgiana	Swamp Sparrow	S5B	Secure
ABPBXA4020	EMBERIZIDAE	Zonotrichia albicollis	White-throated Sparrow	S5B	Secure
ABPBXA4040	EMBERIZIDAE	Zonotrichia leucophrys	White-crowned Sparrow	S5B	Secure
ABPBXA4050	EMBERIZIDAE	Zonotrichia querula	Harris's Sparrow	S3M	Secure
ABPBXA5020	EMBERIZIDAE	Junco hyemalis	Dark-eyed Junco	S5B	Secure
ABPBXA6020	EMBERIZIDAE	Calcarius lapponicus	Lapland Longspur	S5M	Secure
ABPBXA8010	EMBERIZIDAE	Plectrophenax nivalis	Snow Bunting	S5N	Secure

		ICTERIDAE			
ABPBXA9010	ICTERIDAE	Dolichonyx oryzivorus	Bobolink	S2B	Sensitive
ABPBXB0010	ICTERIDAE	Agelaius phoeniceus	Red-winged Blackbird	S5B	Secure
ABPBXB2030	ICTERIDAE	Sturnella neglecta	Western Meadowlark	S5B	Secure
ABPBXB3010	ICTERIDAE	Xanthocephalus xanthocephalus	Yellow-headed Blackbird	S4S5B	Secure
ABPBXB5010	ICTERIDAE	Euphagus carolinus	Rusty Blackbird	S3S4B	Sensitive
ABPBXB5020	ICTERIDAE	Euphagus cyanocephalus	Brewer's Blackbird	S5B	Secure
ABPBXB6070	ICTERIDAE	Quiscalus quiscula	Common Grackle	S5B	Secure
ABPBXB7030	ICTERIDAE	Molothrus ater	Brown-headed Cowbird	S5B	Secure
ABPBXB9190	ICTERIDAE	Icterus galbula	Baltimore Oriole	S4B	Sensitive
		FRINGILLIDAE			
ABPBY03010	FRINGILLIDAE	Pinicola enucleator	Pine Grosbeak	S4	Secure
ABPBY04020	FRINGILLIDAE	Carpodacus purpureus	Purple Finch	S5B	Secure
ABPBY04040	FRINGILLIDAE	Carpodacus mexicanus	House Finch	S5	Secure
ABPBY05010	FRINGILLIDAE	Loxia curvirostra	Red Crossbill	S4B, S5N	Secure
ABPBY05020	FRINGILLIDAE	Loxia leucoptera	White-winged Crossbill	S5	Secure
ABPBY06010	FRINGILLIDAE	Acanthis flammea	Common Redpoll	S5N	Secure
ABPBY06020	FRINGILLIDAE	Acanthis hornemanni	Hoary Redpoll	S5N	Secure
ABPBY06030	FRINGILLIDAE	Spinus pinus	Pine Siskin	S5	Secure
ABPBY06110	FRINGILLIDAE	Spinus tristis	American Goldfinch	S5B	Secure
ABPBY09020	FRINGILLIDAE	Coccothraustes vespertinus	Evening Grosbeak	S4	Secure
		PASSERIDAE			
ABPBZ01010	PASSERIDAE	Passer domesticus	House Sparrow	SNA	Exotic

LOIS HOLE CENTENNIAL PP SPECIES LIST: FISHES (6)

		Latin Name	Common Name	ACMIMS S Rank	2015 General Status
		ESOCIDAE			
AFCHD01020	ESOCIDAE	Esox lucius	Northern Pike	S5	Secure
		CYPRINIDAE			
AFCJB06010	CYPRINIDAE	Couesius plumbeus	Lake Chub	S5	Secure
AFCJB32020	CYPRINIDAE	Pimephales promelas	Fathead Minnow	S4S5	Secure
		CATOSTOMIDAE			
AFCJC02060	CATOSTOMIDAE	Catostomus commersoni	White Sucker	S5	Secure
		GADIDAE			
AFCMA01010	GADIDAE	Lota lota	Burbot	S5	Secure
		GASTEROSTEIDAE			
AFCPA02010	GASTEROSTEIDAE	Culaea inconstans	Brook Stickleback	S5	Secure

LOIS HOLE CENTENNIAL PP SPECIES LIST: MAMMALS (20)

		Latin Name	Common Name	ACMIMS S Rank	2015 General Status
		SORICIDAE			
AMABA01010	SORICIDAE	Sorex cinereus	Masked Shrew	S5	Secure
AMABA01190	SORICIDAE	Sorex arcticus	Arctic Shrew	S5	Secure
		VESPERTILIONIDAE			
AMACC01010	VESPERTILIONIDAE	Myotis lucifugus	Little Brown Myotis	S3S4	May Be At Risk
AMACC02010	VESPERTILIONIDAE	Lasionycteris noctivagans	Silver-haired Bat	S3S4B	Sensitive
AMACC04010	VESPERTILIONIDAE	Eptesicus fuscus	Big Brown Bat	S4S5	Secure
		LEPORIDAE			
AMAEB03010	LEPORIDAE	Lepus americanus	Snowshoe Hare	S5	Secure
		SCIURIDAE			
AMAFB09020	SCIURIDAE	Glaucomys sabrinus	Northern Flying Squirrel	S5	Secure

		GEOMYIDAE			
AMAFC01040	GEOMYIDAE	Thomomys talpoides	Northern Pocket Gopher	S5	Secure
		CASTORIDAE			
AMAFE01010	CASTORIDAE	Castor canadensis	American Beaver	S5	Secure
		MURIDAE			
AMAFF09020	MURIDAE	Myodes gapperi	Southern Red-backed Vole	S5	Secure
AMAFF11010	MURIDAE	Microtus pennsylvanicus	Meadow Vole	S5	Secure
AMAFF15010	MURIDAE	Ondatra zibethicus	Muskrat	S5	Secure
		DIPODIDAE			
AMAFH01010	DIPODIDAE	Zapus hudsonius	Meadow Jumping Mouse	S5	Secure
		ERETHIZONTIDAE			
AMAFJ01010	ERETHIZONTIDAE	Erethizon dorsatum	Porcupine	S5	Secure
		CANIDAE			
AMAJA01010	CANIDAE	Canis latrans	Coyote	S5	Secure
		MUSTELIDAE			
AMAJF02010	MUSTELIDAE	Mustela erminea	Ermine	S5	Secure
AMAJF02030	MUSTELIDAE	Mustela frenata	Long-tailed Weasel	S3S4	May Be At Risk
AMAJF02050	MUSTELIDAE	Neovison vison	American Mink	S5	Secure
		CERVIDAE			
AMALC02020	CERVIDAE	Odocoileus virginianus	White-tailed Deer	S5	Secure
AMALC03010	CERVIDAE	Alces americanus	Moose	S5	Secure

LOIS HOLE CENTENNIAL PP SPECIES LIST: REPTILES (11)

		Latin Name	Common Name	ACMIMS S Rank	2015 General Status
		EMYDIDAE			
ARAAB01010	CHELYDRIDAE	Chelydra serpentina	Snapping Turtle	SNA	N/a
ARAAD01010	EMYDIDAE	Chrysemys picta	Painted Turtle	S2S3	Sensitive
PHRYNOSOMATIDAE					
ARACF12080	PHRYNOSOMATIDAE	Phrynosoma hernandesi	Mountain Short-horned Lizard	S2	At Risk
		BOIDAE			
ARADA01010	BOIDAE	Charina bottae	Rubber Boa	SU	N/a
		COLUBRIDAE			
ARADB07010	COLUBRIDAE	Coluber constrictor	Racer	S1	Sensitive
ARADB17010	COLUBRIDAE	Heterodon nasicus	Western Hognose Snake	S2	May Be At Risk
ARADB26020	COLUBRIDAE	Pituophis catenifer	Bullsnake	S3	Sensitive
ARADB36050	COLUBRIDAE	Thamnophis elegans	Wandering Garter Snake	S4	Sensitive
ARADB36100	COLUBRIDAE	Thamnophis radix	Plains Garter Snake	S4	Sensitive
ARADB36130	COLUBRIDAE	Thamnophis sirtalis	Red-sided Garter Snake	S4	Sensitive
		VIPERIDAE			
ARADE02120	VIPERIDAE	Crotalus viridis	Prairie Rattlesnake	S3	Sensitive

LOIS HOLE CENTENNIAL PP SPECIES LIST: PLANTS

Scientific Name (Moss 1994)	Scientific Name (ITIS 2013)	Common Name	Family	Origin
Acorus americanus (Raf.) Raf.	Acorus americanus (Raf.) Raf.	Sweetflag	Araceae (Arum Family)	N
Alisma plantago-aquatica L.	Alisma plantago-aquatica L.	Broad-leaved Water-plantain	Alismataceae (Water-plantain Family)	N
Callitriche verna L.	Callitriche palustris L.	Vernal Water-starwort	Callitrichaceae (Water Starwort Family)	N
Carex aquatilis Wahlenb.	Carex aquatilis Wahlenb.	Water Sedge	Cyperaceae (Sedge Family)	N
Carex atherodes Spreng.	Carex atherodes Spreng.	Slough Sedge	Cyperaceae (Sedge Family)	N
Carex rostrata Stokes	Carex utriculata Boott	Bottle Sedge	Cyperaceae (Sedge Family)	N
Ceratophyllum demersum	Ceratophyllum demersum L.	Hornwort; Coon's Tail	Ceratophyllaceae (Hornwort Family)	N
Eleocharis acicularis (L.) R. & S.	Eleocharis acicularis (L.) R. & S.	Needle Spikerush	Cyperaceae (Sedge Family)	N
Eleocharis palustris (L.) R. & S.	Eleocharis acicularis (L.) R. & S.	Common Spikerush	Cyperaceae (Sedge Family)	N
Equisetum fluviatile L.	Equisetum fluviatile L.	Water Horsetail	Equisetaceae (Horsetail Family)	N
Lemna minor L.	Lemna minor L.	Common Duckweed	Lemnaceae (Duckweed Family)	N
Lemna trisulca L.	Lemna trisulca L.	vy Duckweed	Lemnaceae (Duckweed Family)	N
Myriophyllum exalbescens Fern.	Myriophyllum sibiricum Kom.	Northern Watermilfoil	Haloragaceae (Water-milfoil Family)	N
Potamogeton alpinus Balbis.	Potamogeton alpinus Balbis.	Alpine Pondweed	Potamogetonaceae (Pondweed Family)	N
Potomogeton natans L.	Potomogeton natans L.	Floatingleaf Pondweed	Potamogetonaceae (Pondweed Family)	N
Potamogeton foliosus	Potamogeton foliosus	Leafy pondweed	Potamogetonaceae (Pondweed Family)	N
Potomogeton pectinatus L.	Stuckenia pectinata (L.) Borner	Sago Pondweed	Potamogetonaceae (Pondweed Family)	N
Potomogeton pusillus L.	Potomogeton pusillus L.	Small Pondweed	Potamogetonaceae (Pondweed Family)	N
Potomogeton richardsonii (Benn.) Rydb.	Potomogeton richardsonii (Benn.) Rydb.	Richardson's Pondweed	Potamogetonaceae (Pondweed Family)	N
Sagittaria cuneata Sheld.	Sagittaria cuneata Sheld.	Arrowhead	Alismataceae (Water-plantain Family)	N
Scirpus acutus Muhl. ex. Bigel.	Schoenoplectus acutus (Muhl. ex Bigel) A. Love & D. Love	Hardstem Bulrush	Cyperaceae (Sedge Family)	N
Scirpus fluviatilis (Torr.) A. Gray	Bulboschoenus fluviatilis (Torr.) J. Sojak	River Bulrush	Cyperaceae (Sedge Family)	N

Scirpus validus Vahl	Schoenoplectus tabernaemontani (C.C. Gmel.) Palla	Softstem Bulrush	Cyperaceae (Sedge Family)	N
Sparganium eurycarpum Engelm.	Sparganium eurycarpum Engelm.	Giant Bur-reed	Sparganiaceae (Bur-reed Family)	N
Spirodela polyrhiza (L.) Schleiden	Spirodella polyrhiza (L.) Schleiden	Giant Duckweed	Lemnaceae (Duckweed Family)	N
Typha latifolia L.	Typha latifolia L.	Cattail	Typhaceae (Cattail Family)	N
Utricularia vulgaris L.	Utricularia vulgaris L.	Bladderwort	Lentibulariaceae (Bladderwort Family)	N
Zannichellia palustris L.	Zannichellia palustris L.	Horned Pondweed	Zannichelliaceae (Horned Pondweed Family)	N
Botrychium virginianum (L.) Sw.	Botrychium virginianum (L.) Sw.	Grape Fern	Ophioglossaceae (Adder's-tongue Family)	N
Dryopteris carthusiana (Vill.) H. P. Fuchs	Dryopteris carthusiana (Vill.) H. P. Fuchs	Narrow Spinulose Shield Fern	Polypodiaceae (Fern Family)	N
Matteuccia struthiopteris (L.) Torado	Matteuccia struthiopteris (L.) Torado	Ostrich Fern	Polypodiaceae (Fern Family)	N
Agropyron trachycaulum (Link) Malte	Elymus trachycaulus (Link) Gould ex Shinners	Slender Wheatgrass	Poaceae (Grass Family)	N
Agropyron repens (L) Beauv.	Elymus repens (L.) Gould	Quack Grass	Poaceae (Grass Family)	I
Alopecurus aequalis Sobol.	Alopecuris aequalis Sobol.	Water Foxtail	Poaceae (Grass Family)	N
Alopecurus pratensis L.	Alopecurus pratensis L.	Meadow Foxtail	Poaceae (Grass Family)	I
Avena fatua L.	Avena fatua L.	Wild Oats	Poaceae (Grass Family)	I
Beckmannia syzigachne (Steud.) Fern	Beckmannia syzigachne (Steud.) Fern	Slough Grass	Poaceae (Grass Family)	N
Bromus ciliatus L.	Bromus ciliatus L.	Fringed Brome	Poaceae (Grass Family)	N
Bromus inermis Leyss.	Bromus inermis Leyss.	Smooth Brome	Poaceae (Grass Family)	I
Calamagrostis canadensis (Michx.) Beauv.	Calamagrostis canadensis (Michx.) Beauv.	Bluejoint; Marsh Reed Grass	Poaceae (Grass Family)	N
Calamagrostis inexpansa A. Gray	Calamagrostis stricta ssp. inexpansa (A. Gray) C. W. Greene	Northern Reed Grass	Poaceae (Grass Family)	N
Carex deweyana Schwein.	Carex deweyana Schwein.	Deweys' Sedge	Cyperaceae (Sedge Family)	N
Carex disperma Dewey	Carex disperma Dewey	Two-seeded Sedge; Softleaved Sedge	Cyperaceae (Sedge Family)	N
Carex praegracilis W. Boott	Carex praegracilis W. Boott	Graceful Field Sedge	Cyperaceae (Sedge Family)	N
Carex retrorsa Schwein.	Carex retrorsa Schwein.	Retrorse Sedge	Cyperaceae (Sedge Family)	N
Carex sartwellii Dewey	Carex sartwellii Dewey	Sartwells's Sedge	Cyperaceae (Sedge Family)	N
Carex sychnocephala Carey	Carex sychnocephala Carey	Many-headed Sedge	Cyperaceae (Sedge Family)	N

Cinna latifolia (Trev.) Giseb.	Cinna latifolia (Trev.) Giseb.	Drooping Wood Reed	Poaceae (Grass Family)	N
Echinochloa crus-galli (L.) Beauv.	Echinochloa crus-galli (L.) Beauv.	Barnyard Grass	Poaceae (Grass Family)	I
Glyceria striata (Lam.) A.S. Hichc.	Glyceria striata (Lam.) A.S. Hichc.	Fowl Manna Grass	Poaceae (Grass Family)	N
Hierochloe odorata (L.) Beauv.	Hierochloe odorata (L.) Beauv.	Sweetgrass	Poaceae (Grass Family)	N
Hordeum jubatum L.	Hordeum jubatum L.	Foxtail Barley	Poaceae (Grass Family)	I
Phalaris arundinacea L.	Phalaris arundinacea L.	Reed Canary Grass	Poaceae (Grass Family)	N
Phleum pratense L.	Phleum pratense L.	Timothy	Poaceae (Grass Family)	I
Poa annua L.	Poa annua L.	Annual Bluegrass	Poaceae (Grass Family)	I
Poa palustris L.	Poa pal Poa pratensis ustris L.	Fowl Bluegrass	Poaceae (Grass Family)	N
Poa pratensis L.	Poa pratensis L.	Kentucky Bluegrass	Poaceae (Grass Family)	N
Schizachne purpurascens (Torr.) Swallen	Schizachne purpurascens (Torr.) Swallen	False Melic	Poaceae (Grass Family)	N
Scolochloa festucacea (Willd.) Link	Scolochloa festucacea (Willd.) Link	Common Rivergrass	Poaceae (Grass Family)	N
Alnus crispa (Ait.) Pursh	Alnus viridis subsp. crispa (Ait.) Pursh	Green Alder	Betulaceae (Birch Family)	N
Alnus tenuifolia Nutt.	Alnus incana subsp. tenuifolia Nutt.	River Alder	Betulaceae (Birch Family)	N
Amelanchier alnifolia Medic.	Amelanchier alnifolia Medic.	Saskatoon; Service Berry	Rosaceae (Rose Family)	N
Cornus stolonifera Michx.	Cornus sericea L.	Red Osier Dogwood	Cornaceae (Dogwood Family)	N
Corylus cornuta Marsh.	Corylus cornuta Marsh.	Beaked Hazelnut	Betulaceae (Birch Family)	N
Cotoneaster lucidus Schltdl.	Cotoneaster lucidus Schltdl.	Cotoneaster	Rosaceae (Rose Family)	I
Lonicera dioica L.	Lonicera dioica L.	Twining Honeysuckle	Caprifoliaceae (Honeysuckle Family)	N
Lonicera involucrata (Richards.) Banks	Lonicera involucrata (Richards.) Banks	Bracted Honeysuckle	Caprifoliaceae	N
Prunus pensylvanica L.f.	Prunus pensylvanica L.f.	Pin Cherry	Rosaceae (Rose Family)	N
Prunus virginiana L.	Prunus virginiana L.	Choke Cherry	Rosaceae (Rose Family)	N
Ribes americanum Mill.	Ribes americanum Mill.	Wild Black Currant	Grossulariaceae (Gooseberry Family)	N
Ribes glandulosum Grauer	Ribes glandulosum Grauer	Skunk Currant	Grossulariaceae (Gooseberry Family)	N
Ribes hudsonianum Richards.	Ribes hudsonianum Richards.	Wild Black Currant	Grossulariaceae (Gooseberry Family)	N
Ribes oxycanthoides L.	Ribes oxycanthoides L.	Wild Gooseberry	Grossulariaceae (Gooseberry Family)	N

Ribes triste Pall.	Ribes triste Pall.	Wild Red Currant	Grossulariaceae (Gooseberry Family)	N
Rosa acicularis Lindl.	Rosa acicularis Lindl.	Prickly Rose	Rosaceae (Rose Family)	N
Rosa woodsii Lindl.	Rosa woodsii Lindl.	Common Wild Rose	Rosaceae (Rose Family)	N
Rubus idaeus L.	Rubus idaeus L.	Wild Red Raspberry	Rosaceae (Rose Family)	N
Salix bebbiana Sarg.	Salix bebbiana Sarg.	Bebb's Willow	Salicaceae (Willow Family)	N
Salix candida Gluegge ex Willd.	Salix candida Gluegge ex Willd.	Sageleaf Willow	Salicaceae (Willow Family)	N
Salix discolor Muhl.	Salix discolor Muhl.	Pussy Willow	Salicaceae (Willow Family)	N
Salix exigua Nutt.	Salix exigua Nutt.	Sandbar Willow	Salicaceae (Willow Family)	N
Salix lucida Muhl.	Salix lucida Muhl.	Shining Willow	Salicaceae (Willow Family)	--
Salix maccalliana Rowlee	Salix maccalliana Rowlee	McCalla's Willow	Salicaceae (Willow Family)	N
Salix maccalliana Rowlee.	Salix maccalliana Rowlee.	McCalla's Willow	Salicaceae (Willow Family)	N
Salix petiolaris J. E. Smith	Salix petiolaris J. E. Smith	Meadow Willow	Salicaceae (Willow Family)	N
Salix pseudomonticola Ball.	Salix pseudomonticola Ball.	White Mountain Willow	Salicaceae (Willow Family)	N
Sambucus racemosa L.	Sambucus racemosa L.	Red Elderberry	Caprifoliaceae (Honeysuckle Family)	N
Shepherdia canadensis (L.) Nutt.	Shepherdia canadensis (L.) Nutt.	Canadian Buffalo Berry	Elaeagnaceae (Oleaster Family)	N
Sorbus aucuparia L.	Sorbus aucuparia L.	European Mountain Ash	Rosaceae (Rose Family)	I
Sorbus scopulina Greene	Sorbus scopulina Greene	Western Mountain Ash	Rosaceae (Rose Family)	N
Symphoricarpos albus (L) Blake	Symphoricarpos albus (L) Blake	Snowberry	Caprifoliaceae (Honeysuckle Family)	N
Symphoricarpos occidentalis Hook	Symphoricarpos occidentalis Hook	Buckbrush	Caprifoliaceae (Honeysuckle Family)	N
Viburnum edule (Michx.) Raf.	Viburnum edule (Michx.) Raf.	Lowbush Cranberry	Caprifoliaceae (Honeysuckle Family)	N
Viburnum opulus L.	Viburnum opulus L.	Highbush Cranberry	Caprifoliaceae (Honeysuckle Family)	N
Acer negundo L.	Acer negundo L.	Manitoba Maple	Aceraceae (Maple Family)	N/ I
Betula neoalaskana Sargent	Betula neoalaskana Sargent	Alaskan Birch	Betulaceae (Birch Family)	N
Betula papyrifera Marsh.	Betula papyrifera Marsh.	Paper Birch	Betulaceae (Birch Family)	N
Fraxinus pennsylvanica Marsh.	Fraxinus pennsylvanica Marsh.	Green Ash	Oleaceae (Olive Family)	I
Achillea millefolium L.	Achillea millefolium L.	Yarrow	Asteraceae (Aster Family)	N
Picea glauca (Moench) Voss	Picea glauca (Moench) Voss	White Spruce	Pinaceae (Pine Family)	N
Picea mariana (Mill.) BSP.	Picea mariana (Mill.) BSP.	Black Spruce	Pinaceae (Pine Family)	N
Populus balsamifera L.	Populus balsamifera L.	Balsam Poplar	Salicaceae (Willow Family)	N

Populus tremuloides Michx.	Populus tremuloides Michx.	Trembling Aspen	Salicaceae (Willow Family)	N
Achillea sibirica Ledeb.	Achillea alpina L.	Siberian Yarrow	Asteraceae (Aster Family)	N
Actaea rubra (Ait.) Willd.	Actaea rubra (Ait.) Willd.	Baneberry	Ranunculaceae (Buttercup Family)	N
Adoxa moschatellina L.	Adoxa moschatellina L.	Moschatel	Adoxaceae (Moschatel Family)	N
Agastache foeniculum (Pursh) Ktze.	Agastache foeniculum (Pursh) Ktze.	Giant Hyssop	Lamiaceae (Mint Family)	N
Agrimonia striata Michx.	Agrimonia striata Michx.	Agrimony	Rosaceae (Rose Family)	N
Anemone canadensis L.	Anemone canadensis L.	Canada Anemone	Ranunculaceae (Buttercup Family)	N
Anemone riparia Fern.	Anemone virginiana var. alba (Oakes) Alph. Wood	Thimbleweed	Ranunculaceae (Buttercup Family)	N
Aralia nudicaulis L.	Aralia nudicaulis L.	Wild Sarsaparilla	Araliaceae (Ginseng Family)	N
Artemisia biennis Willd.	Artemisia biennis Willd.	Biennial Sagewort	Asteraceae (Aster Family)	N
Aster brachyactis Blake	Symphiotricum ciliatum (Ledeb.) G.L. Nesom	Rayless Aster	Asteraceae (Aster Family)	I
Aster ciliolatus Lindl.	Symphyotrichum ciliolatum Lindl.	Lindley's Aster	Asteraceae (Aster Family)	N
Aster conspicuus Lindl.	Eurybia conspicua (Lindl.) G.L. Nesom	Showy Aster	Asteraceae (Aster Family)	N
Aster hesperius A. Gray	Symphyotrichum lanceolatum (Willd.) G.L. Nesom subsp. hesperium (A. Gray) G.L. Nesom	Western Willow Aster	Asteraceae (Aster Family)	N
Aster puniceus L.	Symphyotrichum puniceum (L.) A. Love & D. Love var. puniceum	Purple-stemmed Aster	Asteraceae (Aster Family)	N
Bidens cernua L.	Bidens cernua L.	Nodding Beggar-ticks	Asteraceae (Aster Family)	N
Caltha palustris L.	Caltha palustris L.	Marsh Marigold	Ranunculaceae (Buttercup Family)	N
Caragana arborescens Lam.	Caragana arborescens Lam.	Caragana	Fabaceae (Pea Family)	I
Cardamine pensylvanica Muhl. ex Willd	Cardamine pensylvanica Muhl. ex Willd	Pennsylvania Bittercress	Brassicaceae (Mustard Family)	N
Chenopodium album L.	Chenopodium album L.	Lamb's Quarters	Chenopodiaceae (Goosefoot Family)	I
Chenopodium salinum Stand.	Chenopodium glaucum var. salinum (Stand.) B. Boivin	Oak-leaved Goosefoot	Chenopodiaceae (Goosefoot Family)	N
Chrysosplenium iowense Rydb.	Chrysosplenium iowense Rydb.	Golden Saxifrage	Saxifragaceae (Saxifrage Family)	N
Cicuta bulbifera L.	Cicuta bulbifera L.	Bulblet-bearing Water Hemlock	Apiaceae (Carrot Family)	N

Cicuta maculata L. var. angustifolia	Cicuta maculata L. var. angustifolia	Spotted Water Hemlock	Apiaceae (Carrot Family)	N
Circaea alpina L.	Circaea alpina L.	Enchanter's Nightshade	Onagraceae (Evening Primrose Family)	N
Circaea alpina L.	Circaea alpina L.	Enchanter's Nightshade	Onagraceae (Evening Primrose Family)	N
Cirsium arvense (L.) Scop.	Cirsium arvense (L.) Scop.	Canada Thistle	Asteraceae (Aster Family)	I
Corallorhiza maculata Raf.	Corallorhiza maculata (Raf.) Raf.	Spotted Coralroot	Orchidaceae (Orchid Family)	N
Cornus canadensis L.	Cornus canadensis L.	Bunchberry	Cornaceae (Dogwood Family)	N
Corydalis aurea Willd.	Corydalis aurea Willd.	Golden Corydalis	Fumariaceae (Fumitory Family)	N
Descurania sophia (L.) Webb	Descurania sophia (L.) Webb ex Prantl.	Flixweed	Brassicaceae (Mustard Family)	I
Disporum trachycarpum (S. Wats.) B. & H.	Prosartes trachycarpa S. Watson	Rough-fruited Fairybells	Liliaceae (Lily Family)	N
Epilobium angustifolium L.	Chamerion angustifolium subsp. angustifolium (L.) Holub	Fireweed	Onagraceae (Evening Primrose Family)	N
Epilobium ciliatum subsp. ciliatum Raf.	Epilobium ciliatum subsp. ciliatum Raf.	Northern Willowherb; Hairy Willowherb	Onagraceae (Evening Primrose Family)	N
Epilobium palustre L.	Epilobium palustre L.	Marsh Willowherb	Onagraceae (Evening Primrose Family)	N
Equisetum arvense L.	Equisetum arvense L.	Field Horsetail	Equisetaceae (Horsetail Family)	N
Equisetum palustre L.	Equisetum palustre L.	Marsh Horsetail	Equisetaceae (Horsetail Family)	N
Equisetum pratense Ehrh.	Equisetum pratense Ehrh.	Meadow Horsetail	Equisetaceae (Horsetail Family)	N
Equisetum pratense Ehrh.	Equisetum pratense Ehrh.	Meadow Horsetail	Equisetaceae (Horsetail Family)	N
Equisetum sylvaticum L.	Equisetum sylvaticum L.	Woodland Horsetail	Equisetaceae (Horsetail Family)	N
Erigeron canadensis L.	Conyza canadensis (L.) Cronquist	Horseweed	Asteraceae (Aster Family)	N
Erigeron glabellus Nutt.	Erigeron glabellus Nutt.	Smooth Fleabane	Asteraceae (Aster Family)	N
Erigeron philadelphicus L.	Erigeron philadelphicus L.	Philadelphia Fleabane	Asteraceae (Aster Family)	N
Erysimum cheiranthoides L.	Erysimum cheiranthoides L.	Wormseed Mustard	Brassicaceae (Mustard Family)	N
Fragaria vesca L.	Fragaria vesca L.	Woodland Strawberry	Rosaceae (Rose Family)	N
Fragaria virginiana Duchesne.	Fragaria virginiana Duchesne.	Wild Stawberry	Rosaceae (Rose Family)	N
Galeopsis speciosa Mill.	Galeopsis speciosa Mill.	Yellow Hemp Nettle	Lamiaceae (Mint Family)	I
Galeopsis tetrahit L.	Galeopsis tetrahit L.	Hemp Nettle	Lamiaceae (Mint Family)	I
Galium boreale L.	Galium boreale L.	Northern Bedstraw	Rubiaceae (Madder Family)	N
Galium trifidum subsp. trifidum L.	Galium trifidum subsp. trifidum L.	Small Bedstraw	Rubiaceae (Madder Family)	N

Galium triflorum Michx.	Galium triflorum Michx.	Sweet-scented Bedstraw	Rubiaceae (Madder Family)	N
Geranium bicknellii Briton	Geranium bicknellii Briton	Bicknell's Geranium	Geraniaceae (Geranium Family)	N
Geum aleppicum Jacq.	Geum aleppicum Jacq.	Yellow Avens	Rosaceae (Rose Family)	N
Geum macrophyllum subsp. perincisum Willd.	Geum macrophyllum subsp. perincisum Willd.	Large-leaf Avens	Rosaceae (Rose Family)	N
Geum rivale L.	Geum rivale L.	Purple Avens; Water Avens	Rosaceae (Rose Family)	N
Gnaphalium palustre Nutt.	Gnaphalium palustre Nutt.	Marsh Cudweed	Asteraceae (Aster Family)	N
Habenaria hyperborea (L.) R.Br	Platanthera aquilonis Sheviak	Northern Green Orchid	Orchidaceae (Orchid Family)	N
Halenia deflexa (Sm.) Griseb.	Halenia deflexa (Sm.) Griseb.	Spurred Gentian	Gentianaceae (Gentain Family)	N
Heracleum lanatum Michx.	Heracleum sphondylium subsp. montanum (Schleich ex Gaudin) Briq.	Cow Parsnip	Apiaceae (Carrot Family)	N
Hieracium umbellatum L.	Hieracium umbellatum L.	Narrow-leaved Hawkweed	Asteraceae (Aster Family)	N
Hippuris vulgaris L.	Hippuris vulgaris L.	Mare's Tail	Hippuridaceae (Mare's Tail Family)	Natvie
Impatiens capensis Meerb.	Impatiens capensis Meerb.	Jewelweed	Balsaminaceae (Touch-me-not Family)	N
Impatiens noli-tangere L.	Impatiens noli-tangere L.	Touch-me-not; Jewelweed	Balsaminaceae (Touch-me-not Family)	N
Juncus balticus Willd.	Juncus balticus Willd.	Wire Rush	Juncaceae (Rush Family)	N
Juncus bufonius L.	Juncus bufonius L	Toad Rush	Juncaceae (Rush Family)	N
Lappula squarrosa (Retz.) Dumort	Lappula squarrosa (Retz.) Dumort	Blue-bur	Boraginaceae (Borage Family)	I
Lathyrus ochroleucus Hook.	Lathyrus ochroleucus Hook.	Cream Peavine	Fabaceae (Pea Family)	N
Lathyrus venosus Muhl.	Lathyrus venosus Muhl. ex Willd.	Purple Peavine	Fabaceae (Pea Family)	N
Ledum groenlandicum Oeder	Rhododendron groenlandicum (Oeder) Kron and Judd	Labrador Tea	Ericaceae (Heath Family)	N
Lepidium densiflorum Schrad.	Lepidium densiflorum Schrad.	Peppergrass	Brassicaceae (Mustard Family)	N
Linnaea borealis L.	Linnaea borealis L.	Twinflower	Caprifoliaceae (Honeysuckle Family)	N
Lycopus asper Greene	Lycopus asper Greene	Rough Water-horehound	Lamiaceae (Mint Family)	N
Lycopus uniflorus Michx.	Lycopus uniflorus Michx.	Northern Water-horehound	Lamiaceae (Mint Family)	N
Lysimachia ciliata L.	Lysimachia ciliata L.	Fringed Loosestrife	Primulaceae (Primrose Family)	N
Lysimachia thrysiflora L.	Lysimachia thrysiflora L.	Tufted Loosestrife	Primulaceae (Primrose Family)	N
Maianthemum canadense Desf.	Maianthemum canadense Desf.	Wild Lily-of-the-valley	Liliaceae (Lily Family)	N

Matricaria perforata Merat	Tripleurospermum inodorum (L.) Sch. Bip.	Scentless Chamomile; Scentless False Mayweed	Asteraceae (Aster Family)	I
Medicago lupulina L.	Medicago lupulina L.	Black Medic	Fabaceae (Pea Family)	I
Medicago sativa L.	Medicago sativa L.	Alfalfa	Fabaceae (Pea Family)	I
Melilotus alba Desr.	Melilotus albus Medik.	White Sweet Clover	Fabaceae (Pea Family)	I
Melilotus officinalis (L.) Lam	Melilotus officinalis (L.) Lam	Yellow Sweet Clover	Fabaceae (Pea Family)	I
Mentha arvensis L.	Mentha arvensis L.	Wild Mint	Lamiaceae (Mint Family)	N
Mertensia paniculata (Ait) G. Don.	Mertensia paniculata (Ait) G. Don.	Tall Bluebells	Boraginaceae (Borage Family)	N
Mitella nuda L.	Mitella nuda L.	Bishop's-cap	Saxifragaceae (Saxifrage Family)	N
Moehringia lateriflora (L.) Fenzl.	Moehringia lateriflora (L.) Fenzl.	Blunt Leaved Sandwort	Caryophyllaceae (Pink Family)	N
Monotropa uniflora L.	Monotropa uniflora L.	Indian Pipe	Monotropaceae (Indian-pipe Family	N
Orthilia secunda (L.) House	Orthilia secunda (L.) House	One-sided Wintergreen	Pyrolaceae (Wintergreen Family)	N
Orthilia secunda (L.) House	Orthilia secunda (L.) House	One-sided Wintergreen	Pyrolaceae (Wintergreen Family)	N
Osmorhiza depauperata Philippi	Osmorhiza depauperata Philippi	Blunt-fruited Sweet Cicely	Apiaceae (Carrot Family)	N
Osmorhiza longistylis (Torr.) DC.	Osmorhiza longistylis (Torr.) DC.	Smooth Sweet Cicely	Apiaceae (Carrot Family)	N
Petasites palmatus (Ait.) A. Gray	Petasites frigidus var. palmatus (Ait.) Cronquist	Palmate-leaved Coltsfoot	Asteraceae (Aster Family)	N
Petasites sagittatus (Pursh) A. Gray	Petasites frigidus var. sagittatus (Banks ex Pursh) Chern	Arrow-leaved Coltsfoot	Asteraceae (Aster Family)	N
--	Physostegia ledinghami (B. Boivin) P.D. Cantino	False Dragonhead	Lamiaceae (Mint Family)	N
Plantago major L.	Plantago major L.	Common Plantain	Plantaginaceae (Plantain Family)	I
Polygonum amphibium L.	Persicaria amphibia (L.) Delarbre	Water Smartweed	Polygonaceae (Buckwheat Family)	N
Polygonum lapathifolium L.	Persicaria lapathifolium (L.) Gray	Pale Smartweed	Polygonaceae (Buckwheat Family)	N
Potentilla anserina L.	Potentilla anserina L.	Silverweed	Rosaceae (Rose Family)	N
Potentilla norvegica L.	Potentilla norvegica L.	Rough Cinquefoil	Rosaceae (Rose Family)	N
Potentilla rivalis Nutt.	Potentilla rivalis Nutt.	River Cinquefoil	Rosaceae (Rose Family)	N
Pyrola asarifolia Michx.	Pyrola asarifolia Michx.	Common Pink Wintergreen	Pyrolaceae (Wintergreen Family)	N
Pyrola elliptica Nutt.	Pyrola elliptica Nutt.	White Wintergreen	Ericaceae (Heather Family)	N
Ranunculus acris L.	Ranunculus acris L.	Tall Buttercup	Ranunculaceae (Buttercup Family)	I

Ranunculus aquatilis L.	Ranunculus aquatilis L.	White Water Crowfoot	Ranunculaceae (Buttercup Family)	N
Ranunculus macounii Britt.	Ranunculus macounii Britt.	Macoun's Buttercup	Ranunculaceae (Buttercup Family)	N
Ranunculus sceleratus L.	Ranunculus sceleratus L.	Celery-leaved Buttercup	Ranunculaceae (Buttercup Family)	N
Rorippa palustris (L.)	Rorippa palustris (L.)	Yellow Cress	Brassicaceae (Mustard Family)	N
Rubus pubescens Raf.	Rubus pubescens Raf.	Dewberry; Running Raspberry	Rosaceae (Rose Family)	N
Rumex crispus L.	Rumex crispus L.	Curled Dock	Polygonaceae (Buckwheat Family)	I
Rumex maritimus L.	Rumex maritimus L.	Golden Dock	Polygonaceae (Buckwheat Family)	N
Rumex occidentalis S. Wats.	Rumex occidentalis S. Wats.	Western Dock	Polygonaceae (Buckwheat Family)	N
Rumex triangulivalvis (Dans.) Rech. f.	Rumex triangulivalvis (Dans.) Rech. f.	Narrow-leaved Dock	Polygonaceae (Buckwheat Family)	N
Sanicula marilandica L.	Sanicula marilandica L.	Black Sanicle	Apiaceaa (Carrot Family)	N
Scutellaria galericulata L.	Scutellaria galericulata L.	Marsh Skullcap	Lamiaceae (Mint Family)	N
Senecio congestus (R. Br.) DC.	Tephroseris palustris (L.) Reichenbach	Marsh Ragwort	Asteraceae (Aster Family)	N
Senecio eremophilus Richards	Senecio eremophilus Richards	Ragwort	Asteraceae (Aster Family)	N
Senecio vulgaris L.	Senecio vulgaris L.	Common Groundsel	Asteraceae (Aster Family)	I
Silene crassifolia Ehrh.	Silene crassifolia Ehrh.	Thickleaved Chickweed	Caryophyllaceae (Pink Family)	N
Sisymbrium altissimum L.	Sisymbrium altissimum L.	Tall Hedge-mustard	Brassicaceae (Mustard Family)	I
Sium suave Walt.	Sium suave Walt.	Water Parsnip	Apiaceae (Carrot Family)	N
Smilacina stellata (L.) Desf.	Maianthemum stellatum (L.) Desf.	Star-flowered Solomon's Seal	Liliaceae (Lily Family)	N
Smilacina stellata (L.) Desf.	Maianthemum stellatum (L.) Link	Star-flowered Solomon's Seal	Liliaceae (Lily Family)	N
Solidago canadensis L.	Solidago canadensis L.	Canada Goldenrod	Asteraceae (Aster Family)	N
Sonchus asper (L.) Hill	Sonchus asper (L.) Hill	Spiny Sowthistle	Asteraceae (Aster Family)	I
Sonchus uliginosus Bieb.	Sonchus arvensis subsp. uliginosus (Bieb.) Nyman	Perennial Sow Thistle	Asteraceae (Aster Family)	N
Stachys palustris L.	Stachys palustris L.	Marsh Hedge Nettle	Lamiaceae (Mint Family)	N
Stellaria longifolia Muhl.	Stellaria longifolia Muhl. ex Willd.	Long-leaved Chickweed	Caryophyllaceae (Pink Family)	N
Stellaria media (L.) Vill.	Stellaria media (L.) Vill.	Chickweed	Caryophyllaceae (Pink Family)	I
Streptopus amplexifolius (L.) DC.	Streptopus amplexifolius (L.) DC.	Twisted Stalk	Liliaceae (Lily Family)	N

Tanacetum vulgare L.	Tanacetum vulgare L.	Tansy	Asteraceae (Aster Family)	I
Taraxacum officinale Weber	Taraxacum officinale Weber	Common Dandelion	Asteraceae (Aster Family)	I
Thalictrum dasycarpum Fisch & Ave-Lall.	Thalictrum dasycarpum Fisch & Ave-Lall.	Tall Meadow Rue	Ranunculaceae (Buttercup Family)	N
Thalictrum venulosum Trel.	Thalictrum venulosum Trel.	Veiny Meadow Rue	Ranunculaceae (Buttercup Family)	N
Thlaspi arvense L.	Thlaspi arvense L.	Stinkweed; Pennycress	Brassicaceae (Mustard Family)	I
Trifolium hybridum L.	Trifolium hybridum L.	Alsike Clover	Fabaceae (Pea Family)	I
Trifolium pratense L.	Trifolium pratense L.	Red Clover	Fabaceae (Pea Family)	I
Trifolium repens L.	Trifolium repens L.	White Clover	Fabaceae (Pea Family)	I
Triglochin maritima L.	Triglochin maritima L.	Seaside Arrow Grass	Juncaginaceae (Arrow-grass Family)	N
Urtica dioica subsp. gracilis (Aiton) Selander	Urtica dioica subsp. gracilis (Aiton) Selander	Stinging Nettle; Common Nettle	Urticaceae (Nettle Family)	N
Veronica americana (Raf.) Schw.	Veronica americana (Raf.) Schw.	American Brooklime	Plantaginaceae (Plantain Family)	N
Vicia americana Muhl.	Vicia americana Muhl. ex Willd	American Vetch	Fabaceae (Pea Family)	N
Vicia cracca L.	Vicia cracca L.	Tufted Vetch	Fabaceae (Pea Family)	I
Viola adunca J.E. Smith	Viola adunca J.E. Smith	Early Blue Violet	Violaceae (Violet Family)	N
Viola canadensis L.	Viola canadensis L.	Canada Violet	Violaceae (Violet Family)	N

Appendix D: Species of Conservation Concern in LHCPP

Latin Name	Common Name	ACIMS S Rank	Status
Anaxyrus boreas	Western Toad	S3S4	Sensitive
Anaxyrus hemiophrys	Canadian Toad	S3	May Be At Risk
Podilymbus podiceps	Pied-billed Grebe	S4B	Sensitive
Podiceps auritus	Horned Grebe	S3B	Sensitive
Aechmophorus occidentalis	Western Grebe	S3B	At Risk
Pelecanus erythrorhynchos	American White Pelican	S2S3B	Sensitive
Botaurus lentiginosus	American Bittern	S3S4B	Sensitive
Ardea herodias	Great Blue Heron	S3B	Sensitive
Nycticorax nycticorax	Black-crowned Night-Heron	S2B	Sensitive
Plegadis chihi	White-faced Ibis	S1S2B	Sensitive
Cygnus buccinator	Trumpeter Swan	S2S3B	Sensitive
Melanitta fusca	White-winged Scoter	S3S4B	Sensitive
Pandion haliaetus	Osprey	S4B	Sensitive
Haliaeetus leucocephalus	Bald Eagle	S4B, S5M	Sensitive
Accipiter gentilis	Northern Goshawk	S3S4B	Sensitive
Aquila chrysaetos	Golden Eagle	S3B, S4N	Sensitive
Falco sparverius	American Kestrel	S5B	Sensitive
Falco peregrinus	Peregrine Falcon	S2S3B	At Risk
Tympanuchus phasianellus	Sharp-tailed Grouse	S3S4	Sensitive
Coturnicops noveboracensis	Yellow Rail	S2S3B	Undetermined
Rallus limicola	Virginia Rail	SUB	Undetermined
Porzana carolina	Sora	S5B	Sensitive
Grus canadensis	Sandhill Crane	S4B, S5M	Sensitive
Himantopus mexicanus	Black-necked Stilt	S2S3B	Sensitive
Bartramia longicauda	Upland Sandpiper	S3B	Sensitive
Calidris canutus	Red Knot	SUM	May Be At Risk
Limnodromus griseus	Short-billed Dowitcher	SUB	Undetermined
Sterna forsteri	Forster's Tern	S2S3B	Sensitive

Chlidonias niger	Black Tern	S4B	Sensitive
Strix nebulosa	Great Gray Owl	S4	Sensitive
Asio flammeus	Short-eared Owl	S3B	May Be At Risk
Chordeiles minor	Common Nighthawk	S3S4B	Sensitive
Picoides arcticus	Black-backed Woodpecker	S3	Sensitive
Dryocopus pileatus	Pileated Woodpecker	S4	Sensitive
Contopus cooperi	Olive-sided Flycatcher	S3B	May Be At Risk
Contopus sordidulus	Western Wood-Pewee	S3S4B	May Be At Risk
Empidonax alnorum	Alder Flycatcher	S5B	Sensitive
Empidonax minimus	Least Flycatcher	S5B	Sensitive
Sayornis phoebe	Eastern Phoebe	S4B	Sensitive
Tyrannus tyrannus	Eastern Kingbird	S4S5B	Sensitive
Progne subis	Purple Martin	S4B	Sensitive
Riparia riparia	Bank Swallow	S4B	Sensitive
Hirundo rustica	Barn Swallow	S3B	Sensitive
Certhia americana	Brown Creeper	S3S4B	Sensitive
Catharus minimus	Gray-cheeked Thrush	SUB, SUM	Undetermined
Cistothorus platensis	Sedge Wren	S3B	Sensitive
Anthus spragueii	Sprague's Pipit	S3S4B	Sensitive
Lanius ludovicianus	Loggerhead Shrike	S3B	Sensitive
Setophaga tigrina	Cape May Warbler	S3B	Sensitive
Setophaga virens	Black-throated Green Warbler	S3S4B	Sensitive
Setophaga castanea	Bay-breasted Warbler	S3B	Sensitive
Geothlypis trichas	Common Yellowthroat	S5B	Sensitive
Cardellina canadensis	Canada Warbler	S3S4B	At Risk
Piranga ludoviciana	Western Tanager	S3S4B	Sensitive
Dolichonyx oryzivorus	Bobolink	S2B	Sensitive
Euphagus carolinus	Rusty Blackbird	S3S4B	Sensitive
Icterus galbula	Baltimore Oriole	S4B	Sensitive
Myotis lucifugus	Little Brown Myotis	S3S4	May Be At Risk
Lasionycteris noctivagans	Silver-haired Bat	S3S4B	Sensitive
Mustela frenata	Long-tailed Weasel	S3S4	May Be At Risk

Appendix E: Nature Trail Development Guidelines

The following specifications are guidelines for the development of Nature Trails at Lois Hole Centennial Provincial Park.

Type of Use: Walking, cycling, snowshoeing, cross-country skiing

Width: 1-2m where possible

Clearing Height: 2.5m to 3m

Surfacing: Compacted granular

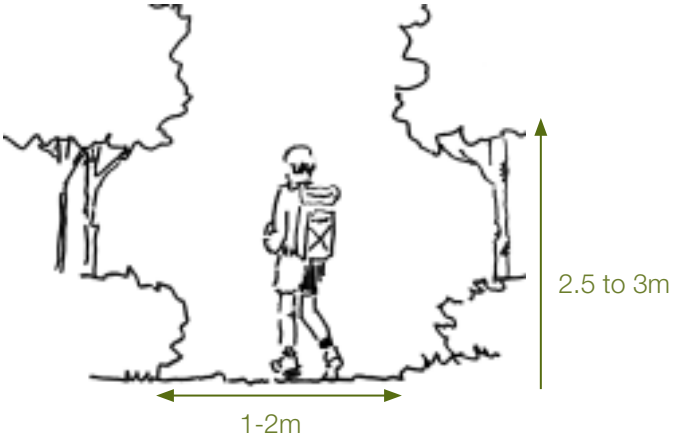
Slope: Trail maximum 30%, over 30% stairs are required

Landscape treatment: low, soft landscape treatment between edge of trail to property line, fence or barrier, to a maximum height of 60 cm. The type of treatment will match existing, with plant material that is native and non-invasive

Accessibility: Designed to meet Americans with Disabilities Act Trail development guidelines where appropriate and practical

Other considerations:

- Where appropriate and deemed necessary, Alberta Parks will follow Crime Prevention through Environmental Design (CPTED) principles and recommendations.
- Trails may traverse seasonally wet areas or areas that are subject to regular flooding. Boardwalks or crossing structures may or may not be developed through these areas.
- Trails will be subject to closure as necessary for management purposes, especially to mitigate and prevent ecological disturbance.



Examples:

Appendix F: East Facility Zone Option Evaluation Matrix

As per section 7.1.2, three different options for infrastructure development were considered by the planning team for the East Facility Zone including: 1) a campground built to Alberta Parks guidelines, 2) a multi-use day use area, and 3) a network of nature trails accompanied by restoration of disturbed land. The following matrix was used to evaluate these options and develop a final recommendation for the LHCPP management plan. Weighting of objective categories was based on management priorities for LHCPP, and scoring was done by the planning team using a consensus process.

LHCPP East Facility Zone Evaluation Matrix	SECTION 3.0 CONSERVATION & PROTECTION (WEIGHT .5)					SECTION 4.0 COMMUNITY ENGAGEMENT (WEIGHT .15)			SECTION 5.0 VISITOR EXPERIENCE (WEIGHT .2)						SECTION 6.0 OUTDOOR RECREATION & HEALTHY LIVING (WEIGHT .15)							WEIGHTED CATEGORY TOTALS				TOTAL SCORE
	Objective 3.2: Maintain and restore ecological function and biodiversity:	Indicator 3.2: Degree of native vegetation replanting within facility zone	**Objective 3.2.1 Prevent the negative impacts of light and noise pollution on wildlife:**	Indicator 3.2.1: Amount of noise and light pollution detectable in facility zone per day, per year	**Objective 3.4: Identify and maintain ecological connectivity corridors**	**Objective 4.4: Identify and create opportunities for enhanced community engagement in the park through collaboration between AB parks and community-based organizations:**	Indicator 4.4: Ability of facilities to support community group & family events and gatherings	Indicator 4.4: Number of people supported for community events[3] in the facility zone	**Objective 5.1: Build environmental literacy among diverse target audiences and foster appreciation and caring for nature through intentional, collaboratively developed nature-based educational and interpretive programming:**	Indicator 5.1: Ability of facilities to support a diversity of outdoor environmental education programs	Indicator 5.1: Number of participants supported in environmental education programs in facility zone	**Objective 5.3: Ensure that people of all abilities and backgrounds can participate in nature-based experience and outdoor recreation at LHCPP:**	Indicator 5.3: Ability to attract new audiences of participants in environmental education programs	**Objective 5.4: Foster emotional connection to place in support of long-term stewardship/protection of the park.**	**Objective 6.1.2: Develop infrastructure within facility zones that facilitate low-impact recreation to connect diverse groups of people to nature for environmental learning, health and wellness:**	Indicator 6.1.2: Ability of facilities to support nature-based recreation (use of nature trails, bird watching, nature appreciation).	Indicator 6.1.2: Number of people supported for nature-based recreation in the facility zone.	Indicator 6.1.2: Ability of facilities to support year-round recreation	Indicator 6.1.2: Diversity of visitors supported for recreational use (demographics, cultural diversity, socioeconomic status, etc.)	**Objective 6.3: Foster nature-based, unstructured play for children, parents, and community groups in a safe but natural setting.**	**Objective 6.4: Facilitate opportunities for community groups and families to gather in a natural setting for celebration, recreation and other wellness-promoting activities.**	**C&P (.5)**	**CE (.15)**	**VE (.2)**	**OR &HL (.15)**	
Option 1: Campground																										
~80 site campground built to parks guidelines																										
Small playground																										
Nature based walking trails: a series of loops of varying length	**-2**	-2	**-2**	-2	**-2**	**2**	1	1	**2**	1	1	**1**	1	**1**	**4**	1	1	1	1	**0**	**1**	**-3**	**0.3**	**0.8**	**0.75**	**-1.15**
Option 2: Nature Trails and Day Use																										
Nature based walking trails: a series of loops of varying length																										
Up to 6 picnic shelters of various sizes to accommodate families or groups on first-come-first-serve or reservable basis; naturalized landscaping to create wildlife habitat																										
Nature-based playround																										
Parking lot/Staging area																										
Paved commuter trail to connect nature loops to adjacent trail systems	**-1**	-1	**-1**	-1	**1**	**4**	2	2	**4**	2	2	**2**	2	**2**	**8**	2	2	2	2	**2**	**2**	**-0.5**	**0.6**	**1.6**	**1.8**	**3.5**
Option 3: Nature Trails and Restoration of Disturbed Land																										
Nature based walking trails: a series of loops of varying length																										
Restoration of upland disturbed area through native vegetation planting	**1**	1	**1**	1	**2**	**0**	0	0	**0**	0	0	**0**	0	**0**	**3**	1	1	1	0	**0**	**0**	**2**	**0**	**0**	**0.45**	**2.45**

Appendix G: Management Objectives, Strategies and Indicators

Table 1: LHCPP Management Plan Objectives, Strategies and Examples of Measurement Indicators.

This table provides some examples of the types of measurement indicators that will be used to assess progress in delivering on management objectives at LHCPP. Additional measurement indicators will be developed as the management plan is implemented.

OBJECTIVES	**INDICATOR EXAMPLES** **This column provides examples of how progress in achieving management objectives/strategies will be measured.**
3.2 ENVIRONMENTAL MONITORING	
Support ongoing and collaborative environmental monitoring	• Environmental Monitoring working group established • Environmental Monitoring Plan developed
3.3 ECOSYSTEM FUNCTION AND BIODIVERSITY	
Maintain and restore ecological function and biodiversity Restrict access to ecologically sensitive areas Protect terrestrial and aquatic ecosystems from human disturbance	• % native vegetation cover replanted on disturbed land • Riparian health inventories completed • Riparian health inventory score • % compliance with closures (observations of visitor access to closed areas) • % regrowth of previously disturbed land • Number of nests abandoned • Number and diversity of water birds present at Big Lake • Number and nature of face-to-face interactions between park visitors and Community Volunteer Stewardship Program Volunteers • Number of education materials and programs developed • Assessment of visitor attitudes, skills and behaviours pre-/post- program participation
3.3.1 FLORA	
Manage native plant communities (terrestrial and aquatic) to conserve their extent, health, and biodiversity	• Riparian health monitoring plans developed • Riparian health assessment completed • Riparian health assessment score • Native plant monitoring plan developed • Native plant diversity and density

3.3.2 FAUNA	
Maintain status of Big Lake as an Important Bird and Biodiversity Area (IBA) according to Canadian IBA Criteria Mitigate the impacts of water-based recreation on birds) Prevent the negative impacts of light and noise pollution on wildlife	• Number and diversity of water birds present at Big Lake • Number of volunteers/organizations involved in stewardship • Motorized boat restriction in place • Number of motorized watercraft observed on Big Lake • Number and type of water-based recreationalists • Duration and timing of water-based recreation • Number of education materials and programs developed • Observations of water-based recreationalist behaviour pre- and post- education • Amount of noise and light pollution detectable per day/per year • Number of outdoor house lights left on overnight pre- and post- education • Number of street lights retrofitted
3.3.3 HUMAN WILDLIFE CONFLICT	
Prevent human wildlife conflict	• Beaver management plan developed • Number of negative human wildlife encounters • Number of pond levelers installed
3.3.4 SPECIES OF CONSERVATION CONCERN	
Identify and protect rare and globally significant ecosystems, rare and globally significant plant species and areas of special ecological concern Protect current and future Species at Risk identified through Federal SARA and Alberta Wildlife Act	• Number of rare or globally significant ecosystems and species occurrences
3.4 ECOLOGICAL CONNECTIVITY	
Identify and maintain ecological connectivity corridors	• Area (sq. km) of connectivity corridors protected across the region
3.5 INVASIVE SPECIES	
Manage and monitor invasive species according to Government of Alberta policies, legislation and best practices	• Number of invasive species occurrences • Number of invasive species eradicated • Integrated weed management plan developed • Number and types of control measures applied • Number of education materials and programs developed • Number and nature of face-to-face interactions between adjacent land owners and Community Volunteer Stewardship Program Volunteers

3.6 WATER RESOURCES	
Monitor and enhance water quality and quantity in Big Lake Address ongoing drainage issues on adjacent lands to LHCPP, particularly in the western portion of Big Lake Protect and enhance the integrity of riparian areas and wetlands within and in proximity to LHCPP	• Water quality parameters: chlorophyll-a levels, phosphorus levels, pH levels, turbidity levels, algal biomass • Lake levels • Water quality monitoring plan developed • Number of stakeholders and partners involved • Water quality parameters: chlorophyll-a levels, phosphorus levels, pH levels, turbidity levels, algal biomass • Number and types of best management practices adopted by adjacent land owners/land managers • Hydrological assessment completed • Ecological assessment completed • Number of drainage issues/complaints reported by adjacent land owners • Priority areas identified for riparian health inventories • Riparian health inventories conducted • Riparian health inventory scores • Number and types of best management practices adopted by adjacent land owners/land managers
3.7 CLIMATE CHANGE	
Adapt to, mitigate, and prevent the negative impacts of climate change	• Number and types of sustainable practices implemented • Number and types of energy efficiency and green building designs incorporated • Number of visitors accessing the park and forms of transportation utilized
3.8 CULTURAL HERITAGE AND HISTORIC RESOURCES	
Protect historic resources for the purposes of scientific study and visitor appreciation Ensure that development within the Park complies with all Historical Resources Act requirements.	• Strategies developed for the protection of historic resources • Approval received from HRM branch
3.9 ADJACENT LAND USE AND DEVELOPMENT	
Encourage and build capacity for conservation efforts and initiatives on adjacent public and private lands that enhance the integrity of ecological and water resources	• Number and types of best management practices adopted by adjacent land owners/land managers • Area (sq. km) of buffer lands created between park and adjacent land development • % native vegetation cover on municipal reserve lands • Number of meetings or workshops held with key stakeholders • Number of organizations and stakeholders engaged

4.4 PARTNERSHIPS AND COLLABORATION	
Identify and create opportunities for enhanced community engagement in the park through collaboration between AB parks and community-based organizations Engage in local communities Maintain open and productive dialogue with local communities regarding the ongoing management of LHCPP	• Number of organizations represented on Environmental Monitoring Working Group and Education and Outreach Working Group • Community Volunteer Stewardship program developed • Number of volunteers involved • Number of stewardship activities or events conducted • Number and types of community organizations engaged • Number of community events attended • Number of people engaged
5.0 INDIGENOUS PEOPLES	
Identify opportunities to recognize and share Indigenous culture and history Protect Indigenous ceremonial and cultural sites. Explore opportunities for Indigenous participation in LHCPP operational activities, programming and future management planning.	• Number of meetings or workshops held with Indigenous communities
6.1 ENVIRONMENTAL LITERACY PROGRAMMING, PLANNING AND DESIGN	
Build environmental literacy among diverse target audiences and foster appreciation and caring for nature through intentional, collaboratively developed nature-based educational and interpretive programming.	• Education and Outreach Strategy developed • Number of education materials and programs developed • Business case for Environmental Learning Centre submitted • Day-use area developed • Number of environmental education programs run per year • Number of community organizations and educators delivering education programs • Number of program participants • Assessment of participant knowledge, attitudes, skills pre- and post- program participation • Number of schools and students engaged • Number of education programs or materials developed related to Indigenous knowledge or heritage

6.2 PUBLIC SAFETY, INFORMATION AND REGULATORY COMPLIANCE	
Provide accurate, relevant, consistent, timely and current information for park visitors. Enhance Alberta Parks and volunteer steward presence at LHCPP for face-to-face education opportunities	• Maps developed • Assessment of visitor attitudes and knowledge related to visitor experience • Number of information kiosks developed • Number of education programs or materials developed • Number of information requests received • Number of park visitors • Number of volunteers engaged in community stewardship/education initiatives • Number and nature of face-to-face interactions between park visitors and Community Volunteer Stewardship Program Volunteers • Number of enforcement actions taken • Assessment of visitor attitudes, skills, knowledge and behaviours related to park regulations and desired literacy outcomes
6.3 ACCESSIBILITY AND INCLUSION	
Ensure that people of all abilities and backgrounds can participate in nature-based experiences and outdoor recreation at LHCPP	• Accessibility upgrades completed • Number of new organizations engaged to target under-represented audiences
6.4 FOSTERING CONNECTION TO PLACE	
Foster emotional connection to place in support of long-term stewardship of LHCPP. Ensure compliance with Alberta Parks special events permit system. Enable special events at LHCPP that support the park vision and objectives while protecting sensitive ecological values from human-caused disturbance. Support the use of LHCPP as a resource for people who are dying or grieving.	• Number of programs and infrastructure developed • Assessment of visitor attitudes and experiences • Number and types of special events permits issued • Number of participants and organizations engaged in special events • Special event permit screening criteria updated • Number of people engaged in memorial & dedication program
6.5 MARKETING AND PROMOTION	
Promote the Alberta Parks brand within LHCPP and promote LHCPP to new visitors	• Marketing strategies developed • Number of visitors • Types of visitor uses of the park

7.1 LOW-IMPACT NATURE-BASED RECREATION ON LAND	
Develop a network of nature trails Develop infrastructure within facility zones that facilitate low-impact recreation to connect diverse groups of people to nature for environmental learning, health and wellness	• Kilometres of trail developed • Number of visitors using trails and facilities per season • Number of connections between LHCPP trails and other regional trail systems • Assessment of visitor attitudes related to nature play • Number of picnic shelter bookings • Number and types of community groups using day use area
7.2 WATER-BASED RECREATION	
In suitable areas, provide opportunities for non-motorized water-based recreation that connect people to nature	• Number of education programs or materials developed • Assessment of water-based recreationalist attitudes, knowledge, skills and behaviours • Number of nests abandoned • Number and diversity of water birds present at Big Lake
7.3 NATURE PLAY	
Foster nature-based, unstructured play for children, parents, and community groups in a safe but natural setting	• Number of visitors to nature playground • Assessment of visitors attitudes, knowledge, skills and behaviours
7.4 COMMUNITY WELLNESS	
Facilitate opportunities for community groups and families to gather in a natural setting for celebration, recreation and other wellness-promoting activities Promote the use of active and environmentally sustainable modes of transportation to the park	• Number of community groups and families using facilities • Number of park visitors using sustainable modes of transportation • Number of wellness-promoting events or activities in the park
8.0 RESEARCH, MONITORING AND ADAPTIVE MANAGEMENT	
Encourage and conduct research in and about LHCPP	• Number of research and collection permits granted • Number of organizations involved in monitoring/ research • Number and types of research questions being addressed in the park

Appendix H: Protected Areas Management Effectiveness Preliminary Assessment Summary Tables

Table 1: LHCPP Conservation Values and Social Vales based on PAME Assessment

CONSERVATION VALUES	Addressed in Management Plan Section:
Ecosystem Representation • Captures one upland theme, and 3 freshwater theme natural landscape types	3.0
Special or Unique Habitats • Significant essential habitat: internationally significant Important Bird Area • Essential bird habitat for a wide diversity of water birds • One ecologically rare and ecologically diverse plant community	3.2, 3.3
Special Features • One regionally significant landform: Sturgeon River birdsfoot delta	3.0
Species of Concern • Several species listed as sensitive or conservation concern are found here • All species of conservation concern occur in other areas of the North Saskatchewan region	3.3
Ecological Function • One regionally significant wildlife corridor • Knowledge gap: Natural ecological functions and disturbance regimes including flood cycle is unknown	3.2, 3.4
Hydrologic Function • Compared to the surrounding land base, there is a relatively low level of watershed disturbance within LHCPP • Very small proportions of the Atim and Sturgeon watersheds are within LHCPP • Knowledge gap: Lotic connectivity	3.6
Park Design • The area within the park is largely undisturbed • The park protects a relatively large land base for the parkland region • Buffers between the park and highly disturbed adjacent land are very small	3.9

SOCIAL VALUES	Addressed in Management Plan Section:
Recreation • Site is attractive to a broad range of users • Recreation Diversity: 9 activity categories have been identified for the site (Alberta Parks Recreation Framework identifies 48) • Knowledge gap: complete informal trail inventory, recreation use statistics	7.0

Significance for Scientific Research • Site has potential as a research node but lacks active research program	3.2, 8.0
Fostering Understanding and Appreciation • Access to nature in an accessible and safe setting. • Link to future Environmental Learning Centre • Opportunities for community engagement in environmental education and stewardship activities	4.0, 6.0
Community Engagement • Opportunities to facilitate gatherings for celebration/community-building • Opportunities for monitoring, collaboration and sharing of best practices among land managers for stewardship of Big Lake	3.2, 3.9, 4.0
Health and Well Being • Opportunities to support community and individual health and wellness	7.0
Traditional/Cultural Use • Historic Indigenous use of the area to be explored • Early settlement / historic use of the area	3.8, 5.0
Stewardship • Variety of community-based organizations actively involved in stewardship activities • Opportunities citizen-science/ecological monitoring	3.2, 4.0, 6.0

Table 2: LHCPP Internal and External Threats based on PAME Assessment

The threats assessment looked at the range of currently occurring activities or issues that are perceived to be compromising conservation or social values at LHCPP. Potentially occurring or anticipated future threats are not included.

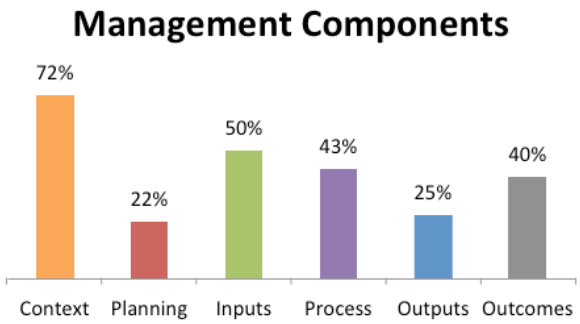
THREAT CATEGORIES	Internal (Within park boundary)	External (Outside park boundary)	Addressed in Management Plan Section:
Residential & Commercial Development • Housing and urban areas • Commercial and industrial areas • Tourism & recreation areas	Negligible	High	3.3.2, 3.4, 3.9, 6.1
Agriculture • Annual & perennial non-timber crops • Livestock farming & ranching	Negligible	Medium	3.3.2, 3.4, 3.9, 6.1
Energy Production & Mining • Oil and gas drilling	Low	Negligible	3.3.1, 3.2, 3.6.3

Transportation & Service Corridors • Roads • Utility and service lines	Low	High	3.3.2, 3.9, 6.1
Biological Resource Use • Unknown	Negligible	Negligible	
Human Intrusions & Disturbance • Recreational activities: motorized terrestrial vehicles • Non-motorized aquatic vehicles	Very high	Negligible	3.2, 3.3.2, 3.3, 3.4, 3.3.3
Natural System Modifications • Water management / use • Unknown: fire and fire suppression	Low	High	3.2, 3.6
Invasive Species • Terrestrial invasive / non-native species • Unknown: aquatic invasive/non-native species	Low	Medium	3.5
Pollution • Garbage and solid waste • Air-borne pollutants • Excess energy (lights) • Unknown: household sewage, urban waste water and industrial effluents	Medium	High	3.2, 3.3.2, 3.4, 3.9, 5.1
Climate Change and Severe Weather • Unknown: habitat shifting and alteration, droughts, temperature extremes, storms and flooding			3.7
Calculated Overall Threat Impact	Very High	Very High	

Table 3. LHCPP Management Effectiveness Evaluation Report Card

Site Name:	Lois Hole Centennial Provincial Park
Evaluators:	LHCPP management planning team, AEP staff
Date:	February 22-23, 2017
Evaluation Tool:	Canadian modification of the Management Effectiveness Tracking Tool
Overall Grade:	**C**: 40% - Basic with Significant Deficiencies

Scoring Level Standard	
A	Sound (67%-100%)
B	Basic (51%-66%)
C	Basic with Significant Deficiencies (34%-50%)
D	Clearly INadequate (0-33%)



Context: Where are we now?	**Explanation of Component**
Summary: Comprehensive conservation and recreation values and threats assessments were completed as part of the evaluation which were used to inform the management plan (see table 1).	Context evaluates the importance of protected areas according to its values and the threats to those values, as well as the political environment.
Grade: **A**: 72% - Sound Management	

Planning: Where do we want to be and how will we get there?	**Explanation of Component**
The evaluation took place in the early stages of the management planning process and questions related to planning could not be answered adequately but helped to inform the plan. Issues were identified related to: the ability to apply regulations to protect the conservation values; the design of the park and lack of terrestrial land base as an impediment to effectively managing biodiversity of the park; and broader landscape/watershed planning.	This component evaluates the design features of a protected area or system including the physical, legal and institutional factors which determine whether its management will be relatively straightforward or complicated. *Assesses regulations, policies, objectives, design, management plan and broader land and water planning objectives*.
Grade: **D**: 22% - Clearly Inadequate	

Inputs: What do we need?	Explanation of Component
LHCPP workshop participants assessed staff as well-trained and the budget as reasonably secure but concerns were identified related to staff capacity and the availability of information needed to make decisions related to management such as information about park visitors and data related to conservation values.	Assessments of protected area effectiveness repeatedly suggest that the level of resources available for management often has a major impact on effectiveness. This component attempts to evaluate inputs by developing a clear and unbiased picture of the inputs available and to identify gaps and shortfalls. *Assesses law enforcement, resources, staff numbers and training, budget, management equipment and facilities and fees.*
Grade: **C**: 50% - Basic with Significant Deficiencies	

Processes: How do we go about it?	Explanation of Component
LHCPP workshop participants scored the park as "sound" on questions related to equipment availability and maintenance and budget management. Gaps that were identified are addressed within the management plan. These include research and monitoring, resource management, information and awareness building and engagement with neighbouring land owners and managers, stakeholders and indigenous communities.	Managers deal with a range of issues and sound management practices are needed to ensure protected areas are managed effectively. This component evaluates the processes that are in place to guide management. *Assesses the protection system, research and monitoring, resource management, education, stakeholder and indigenous community engagement and conflict resolution.*
Grade: **C**: 43% - Basic with Significant Deficiencies.	

Outputs: What were the results?	Explanation of Component
LHCPP workshop participants identified an issue with visitor facilities related to the lack of a formalized trail system. Currently there is no regular work planning that is done beyond patrol scheduling. More work needs to be done to measure and document outputs.	This component evaluates whether protected area managers achieved what they set out to do. *Assesses work planning and visitor facilities*.
Grade: **D**: 25% - Clearly Inadequate.	

Outcomes: What did we achieve?	Explanation of Component
LHCPP workshop participants identified the park as providing some flow of community well-being and economic benefit to local communities as proximity to the park provides amenity space and value to adjacent residential properties and municipalities. Since the park was established as a natural area in 1999, recreational values have remained intact while the conservation values are becoming more degraded due to urban encroachment.	This component evaluates whether management is maintaining the core values for which the protected area was established. *Assesses benefit to local community, condition of identified values and management actions to achieve identified values.*
Grade: **C**: 40% - Basic with Significant Deficiencies.	

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