



# LAND USE BYLAW WATERSHED REGULATIONS

A Discussion Guide for Pigeon Lake Municipalities

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Prepared For: Pigeon Lake Watershed Management Plan (PLWMP) Steering Committee  
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# ACKNOWLEDGEMENTS

## PLWMP Steering Committee

The Pigeon Lake Watershed Management Plan (PLWMP) Steering Committee is composed of the following members:

Name	Organization
Glenn Belozer	Councillor, Leduc County
Wiebe Buruma	Alberta Agriculture & Forestry
Richard Conrad	Pigeon Lake Regional Chamber of Commerce
Melanie Daniels	Consultation Coordinator, Louis Bull Tribe
Don Davidson	Mayor, Summer Village of Grandview
Robert (Bob) Gibbs	Vice President, Pigeon Lake Watershed Association Chair, Pigeon Lake Watershed Management Plan Steering Committee
Tom Karpa	Chair, Pigeon Lake Regional Chamber of Commerce
Randal Kay	Mayor, Summer Village of Golden Days Chair, Alliance of Pigeon Lake Municipalities
Daniel Kenway	Director, Pigeon Lake Watershed Association
Ron LaJeunesse	Deputy Mayor, Summer Village of Chrystal Springs
Arin MacFarlane Dyer	Integrated Resource Planner, Alberta Environment and Parks
Brian Meaney	Councillor, Summer Village of Poplar Bay
Nicholaus Moffat	Parks Planner, Leduc County
Catherine Peirce	Executive Director, Pigeon Lake Watershed Association
Sarah Skinner	Battle River Watershed Alliance, Watershed Planning Coordinator
Leonard Standing on the Road	Chief, Montana Band
Dale Woitt	Councillor, County of Wetaskiwin No. 10

## Municipalities

The Land Use Bylaws of the following municipalities were reviewed for the purposes of this project:

Summer Villages	Rural Municipalities
Argentia Beach Golden Days Itaska Beach Norris Beach Silver Beach	Crystal Springs Grandview Ma-Me-O Beach Poplar Bay Sundance Beach
	County of Wetaskiwin No. 10 Leduc County

## Pigeon Lake Watershed Association (PLWA)

Name	Title
Bob Gibbs	Vice President
Catherine Pierce	Executive Director

## Consulting Services

Name	Title
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# ABOUT PIGEON LAKE

## Geography and Development History

Pigeon Lake is located in west-central Alberta, approximately 85 kilometres southwest of the City of Edmonton. Pigeon Lake is a relatively shallow prairie lake; it has a total surface area of 96.7 km<sup>2</sup> and a maximum depth of 9.1 metres.

Pigeon Lake's watershed covers an area of approximately 187 km<sup>2</sup>. There is one outlet from the lake, Pigeon Lake Creek, which flows from the southeast end of Pigeon Lake to the Battle River. The Battle River watershed is within the larger North Saskatchewan River watershed.

The watershed and lake are part of Treaty 6 territory, the traditional lands of First Nations peoples, stretching from Alberta's eastern slopes to the Manitoba border. The Maskwacis Cree (Samson Cree Nation, Ermineskin Cree Nation, Louis Bull Tribe and Montana First Nation) were provided home reserves near Maskwacis, Alberta and a satellite reserve on the shores of Pigeon Lake (IR 138A) for traditional access to Pigeon Lake and fishing.

Lands within the Pigeon Lake watershed are administered by two rural municipalities (Leduc County and the County of Wetaskiwin), ten Summer Villages, the Maskwacis Cree (IR 138A), and the Government of Alberta (Pigeon Lake Provincial Park). Development on private lands within the Pigeon

Snapshot of the Lake	
Lake Surface Area	96.7 km <sup>2</sup>
Lake Water Volume	603,000,000 m <sup>3</sup>
Maximum Depth	9.1 m
Mean Depth	6.2 m
Shoreline Length	46 km
Mean Annual Lake Evaporation	664 mm
Mean Annual Precipitation	534 mm
Mean Annual Inflow	17,000,000 m <sup>3</sup>
Mean Residence Time	100+ Years
Lake Weir Sill Elevation	849.9 m (Above Sea Level)
Watershed Drainage Area	187 km <sup>2</sup>
Watershed to Lake Ratio	2:1

Lake Watershed is regulated by the land use bylaws and statutory plans of the twelve respective municipalities. Statutory plans include Intermunicipal Development Plans (IDPs), Municipal Development Plans (MDPs), and Area Structure Plans (ASPs). Land use planning and development is a complex process in the Pigeon Lake Watershed because of the different and area specific plans, bylaws, provincial regulations, and federal regulations.

Pigeon Lake is a highly popular recreation area in Alberta, and surrounding lands within the lake's watershed are developed for a wide range of agricultural, residential, recreational, institutional, commercial, and industrial purposes. Recreational and residential development activities near the lake have been occurring for over one hundred years.



(Photo provided by Don Davidson)

The Pigeon Lake Watershed Association (PLWA), the Pigeon Lake Watershed Management Plan (PLWMP) Steering Committee and the Alliance of Pigeon Lake Municipalities (APLM) were formed to develop, implement and monitor voluntary, technical and regulatory actions to support the long-term health, protection and restoration of the lake, shorelands and watershed.

Recognizing the need to plan and work collaboratively with community, municipal, traditional, and provincial partners, these organizations began providing watershed education and commissioning new scientific studies to gather more science based information about the complex state of the lake, the shoreline area, and the surrounding lands.

## Pigeon Lake Watershed Management Plan

In 2018, the Pigeon Lake Watershed Management Plan (PLWMP), which was a joint initiative of the PLWA and the APLM, was approved and endorsed by the watershed community. The PLWMP provides a comprehensive, science-based strategy to coordinate action for the protection and improvement of Pigeon Lake, its shore lands, and its watershed. The PLWMP's goals are to:

- Reduce the frequency and intensity of algal blooms.
- Improve the health of the watershed and the lake.
- Improve the recreational value of the lake and economic health of the region.

The PLWMP recognizes that a variety of perspectives and interests exist among the various municipalities and stakeholders of the Pigeon Lake watershed. The PLWMP focusses on topics and actions that are rooted in science, provide benefit, and represent common ground.

The PLWMP was adopted by the Councils of the local municipalities through resolution. The municipalities committed to:

- Work collaboratively with other Pigeon Lake watershed municipalities, the Pigeon Lake Watershed Association and the Pigeon Lake Watershed Steering Committee to implement the PLWMP; and

- Reference and consider the recommendations of the PLWMP in the development of new or updated Statutory Plans required under the *Municipal Government Act (MGA)* and in the ordinary business of the municipality.

## Other Studies and Reports

The PLWMP was informed by a considerable number of studies, prior initiatives, and projects undertaken by the Pigeon Lake Watershed Association, the Alliance of Pigeon Lake Municipalities, non-governmental organizations, the Government of Alberta, the Government of Canada, the PLWMP Steering Committee, the University of Alberta, and the Alberta Biomonitoring Institute. A list of these studies, initiatives and reports can be found in the 2018 Pigeon Lake Watershed Management Plan.

# PROJECT OVERVIEW

## Purpose & Objectives

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The purpose of this project is to provide straightforward recommendations and tools for the municipalities in the Pigeon Lake Watershed to assist with the implementation of recommendations from the 2018 PLWMP and environmental land management best practices into development regulations in their planning documents. The objectives of the project are to:

- Identify opportunity areas for land use bylaw (LUB) amendments to assist Administrations and Councils in their efforts to implement the recommendations from the 2018 PLWMP;
- Recognize and share information about local successes and the land use regulations that are already effectively established within the Pigeon Lake Watershed; and
- Establish a more consistent approach to land management and development in the Pigeon Lake Watershed.

Adopting a more consistent approach to land management and land development regulations within the watershed represents a significant commitment to supporting the long-term health, protection, and restoration of the watershed.

Land use and development are independently regulated by the twelve Pigeon Lake municipalities through their land use bylaws and statutory plans.

The project will be rolled out in three phases:

### Part 1: Discussion Guide - Complete

This **Discussion Guide** is a high level report for the Pigeon Lake Watershed that identifies priorities and opportunities to implement recommendations from the PLWMP, Model Land Use Bylaw, Clean Runoff Action Guide and provides a focused review of the current regulations in the Pigeon Lake municipalities' Land Use Bylaws related to watershed recommendations and environmental land management best practices.

### Part 2: Engagement – To be rescheduled due to COVID-19

A critical component to the collaborative development of the **Implementation Guides** is engagement with Municipal Leaders & Administrators. MPS and the PLWMP Steering Committee will conduct a workshop to present the findings of the **Discussion Guide** and work with Councils and Administrations to review and refine regulations to ensure that the proposed recommendations address the diverse needs of the municipalities.

### Part 3: Implementation Guides – MPS to prepare and present to Councils following Engagement

The **Implementation Guides** are individualized reports for each municipality that identify areas where regulations are already successfully implemented and areas where new regulations could be considered. The **Implementation Guides** will be added to Appendix D.

## Limitations & Applicability

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This Guide is intended for use by municipalities governed under the *Municipal Government Act (MGA)*. The PLWMP Steering Committee recognizes that the applicability of this Guide may be limited in other jurisdictions.

This Guide does not apply to Pigeon Lake and the bed and shore, which is under the jurisdiction of the Government of Alberta and the Department of Fisheries and Oceans; however, the recommendations are designed to help protect these areas.

## Current Regulatory Environment & Successes

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Land use and development in the Pigeon Lake Watershed is regulated through the approved statutory plans and land use bylaws of the twelve Pigeon Lake municipalities. Land use and development within the watershed is also managed by the Government of Alberta, the Government of Canada and the

Maskwacis Cree (Indian Reserve 138A). There are four First Nations with an interest in IR 138A.

The twelve municipalities in the Pigeon Lake Watershed have made significant advancements in recent years in developing a coordinated approach to land use management in the area. For instance, nine of the Summer Villages are in the process of developing and adopting new MDPs that are generally consistent in their approach to future land management and development. The MDPs contain policies that have been adapted from recommendations in the PLWMP, the Pigeon Lake Model Land Use Bylaw, and the *Alberta Clean Runoff Action Guide*. Additionally, by 2021 all municipalities in the Pigeon Lake Watershed will have adopted Intermunicipal Collaboration Frameworks (ICFs) and IDPs with their neighbouring municipalities. The ICFs and IDPs will require the municipalities to work collaboratively and cooperatively to plan for future land use activities and develop/maintain intermunicipal services.

### Significance of Municipal Regulations and Bylaws

The primary planning and development tool for a municipality is the Land Use Bylaw. A Land Use Bylaw is a regulatory document that implements the policy direction set forth in a statutory plan (IDP, MDP, ASP). It regulates and controls the use and development of lands and buildings in a municipality. It identifies where specific land uses are allowed to be developed, and establishes specific building height, setback distance, area, and density requirements.

Land Use Bylaws are specific to each municipality, and are not shared between municipalities. Two adjacent municipalities may develop different regulatory approaches to the same land use issue (e.g. setback distances, the types of uses that may be permitted in an area, etc.). This has historically been the approach within the watershed. As a result, the development footprint within each of the twelve municipalities is unique and reflects the historic regulatory approaches to land development. However, individual municipalities may choose to incorporate regulations into their Land Use Bylaws that are similar to the regulations adopted by a neighbouring municipality, in order to develop a regionally consistent approach to land development.

Additionally, municipalities may choose to adopt supplementary bylaws to further address, regulate, and provide processes for specific land use issues. Two common examples of this include Fertilizer and Wastewater Bylaws.

### Methodology

The following steps were taken to complete the project objectives:

<b>STEP 1</b>	Identify land use bylaw regulations in the Pigeon Lake Watershed with respect to land cover and biodiversity, phosphorus management, clean runoff practices, groundwater quality, and shoreline/riparian areas.
<b>STEP 2</b>	Identify the municipal authority for regulating the issues identified in <b>Step 1</b> through Land Use Bylaws.
<b>STEP 3</b>	Identify how municipalities in the Pigeon Lake Watershed regulate the issues identified in <b>Step 1</b> through their respective Land Use Bylaws.
<b>STEP 4</b>	Identify opportunities for municipalities in the Pigeon Lake Watershed to implement recommendations from the PLWMP through their respective Land Use Bylaws.



# IMPLEMENTATION 1: LAND COVER AND BIODIVERSITY

## Existing Conditions

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Over 60% of the watershed has already been cultivated or converted for human uses, including urban development, pasture/perennial crops, and annual crops. Land cover is directly related to the sources and quantity of phosphorus that is entering the lake.

There are land management best practices and regulatory tools that can be implemented through LUBs that will increase land cover types (e.g. forest, wetlands) that have lower nutrient release rates, trap nutrients, and that promote biodiversity.

Implementing a coordinated approach to land use and land management within the watershed will support the land cover and biodiversity objectives identified in the PLWMP.

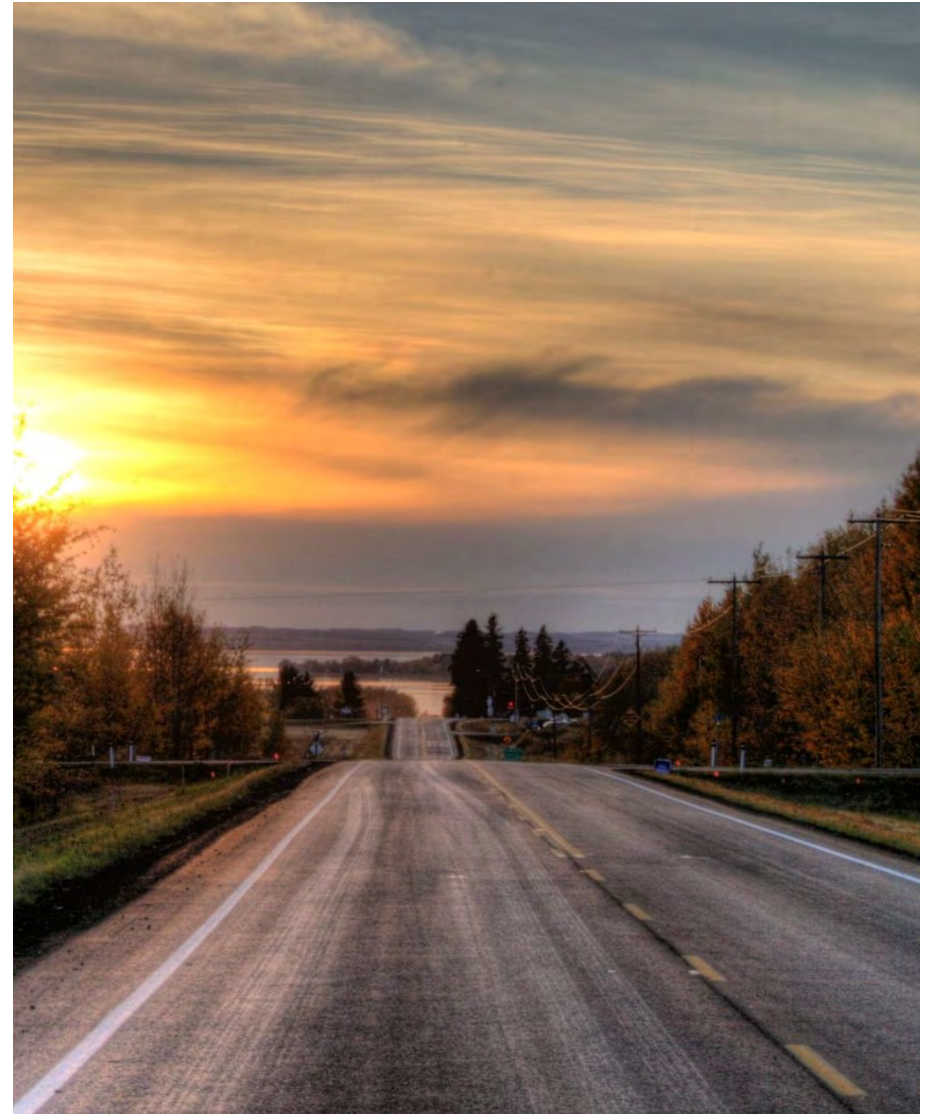
## Municipal Authority

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Through Part 17 of the MGA, the province of Alberta has delegated the authority to approve subdivision and development applications to municipalities based on the regulatory frameworks adopted through municipal land use bylaws (LUBs). An LUB must prescribe the “uses of land or buildings that are permitted... with or without conditions.” An LUB may also provide for subdivision design standards, the amount of land to be provided around or between buildings, landscaping, the excavation or filling in of land, the development of buildings (including appearance, height, and size), population density, development on lands subject to flooding or subsidence, and development on lands adjacent to waterbodies.

Each of the twelve municipalities has taken a different approach to the implementation of regulations that affect land cover and biodiversity. The following chart includes a summary of land use regulations that can be incorporated into a LUB to improve Land Cover and Biodiversity within the

watershed and an analysis of how these regulations are currently being implemented through the LUBs of the twelve Pigeon Lake municipalities.



# Current Land Use Bylaw Regulations

PLWMP Objectives		Leduc County	Co. of Wetaskiwin	Argenti a Beach	Crystal Springs	Golden Days	Grandview	Itaska Beach	Ma-Me-O Beach	Norris Beach	Poplar Bay	Silver Beach	Sundance Beach	
<b>1b.</b> Retain natural vegetation	Do the LUBs include a requirement for a development permit for clearing vegetation?	YES	YES, if it affects drainage	YES	DPs include landscaping and surface draining plans	YES	YES	YES	YES	YES	YES	YES	YES	
	Do the LUBs include a minimum requirement for % of vegetative cover (or landscaping) on a lot?	YES, - in Rural Residential District	YES - in LM, LR, RCV, WP Districts			YES	NO, but may be addressed in a DP					YES (Min. 50%. 20% trees and shrubs)		
	Do the LUBs regulate a minimum % of native vegetation in landscaping requirements?	Not as a percentage	YES - in LM, LR, RCV, WP Districts			NO, but addresses native vegetation	NO, but addresses native vegetation							
	Do the LUBs include requirements to include LID tools in SWMPs?	No, County Standards only						YES, but no details provided						
	Do the LUBs discourage or restrict the removal of healthy tree stands or shelterbelts?	YES	YES					YES, requires a DP						Removal of Trees is Discretionary Use in RE District
<b>1c.</b> Delineate and classify wetlands and peatlands. Apply setbacks to delineated areas	Do the LUBs include, as an application requirement (during ASP development, subdivision or development permit applications) the delineation of wetlands or peatlands?													
	Do the LUBs include required development setbacks from wetlands?													

Blank cell: The LUB does not include specific regulations on this topic.

1\*: The LUB does not include specific regulations but this **topic is addressed** in statutory plans, non-statutory plans, policies or other bylaws. (Note: the MDPs for the summer villages (except Golden Days) are currently in development)

2\*: The LUB does not include specific regulations but this **topic may be addressed** in statutory plans, non-statutory plans, policies or other bylaws.

LM: Lakeshore Mixed Use

LR: Lakeshore Residential

RCV: Rural Conservation

WP: Watershed Protection

## Opportunities

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Based on the analysis in the previous section, the following opportunities have been identified for amendments to LUBs to improve land cover and biodiversity in the Pigeon Lake Watershed.

### PLWMP RECOMMENDATION 1B: Retain Natural Vegetation

#### LUB Opportunities:

1. Require a development permit for the clearing of vegetation (does not include removal of dead trees, cutting grass, removal of weeds) and/or to re-contour residential lots within 800 m of the lake. This does not apply to agricultural parcels.
2. Include a minimum required vegetative lot cover percentage in the LUBs.
3. Identify requirements for landscaping, including a minimum percentage of native vegetation.
4. Encourage the use of low impact development (LID) tools, including native vegetation.
5. Discourage the removal of healthy, mature tree stands and shelter belts within the watershed.

# IMPLEMENTATION 2: PHOSPHORUS MANAGEMENT

## Existing Conditions

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Each year, phosphorus levels in Pigeon Lake vary from quite low during winter ice cover to higher levels, which in certain years coincide with bloom conditions. The sources of phosphorus that can potentially be managed include runoff, sewage, and release from lake-bottom sediments.

Trend lines in phosphorus and algae levels show considerable variations, from one year to the next. Since 2002, the pattern of peaks and lows has changed with larger fluctuations and specific years being much higher. The PLWMP recognizes that the reasons for this are not fully understood and require more research.

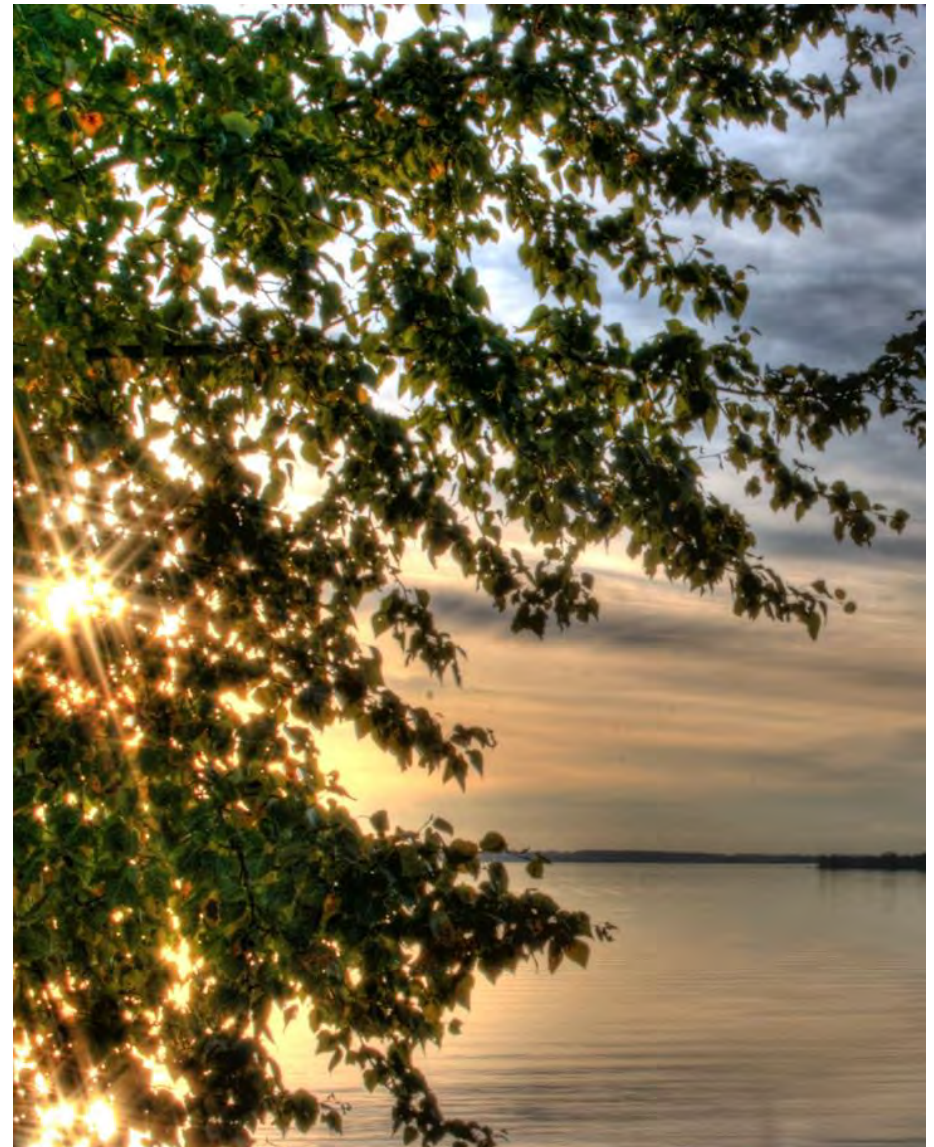
However, controlling the amount of new phosphorus and sediment entering the lake has been identified as an important strategy for managing phosphorus levels. Improving phosphorous management relating to land use activities will help to achieve a net reduction in nutrient runoff and promote biodiversity.

## Municipal Authority

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Municipalities have the authority through their LUBs to establish development regulations that can assist in the management of phosphorus entering the lake. The chart on the following page provides an overview of tools that can be incorporated into an LUB to manage phosphorus levels entering the lake.

Each of the twelve municipalities has taken a different approach to the implementation of regulations that affects phosphorus management. The following chart includes a summary of land use regulations that can be incorporated into a LUB to implement phosphorus management within the watershed and an analysis of how these regulations are currently being implemented through the LUBs of the twelve Pigeon Lake municipalities.



## Current Land Use Bylaw Regulations

PLWMP Objectives		Leduc County	Co. of Wetaskiwin	Argentia Beach	Crystal Springs	Golden Days	Grandview	Itaska Beach	Ma-Me-O Beach	Norris Beach	Poplar Bay	Silver Beach	Sundance Beach	
<b>2a.</b> Include a Lakeside Environmental Overlay area in the IDPs and LUBs to apply to those lands within 800 m of the lake.	Does the LUB require construction management plans (onsite sediment management during construction) for new development?	Not explicitly	Not explicitly	1*	1*	2*	YES	1*	1*	1*	1*	1*	1*	
	Does the LUB restrict the types of development allowed within 800 m of the lake?	1*	1*	N/A – all the summer villages are located within 800m of the lake (except for small portion of Golden Days). Residential, recreational, environmental, and commercial uses are primarily the only uses allowed.										
	Does the LUB require development permits for stripping and grading?	YES	YES, if it affects drainage	YES	YES, if it affects drainage, neighbours, roadways	YES	YES	YES, if it affects drainage, neighbours, roadways	YES	YES	YES	YES	YES	YES
	Does the LUB include additional development regulations within 800m of the lake?	Not explicitly – but districts intended for lake area do	Not explicitly – but districts intended for lake area do	N/A – all the summer villages are located within 800m of the lake (except for small portion of Golden Days).										
	Does the LUB require a minimum percentage of local topsoil? NOTE: requirements for native plants are outlined in 1b in the previous section.					Encourages preservation	Encourages preservation							
	Does the LUB prescribe a minimum site coverage percentage for non-permeable surfaces on lots within 800 m of the lake?	In the front yard for some Districts (not specifically within 800m)					YES (Max. 12%)	YES (Max. 10%)					YES (Max. 15%)	
	Does the LUB prescribe site coverage percentage guidelines for natural vegetative cover, compatible with FireSmart principles?													
	Does the LUB prohibit or regulate the compaction of soils during stripping and grading?													
	Does the LUB prohibit the disturbance of wetlands, streams, and riparian areas?	YES	YES	2*	2*	2*	2*	2*	2*	2*	2*	2*	2*	2*

Blank cell: The LUB does not include specific regulations on this topic.

1\*: The LUB does not include specific regulations but this **topic is addressed** in statutory plans, non-statutory plans, policies or other bylaws. (Note: the MDPs for the summer villages (except Golden Days) are currently in development)

2\*: The LUB does not include specific regulations but this **topic may be addressed** in statutory plans, non-statutory plans, policies or other bylaws.

## Opportunities

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Based on the analysis in the previous section, the following opportunities have been identified for amendments to LUBs to improve phosphorus management in the Pigeon Lake Watershed.

**PLWMP RECOMMENDATION 2A: Include a “Lakeside Environmental Overlay” area in the IDPs and the LUBs to apply to those lands within 800m of the lake.**

**LUB Opportunities:**

6. Prescribe a maximum site coverage percentage for non-permeable surfaces on lots.
7. Require a minimum site coverage percentage for landscaping (vegetation, including native vegetation) that is compatible with FireSmart development principals.
8. Recommend the inclusion of native vegetation in landscaping plans and Land Use Bylaw regulations (See Appendix C for list).
9. Require development permits for the stripping and grading of land.
10. Include provisions to discourage the compaction of soils during stripping and grading activities.
11. Require Construction Management Plans (CMPs) to manage sediment onsite during construction for new developments/ redevelopments that will impact drainage on a site. Require compliance with the CMP as a condition of development permit approval.
12. Where landscaping plans are required as a condition of a development permit approval, encourage the inclusion of a minimum percentage of “local” topsoil and native vegetation.
13. Include a definition for riparian area in the LUBs.
14. Restrict the types of development allowed within riparian areas.
15. Developments within riparian areas setbacks should be designed to minimize surface water run-off and groundwater contamination, and to avoid important groundwater recharge areas;
16. Restrict types of land uses allowed including intensive agriculture, confined feeding operations (CFOs), medium and heavy industrial, and resource extraction (gravel).
17. Include regulations in the LUBs that prohibit the permanent disturbance or destruction of wetlands, streams or significant riparian areas.

# IMPLEMENTATION 3: CLEAN RUNOFF PRACTICES

## Existing Conditions

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Runoff water on properties throughout the Pigeon Lake Watershed carries nutrients into the lake. Suspended sediment in the runoff negatively impacts the health and water quality of the lake by increasing the turbidity of the water and transporting nutrients to the lake. Additionally, when sedimentation occurs, channels and depressions in watercourses and water bodies can become filled in which decreases storage capacity, thereby increasing the risk of flood and drought. It can also negatively impact fish spawning grounds and habitat. .

Historically, municipalities in Alberta did not consider the offsite impacts of runoff in the development of land use policies and regulations. In newer subdivisions, the regulation of the quantity and quality of stormwater runoff is regulated by Alberta Environment and Parks (AEP). However, in older subdivisions (common in the Summer Villages), stormwater management plans and facilities were not required. This has resulted in seasonal flooding in some communities, and ineffective facilities for controlling nutrient and sediment runoff.

Developing and implementing a stormwater management plan at the watershed scale (that includes phosphorus targets) would make the implementation of development regulations much more effective.

Low-Impact Development Practices are supported in the Alberta Clean Runoff Action Guide for individual lot owners and municipalities to reduce the transport of nutrients to Pigeon Lake.

## Municipal Authority

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Municipalities may, through the LUB and master servicing plans, establish minimum requirements for managing runoff and implement regulations to

manage surface water runoff in developed areas that are triggered by redevelopment or subdivision of the site.

Each of the twelve municipalities has taken a different approach to the implementation of clean runoff practices. The following chart includes a summary of land use regulations that can be incorporated into a LUB to improve clean runoff within the watershed and an analysis of how these regulations are currently being implemented through the LUBs of the twelve Pigeon Lake municipalities.



# Current Land Use Bylaw Regulations

PLWMP Objectives		Leduc County	Co. of Wetaskiwin	Argentia Beach	Crystal Springs	Golden Days	Grandview	Itaska Beach	Ma-Me-O Beach	Norris Beach	Poplar Bay	Silver Beach	Sundance Beach
<b>3b.</b> Manage surface water and incorporate stormwater management practices.	Do development permit application requirements include stormwater management plans or stormwater site implementation plans?	YES, if needed in opinion of DA											
	Is onsite surface water management a condition of development permit or subdivision approval?	YES	YES				YES						
	Do development permit applications for stripping/grading/altering drainage include requirements for lot grading/drainage plans?	YES, for commercial & industrial developments, DA MAY require for other types of development	Not explicitly, but DA MAY require landscaping plan with grading	Not explicitly, but grading plan is required for new buildings	Not explicitly, but grading plan is required for new buildings	YES (all DPs require grading and drainage plans)	Not explicitly, but DA MAY require grading and drainage plans if there is a grade change	Not explicitly, but could be requested	YES (all DPs require grading and drainage plans)	YES (all DPs require grading and drainage plans)	YES (all DPs require grading and drainage plans)	YES (all DPs require grading and drainage plans)	YES (all DPs require grading and drainage plans)
	Is a lot grading or drainage plan, a stormwater management plan, or compliance with an existing stormwater management plan a requirement at time of subdivision?	YES, applies everywhere	Not explicitly identified but can be required										
	Does the LUB (or MDP) encourage LID practices in all new developments or subdivisions?	In Urban Growth Areas	2*	1*	1*	1*	YES, but no details provided	1*	1*	1*	1*	1*	1*
<b>3c.</b> Require new development and redevelopment to include construction management plans (construction erosion and sediment control plan)	Opportunities addressing this are provided in the previous recommendation, and in the previous section.	--	--	--	--	--	--	--	--	--	--	--	--

Blank cell: The LUB does not include specific regulations on this topic.

1\*: The LUB does not include specific regulations but this **topic is addressed** in statutory plans, non-statutory plans, policies or other bylaws. (Note: the MDPs for the summer villages (except Golden Days) are currently in development)

2\*: The LUB does not include specific regulations but this **topic may be addressed** in statutory plans, non-statutory plans, policies or other bylaws.



## Opportunities

Based on the analysis in the previous section, the following opportunities have been identified for amendments to LUBs to improve clean runoff in the Pigeon Lake Watershed.

### PLWMP RECOMMENDATION 3B: Manage surface water and incorporate stormwater management practices.

#### LUB Opportunities:

18. Development permit applications should include a requirement for stormwater management plan (SWMP) and demonstrate that the proposed development will:
  - a. Manage surface water onsite;
  - b. Incorporate low impact development (LID) drainage practices.
19. Developments should conform to municipal stormwater management systems/practices.
20. Development permit applications for those developments which include the stripping or grading of land or alter drainage on the site should be required to provide lot grading and drainage plans, at time of application, that demonstrate how runoff will be controlled onsite.
21. LUBs should include a condition requiring development to occur in compliance with approved lot grading and drainage plans.
22. New multi-lot subdivisions and new subdivisions within existing multi-lot areas should be required to provide at time of application or as a condition of subdivision approval, either a lot grading and drainage plan, or a SWMP (depending on the number of lots proposed), or to comply with an existing SWMP.
23. Encourage the inclusion of LID drainage practices at the site level, in existing developed areas and as a component of new Area Structure Plans proposed for new areas.

### PLWMP RECOMMENDATION 3C: Require new development (and redevelopment) to include construction management plans (construction erosion and sediment control plan)

#### Recommendations:

24. Opportunity 11 addresses this recommendation.

# IMPLEMENTATION 4: GROUNDWATER QUALITY

## Existing Conditions

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In Alberta's lakeside communities, residential wastewater management practices have historically been a significant contributor to groundwater quality issues. Private septic fields and non-compliant septic tanks release nutrients into the groundwater (and the lake).

In the Pigeon Lake Watershed, phosphorus from wastewater is identified in the phosphorus budget as a contributor to the total phosphorus budget and as a potential source to be managed. Phosphorus from wastewater may be accompanied with fecal coliforms.

Local municipalities have policies to regulate and minimize potential contamination from private waste water disposal systems. The Northeast portion of the lake is served with a communal wastewater sewer system (gravity collection system and lagoon). The regional wastewater line for the south shore is now complete. The Summer Villages and some residential communities within the Counties have, through wastewater bylaws and the development of municipal wastewater systems, made significant improvements to limit nutrient release into groundwater that feeds into Pigeon Lake.

Where private systems still exist near the lake, most are provincially approved pump-out tanks; however, there are septic fields and surface discharge systems in use today in the lakeshore communities within the Pigeon Lake Watershed.

## Municipal Authority

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Municipalities have the authority to require new developments to include plumbing fixtures that are designed to conserve water. Through their LUBs or other bylaws and servicing standards, they can also require new developments

to be located and designed to minimize potential groundwater impacts, regulate how wastewater will be managed, and regulate the types of wastewater systems that will be permitted and/or prohibited.

Each of the twelve municipalities has taken a different approach to the implementation of regulations that affect groundwater quality. The following chart includes a summary of land use regulations that can be incorporated into a LUB to improve groundwater quality within the watershed and an analysis of how these regulations are currently being implemented through the LUBs of the twelve Pigeon Lake municipalities.

## Current Land Use Bylaw Regulations

PLWMP Objectives		Leduc County	Co. of Wetaskiwin	Argentia Beach	Crystal Springs	Golden Days	Grandview	Itaska Beach	Ma-Me-O Beach	Norris Beach	Poplar Bay	Silver Beach	Sundance Beach
<b>4a.</b> Incorporate water conservation guidance tools into municipal statutory plans and development requirements.	Does the LUB encourage the incorporation of water conservation tools in new developments?												
<b>4b.</b> Require new major developments in the watershed to demonstrate no negative impacts on existing groundwater users or the lake water supply.	Does the LUB require Groundwater Impact Assessments for new developments or subdivisions that may impact the watershed's groundwater with the watershed?	Not explicitly required, but could be required to determine site suitability											
<b>4d.</b> Eliminate septic fields for residential lots within the Lakeside Environmental Area.	Does the LUB (or a Wastewater Bylaw) prohibit the utilization of onsite septic fields, mounds, or surface discharge systems for wastewater management?	No, but each District has requirements			Has Waste water Bylaw, no fields, holding tank only (now connected to South Pigeon Lake Regional WW System)		YES (Private Sewage Disposal System Bylaw)	No in LUB (however bylaws 142 and 156 - mandatory connection to regional sewer)	YES (Waste water Bylaw)	YES (Waste water Bylaw)	YES (Waste water Bylaw)		Has waste water Bylaw, no fields, holding tank only

Blank cell: The LUB does not include specific regulations on this topic.

1\*: The LUB does not include specific regulations but this **topic is addressed** in statutory plans, non-statutory plans, policies or other bylaws. (Note: the MDPs for the summer villages (except Golden Days) are currently in development)

2\*: The LUB does not include specific regulations but this **topic may be addressed** in statutory plans, non-statutory plans, policies or other bylaws.

## Opportunities

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Based on the analysis in the previous section, the following opportunities have been identified for amendments to LUBs to improve groundwater quality in the Pigeon Lake Watershed.

**PLWMP RECOMMENDATION 4A: Incorporate water conservation guidance tools into municipal statutory plans and development requirements.**

**LUB Opportunities:**

25. New development and redevelopment will be encouraged to incorporate water conservation practices and design elements.

**PLWMP RECOMMENDATION 4B: Require new major developments in the watershed to demonstrate no negative impacts on existing groundwater users or the lake water supply.**

**LUB Opportunities:**

26. Require new major developments or major redevelopments to include "Ground Water Impact Assessments" and to demonstrate how impacts on ground water and the lake water supply will be minimized and/or mitigated to the satisfaction of the approving municipality.

**PLWMP RECOMMENDATION 4D: Eliminate septic fields for residential lots within the lakeside area**

**Recommendations:**

27. New residential development and residential redevelopment within 800m of the shoreline of Pigeon Lake should be prohibited from utilizing onsite septic fields, mounds, or surface discharge systems for wastewater management purposes.

# IMPLEMENTATION 5: SHORELINE AND RIPARIAN AREAS

## Existing Conditions

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The state of the shoreline is important to the overall health of a lake. Maintaining or restoring shorelines to their natural state helps maintain water quality by reducing nutrient inputs and preventing soil erosion. When native vegetation is present at the water's edge and in shallow water, it helps stabilize the shoreline, which protects the shoreline from erosion that may occur due to changes in water level or wave action. Natural shorelines also provide productive and diverse wildlife habitat; an abundance of wildlife living within an area is a good indicator of a healthy shoreline. Healthy fish and wildlife population then provide many recreational opportunities such as fishing or bird watching.

Highly developed shorelines, on the other hand, can impact the health of a lake. Shoreline erosion can negatively impact the lake by contributing to poor water quality, nutrient and sediment runoff, habitat loss and excessive weed growth. Disturbed shorelines are typically observed with areas that have been cleared of all or most vegetation, lawns that extend to the water's edge and hardened structures such as retaining walls, which replace natural vegetation.

The *2018 Pigeon Lake Shoreline Assessment Summary Report*, which was prepared by Watersheds Canada and the Canadian Wildlife Federation, summarizes a shoreline assessment conducted in 2018 of 247 properties totaling approximately 5km of shoreline on Pigeon Lake. According to the report, property owners have, on average, developed 43% of their shoreline within a few metres of the water's edge. Approximately 48% of the properties assessed have shoreline retaining walls, which are primarily riprap (39% of all properties assessed), and 21% of the properties had lawns that were mowed to the lakeshore. The shoreline of each property assessed was classified as one of the following classifications:

- **Natural:** a healthy buffer of vegetation and/or natural shoreline of sand or rock that is undisturbed and undeveloped
- **Ornamental:** All natural vegetation has been removed/replaced, structures such as docks/decks/boathouses/boat ramps are predominantly present
- **Regenerative:** natural vegetation has been removed in the past, but is in the process of growing back

Approximately 77% of properties were classified as ornamental and 22% were classified as regenerative. Restricting the removal of shoreline and riparian area vegetation, discouraging shoreline armouring, and requiring naturalized setbacks for upland development activities can improve the health and resilience of the shoreline and riparian areas.

## Municipal Authority

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Through the LUB, municipalities can implement development setbacks to protect all riparian areas including those associated with the lake, wetlands, watercourses and other waterbodies throughout the watershed. Municipalities can also establish restrictions on the clearing of vegetation within these areas and, at the time of subdivision, require the provision of reserves, as provided for in the MGA.

Each of the twelve municipalities has taken a different approach to the implementation of regulations that affect the lake's shoreline and watershed riparian areas. The following chart includes a summary of land use regulations that can be incorporated into a LUB to maintain or improve the health of the shoreline and riparian areas within the watershed and an analysis of how these regulations are currently being implemented through the LUBs of the twelve Pigeon Lake municipalities.

## Current Land Use Bylaw Regulations

PLWMP Objectives		Leduc County	Co. of Wetaskiwin	Argentia Beach	Crystal Springs	Golden Days	Grandview	Itaska Beach	Ma-Me-O Beach	Norris Beach	Poplar Bay	Silver Beach	Sundance Beach
<b>5a.</b> Development setbacks for new developments and redevelopments.	Does the LUB identify a setback requirement for new developments, redevelopment, and subdivision that is consistent with current development footprints?												
	Do the LUBs have setbacks from: watercourses, waterbodies (including wetlands)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Does the LUB identify a minimum ER for new subdivisions adjacent to the lake and near sensitive wetlands/other waterbodies/watercourses?	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*	1*
<b>5b.</b> Require bylaw provisions consistently across the watershed that any shoreline modification requires a development permit for lands above and abutting the legal bank.	Are development permits required for shoreline modifications on lands adjacent to the lake?	YES, although not explicitly stated.	YES, although not explicitly stated.	YES, although not explicitly stated.	YES, although not explicitly stated.	YES, although not explicitly stated.	YES, and identified in the Residential District	YES, although not explicitly stated.	YES, although not explicitly stated.	YES, although not explicitly stated.	YES, although not explicitly stated.	YES, although not explicitly stated.	YES, although not explicitly stated.

Blank cell: The LUB does not include specific regulations on this topic.

1\*: The LUB does not include specific regulations but this **topic is addressed** in statutory plans, non-statutory plans, policies or other bylaws. (Note: the MDPs for the summer villages (except Golden Days) are currently in development)

2\*: The LUB does not include specific regulations but this **topic may be addressed** in statutory plans, non-statutory plans, policies or other bylaws.

## Opportunities

Based on the analysis in the previous section, the following opportunities have been identified for amendments to LUBs to the shoreline and riparian areas in the Pigeon Lake Watershed.

### PLWMP RECOMMENDATION 5A: Development setbacks for new developments and redevelopments

#### LUB Opportunities:

28. Include a minimum setback distance regulation for new developments and redevelopment on existing lots meets or exceeds the minimum development setback regulations from the lake, water courses and waterbodies for the main buildings on a site.
29. For new subdivisions, require the provision of environmental and/or municipal reserves between the lots and the legal bank <sup>1</sup>of Pigeon Lake, water bodies, and watercourses. The width and size of the reserve should take into consideration the guidelines and/or recommendations of:
  - a. Qualified professionals; and/or
  - b. Riparian Setback Matrix Model (RSMM); and/or
  - c. The Government of Alberta's *Stepping Back from the Water: A Beneficial Management Practices Guide for New Development Near Water Bodies in Alberta's Settled Region*; and/or
  - d. ESRD Recommended Setbacks Chart (see Appendix)

### PLWMP RECOMMENDATION 5B: Require bylaw provisions consistently across the watershed that any shoreline modification requires a development permit for lands above and abutting riparian areas.

#### LUB Opportunities:

30. Development Permits should be required for shoreline modifications on lands above and abutting the riparian areas of the Pigeon Lake, watercourses, wetlands and other water bodies

31. Development permits should be required on lots which include or abut riparian areas for:

- e. Modifications to lot grading or drainage which could alter the quantity or quality of surface water runoff into a watercourse or water body;
- f. Clearing of vegetation;

Landscaping which could alter the quantity or quality of surface water runoff into a watercourse or water body.

This should not apply to agricultural parcels.

<sup>1</sup> As defined in Section 17 of the *Surveys Act*, the bed and shore of a body of water ends at the legal bank, also known as the ordinary high water mark. The legal bank is a natural boundary

formed by the presence of water that typically results in vegetation distinct from the upland vegetation. The legal bank may fluctuate over time.

# SUMMARY

The Land Use Bylaw Watershed Regulations Discussion Guide identifies opportunities to implement recommendations from the PLWMP into the Land Use Bylaws of the Pigeon Lake municipalities. The accompanying Implementation Guides for each municipality will provide comprehensive recommendations for consideration of the municipalities to include land management and development regulations in municipal planning documents that implement the objectives and recommendations of the PLWMP.

The adoption of these recommendations will enable coordinated action and collaboration between Pigeon Lake municipalities for the protection and improvement of Pigeon Lake, its shorelands, and the watershed.



(Source: PLMWP)



# APPENDIX A: LIST OF LAND USE BYLAWS

The following is a list of Land Use Bylaws (as amended to September 9, 2019) reviewed for the purposes of this report.

Rural Municipality	
County of Wetaskiwin	County of Wetaskiwin No. 10 Land Use Bylaw 2017/48
Leduc County	Leduc County Land Use Bylaw 7-08
Summer Village	
Summer Village of Argentia Beach	Summer Village of Argentia Beach Land Use Bylaw #254
Summer Village of Crystal Springs	Summer Village of Crystal Springs Land Use Bylaw #208
Summer Village of Golden Days	Summer Village of Golden Days Land Use Bylaw #254
Summer Village of Grandview	Summer Village of Grandview Land Use Bylaw #291
Summer Village of Itaska Beach	Summer Village of Itaska Land Use Bylaw 20015-01
Summer Village of Ma-Me-O	Summer Village of Ma-Me-O Land Use Bylaw #273
Summer Village of Norris Beach	Summer Village of Norris Beach Land Use Bylaw #73
Summer Village of Poplar Bay	Summer Village of Poplar Bay Land Use Bylaw #161
Summer Village of Silver Beach	Summer Village of Silver Beach Land Use Bylaw #208-2010
Summer Village of Sundance	Summer Village of Sundance Land Use Bylaw #155

# APPENDIX B: ACRONYMS & DEFINITIONS

## Abbreviations

<b>AEP</b>	Alberta Environment and Parks
<b>APLM</b>	Alliance of Pigeon Lake Municipalities
<b>ASP</b>	Area Structure Plan
<b>CE</b>	Conservation Easement
<b>CFO</b>	Confined Feeding Operation
<b>CMP</b>	Construction Management Plan
<b>CR</b>	Conservation Reserve
<b>DA</b>	Development Authority
<b>ER</b>	Environmental Reserve
<b>ERE</b>	Environmental Reserve Easement
<b>ICF</b>	Intermunicipal Collaboration Framework
<b>IDP</b>	Intermunicipal Development Plan
<b>IR</b>	Indian Reserve
<b>LID</b>	Low Impact Development
<b>LUB</b>	Land Use Bylaw
<b>LUF</b>	Land Use Framework
<b>MDP</b>	Municipal Development Plan
<b>MGA</b>	<i>Municipal Government Act</i>
<b>MPS</b>	Municipal Planning Services
<b>MSR</b>	Municipal and School Reserve
<b>MR</b>	Municipal Reserve
<b>NSRP</b>	North Saskatchewan Regional Plan
<b>PLWA</b>	Pigeon Lake Watershed Association
<b>PLWMP</b>	Pigeon Lake Watershed Management Plan
<b>SSIP</b>	Stormwater Site Implementation Plan
<b>SWMP</b>	Stormwater Management Plan

<b>CW</b>	County of Wetaskiwin No. 10
<b>LC</b>	Leduc County
<b>AB</b>	Summer Village of Argentia Beach
<b>CS</b>	Summer Village of Crystal Springs
<b>GD</b>	Summer Village of Golden Days
<b>GV</b>	Summer Village of Grandview
<b>IB</b>	Summer Village of Itaska Beach
<b>MB</b>	Summer Village of Ma-Me-O Beach
<b>NB</b>	Summer Village of Norris Beach
<b>PB</b>	Summer Village of Poplar Bay
<b>SL</b>	Summer Village of Silver Beach
<b>SN</b>	Summer Village of Sundance Beach

## Definitions

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### Development (Redevelopment, New Development)

As per the *Municipal Government Act*, “development” means:

- i. an excavation or stockpile and the creation of either of them;
- ii. a building or an addition to or replacement or repair of a building and the construction or placing of any of them on, in, over or under land;
- iii. a change of use of land or a building or an act done in relation to land or a building that results in or is likely to result in a change in the use of the land or building; or
- iv. a change in the intensity of use of land or a building or an act done in relation to land or a building that results in or is likely to result in a change in the intensity of use of the land or building.

In this document, “Redevelopment” means to development that occurs on a previously developed parcel of land.

In this document, “New Development” means development that occurs on a previously undeveloped parcel of land.

### Environmentally Significant Area (ESA)

ESA’s are identified areas containing rare or unique elements in the province, or areas that include elements that may require special management consideration due to their conservation needs. ESAs do not represent government policy and are not necessarily areas that require legal protection, but instead are intended to be an information tool to help inform land use planning and policy at local, regional and provincial scales.

### Major Development/Redevelopment

Major development/redevelopment means a development that has regional significance due to the size, economic value, or the potential impacts to local infrastructure (transportation, municipal water, sanitary sewer, or stormwater) generated in part or in whole by the development.

### Native Vegetation

Plant species that are indigenous to a particular region. (*Native Plant Revegetation Guidelines for Alberta, 2001*)

### Riparian Area

Riparian lands are transitional areas between upland and aquatic ecosystems. They have variable width and extent above and below ground and perform various functions. These lands are influenced by and exert an influence on associated water bodies, including alluvial aquifers and floodplains. Riparian lands usually have soil, biological, and other physical characteristics that reflect the influence of water and hydrological processes. (Alberta Water Council)

### Water Quality

A term used to describe the chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose. (ALMS)

### Water Body

Any location where water flows or is present, whether or not the flow or the presence of water is continuous, intermittent, or occurs only during a flood. This includes, but is not limited to, wetlands and aquifers. (WFL)

### Watercourse

The bed and shore of a river, stream, lake, creek, lagoon, swamp, marsh or other natural body of water, or a canal, ditch, reservoir or other artificial surface feature made by humans, whether it contains or conveys water continuously or intermittently. (EPEA)

### Watershed

An area of land, bounded by topographic features, that drains into a shared destination such as a river, stream, lake, pond or ocean. The size of a watershed can be tiny or immense and its boundaries and velocity of flow are determined by land forms such as hills, slopes and mountain ranges that direct water. Within each large watershed, there are many smaller watersheds.

### Watershed Management Plan

A comprehensive document that addresses many issues in a watershed including water quantity, water quality, point and non-point-source pollution, and source water protection. It may or may not include a Water Management Plan. It may also examine ways to better integrate land and resource management within a watershed. (Partnerships)

### Wetland

Land that is saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained soils, water-loving vegetation, and various kinds of biological activity which are adapted to a wet environment.

# APPENDIX C: ADDITIONAL INFORMATION

## Native Vegetation

The following is a list of the native littoral and riparian vegetation commonly found at Pigeon Lake. This list was obtained from the PLWMP.

Habitat	Growth Form	Common Name	Scientific Name
Littoral	Floating-leaved	Bur-reeds	<i>Sparaganium</i> spp.
Littoral	Floating-leaved	Common Duckweed	<i>Lemna minor</i>
Littoral	Floating-leaved	Star Duckweed	<i>Lemna trisulca</i>
Littoral	Floating-leaved	Variegated Pond-lily	<i>Nuphar variegatum</i>
Littoral	Floating-leaved	Water Smartweed	<i>Persicaria amphibia</i>
Littoral	Submerged	Autumn Water-starwort	<i>Callitriche hermaphroditica</i>
Littoral	Submerged	Common Bladderwort	<i>Utricularia vulgaris</i>
Littoral	Submerged	Common Water Moss	<i>Fontinalis</i> spp.
Littoral	Submerged	Coontail	<i>Ceratophyllum demersum</i>
Littoral	Submerged	Flat-stem Pondweed	<i>Potamogeton zosteriformis</i>
Littoral	Submerged	Fries' Pondweed	<i>Potamogeton friesii</i>
Littoral	Submerged	Lesser Pondweed	<i>Potamogeton pusillus</i>
Littoral	Submerged	Northern Watermilfoil	<i>Myriophyllum sibiricum</i>
Littoral	Submerged	Pondweeds	<i>Potamogeton</i> spp.
Littoral	Submerged	Richardson's Pondweed	<i>Potamogeton richardsonii</i>
Littoral	Submerged	Sago Pondweed	<i>Stuckenia pectinata</i>
Littoral	Submerged	Sheathed Pondweed	<i>Stuckenia vaginata</i>
Littoral	Submerged	Slender Water-nymph	<i>Najas flexilis</i>

Habitat	Growth Form	Common Name	Scientific Name
Littoral	Submerged	Stonewort	<i>Chara</i> spp.
Littoral	Submerged	Various-leaved Pondweed	<i>Potamogeton gramineus</i>
Littoral	Submerged	Water Buttercup	<i>Ranunculus aquatilis</i>
Littoral	Submerged	White-stem Pondweed	<i>Potamogeton praelongus</i>
Littoral	Submerged	Widgeon Grass	<i>Ruppia cirrhosa</i>
Riparian	Emergent Macrophyte	Bluejoint	<i>Calamagrostis canadensis</i>
Riparian	Emergent Macrophyte	Common Cattail	<i>Typha latifolia</i>
Riparian	Emergent Macrophyte	Creeping Spike-rush	<i>Eleocharis palustris</i>
Riparian	Emergent Macrophyte	Horsetails	<i>Equisetum</i> spp.
Riparian	Emergent Macrophyte	Knotted Rush	<i>Juncus nodosus</i>
Riparian	Emergent Macrophyte	Sedges	<i>Carex</i> spp.
Riparian	Emergent Macrophyte	Sloughgrass	<i>Beckmannia syzigachne</i>
Riparian	Emergent Macrophyte	Small-fruited Bulrush	<i>Scirpus microcarpus</i>
Riparian	Emergent Macrophyte	Soft-stem Bulrush	<i>Schoenoplectus tabernaemontani</i>
Riparian	Emergent Macrophyte	Wire Rush	<i>Juncus balticus</i>
Riparian	Forb	American Brooklime	<i>Veronica americana</i>
Riparian	Forb	Arum-leaved Arrowhead	<i>Sagittaria cuneata</i>

Habitat	Growth Form	Common Name	Scientific Name
Riparian	Forb	Celery-leaved Buttercup	<i>Ranunculus sceleratus</i>
Riparian	Forb	Docks	<i>Rumex</i> spp.
Riparian	Forb	Fireweed	<i>Chamerion angustifolium</i>
Riparian	Forb	Marsh Ragwort	<i>Senecio congestus</i>
Riparian	Forb	Marsh Yellow Cress	<i>Rorippa palustris</i>
Riparian	Forb	Nodding Beggar- ticks	<i>Bidens cernua</i>
Riparian	Forb	Northern Stitchwort	<i>Stellaria borealis</i>
Riparian	Forb	Northern Willow- herb	<i>Epilobium ciliatum</i>
Riparian	Forb	Pale Persicaria	<i>Persicaria lapathifolium</i>
Riparian	Forb	Philadelphia Fleabane	<i>Erigeron philadelphicus</i>
Riparian	Forb	Purple-stemmed Aster	<i>Symphyotrichum puniceum</i>
Riparian	Forb	Silverweed	<i>Potentilla anserina</i>
Riparian	Forb	Water Hemlock	<i>Cicuta maculata</i>
Riparian	Forb	Water Parsnip	<i>Sium suave</i>
Riparian	Forb	Western Willow Aster	<i>Symphyotrichum lanceolatum</i>
Riparian	Forb	Wild Mint	<i>Mentha arvensis</i>
Riparian	Forb	Yellow Avens	<i>Geum aleppicum</i>
Riparian	Forb	Yellow Water Crowfoot	<i>Ranunculus gmelinii</i>
Riparian	Shrub	Chokecherry	<i>Prunus virginiana</i>
Riparian	Shrub	Currants and Gooseberries	<i>Ribes</i> spp.
Riparian	Shrub	Prickly Rose	<i>Rosa acicularis</i>
Riparian	Shrub	Red Osier Dogwood	<i>Cornus sericea</i>
Riparian	Shrub	Willows	<i>Salix</i> spp.
Riparian	Tree	Balsam Poplar	<i>Populus balsamifera</i>
Riparian	Tree	Trembling Aspen	<i>Populus tremuloides</i>

## ESRD Recommended Setbacks Chart

### Sustainable Resource Development Recommended Guidelines for Minimum Environmental Reserve/Easement Widths

In reference to Section 664 of the *Municipal Government Act*, the following are recommended where a boundary to a proposed subdivision is a water body or watercourse.

**Table 1. Standard recommended minimum widths for Environmental Reserves or Environmental Reserve Easements based on type of water feature.**

Water Feature	Minimum ER Width <sup>2</sup>	Notes
Reservoirs & Regulated Lakes	30 m from right of way or easement boundary	A regulated lake is a lake where water levels are established to a predetermined elevation and actively managed through use of a licensing requirement (e.g. to pump water into the water body).
Lake (natural & controlled)	30 m from natural boundary	On controlled lakes, 30 m from sill elevation of licensed control structure.
Swamp/wetland <sup>1</sup>	Variable, include wet meadow zone	Wet meadow zone can be extensive in some situations, and in these instances the ER should be wide enough to preserve ecological function.
Large River (> 15m width)	30+ m	See additional requirements for hazardous lands.
Small River/Large Stream (6-15 m)	15 m	See additional requirements for hazardous lands.
Medium Stream (3 - 6 m)	10 m	See additional requirements for hazardous lands.
Small Stream (< 3 m)	6 m	See additional requirements for hazardous lands.
Ephemeral watercourse (no defined channel)	0 m	Use bylaw to regulate tree cutting within a defined distance from feature to maintain riparian vegetation and drainage.
Braided Stream	10 m from outside boundary of active floodway	
<sup>1</sup> Sustainable Resource Development views the term "swamp" to mean any area with hydrological conditions of sufficient duration to have developed saturated soils and hydrophytic vegetation (i.e. wetlands or peatlands). <sup>2</sup> In addition to the recommended ER width for the water feature itself, associated landscape features may require the ER width to be modified to factor in additional inherent hazards to development.		

For lands described in section 664(1)(b) of the *Municipal Government Act* (unsuitable for development because they are subject to flooding, have high risk of erosion, or have existing topographical or geo-technical constraints) the following are recommended.

**Table 2. Additional factors that may necessitate an increase in the width of an Environmental Reserve or Environmental Reserve Easement.**

Hazardous Lands	ER Modifier	Notes
Floodplain	<ul style="list-style-type: none"> <li>The width of the 1:100 year flood line or 30m from the natural boundary of a watercourse or lake, whichever is less.</li> <li>The width of meander belt for watercourses that tend to meander or entire floodplain if it is highly constrained within a confined valley.</li> </ul>	<ul style="list-style-type: none"> <li>Residential development within a floodplain is discouraged.</li> <li>Development within flood fringe area should only be considered if flood proofing undertaken to reduce risk of flood damage. Flood risk mapping or delineation of the 1:100 year flood line generally defines the extent of expected flood occurrence (see Alberta Environment policy and guidelines).</li> <li>The width of a meander belt is determined by multiplying bankfull width by 20 for each reach, and is split equally on either side of creek along axis of meander belt.</li> </ul>
Erosion prone areas	Provide for a toe erosion allowance.	Consider highly erosive soils and annual recession rates.
Gully, ravine, coulee, or valley escarpments	Provide for a stable slope allowance. Apply construction and building setbacks from this line.	Boundary of stable slope allowance measured from top of crest of plateau (terrace), valley slope or tableland.
Steep Slopes (>15%)	3X escarpment height or as recommended by a geotechnical report on slope stability, rate of erosion, etc.	

# APPENDIX D: IMPLEMENTATION GUIDES

[The Implementation Guides for each municipality will be inserted at a later date]