



## **Terms of Reference**

### **Pigeon Lake Watershed Management Plan**

Healthy Watershed – Healthy Lake – Healthy Communities

**PLWMP Steering Committee**

March, 2014

Major Funding Support Received from:



Contributions in funds and in kind have come from numerous organizations and individuals. The following organizations have been particularly instrumental in formulating the PLWMP Terms of Reference:

Battle River Watershed Alliance  
Alberta Lake Management Society  
Association of Pigeon Lake Municipalities

Alberta Environment and Sustainable  
Resource Development

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## ACKNOWLEDGEMENTS

### 2011 / 14 PLWMP Steering Committee Participants

Robert (Bob) Gibbs, (Chair)	Pigeon Lake Watershed Association (PLWA) Director, PLWMP
Susan Ellis,	PLWA President and Director, Communications
Hugh Sanders	PLWA Director, Stewardship
Michael Gaian	PLWA Director, Technical
Doris Bell	Association of Pigeon Lake Municipalities (APLM)
Gene Begg	PLWA Past Director
Don Davidson	PLWA Past Director + Grandview Mayor
John Slater	Ma Me O Beach Councillor, PLWA Board Director
Rex Neilson	Councillor, Itaska Beach
Larry McKeever	Councillor, County of Wetaskiwin
Ruth Harrison	PLWA Board, AFGA, Leduc County Council
Nicholaus Moffat	Leduc County, Parks Planner
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Cheryl Galbraith / Jessica Popadynetz / Marie Precup	Alberta Health Services (AHS)
Kim Barkwell	Ag Services, Leduc and Wetaskiwin Counties
Terry Krause / Nick Mandrusiak	Alberta Tourism Parks and Recreation
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Arin MacFarlane Dyer	Alberta Lake Management Society (ALMS)
Mary Ellen Herman	Past PLWA Director

### PLWA, Board of Directors, Fall of 2011 to Summer of 2014

Susan Ellis, President	Alan Olson
Emile Beaudry, Vice President	Robert (Bob) Gibbs,
Jeff Lloyd	Hugh Sanders
Doug Bell	Michael Gaian
Don Smallwood	Jim Webb
Ryan Devlin	Ruth Harrison
Tom Cliff	John Slater
Marilyn Kane	Marcia Mielke
Wayne Buskas	Leonard Standing on the Road



# 1 INTRODUCTION

## 1.1 Purpose of this Document

This document presents the objectives, process and structure that will guide the development of the Pigeon Lake Watershed Management Plan (PLWMP). It is written in accordance with the *Framework for Water Management Planning* (Alberta Environment, 2001), which is enabled by Section 11 of the *Water Act* (GoA, R.S.A. 2000, c. W65). The PLWMP also takes into consideration recommendations from the Alberta Water Council for a *Watershed Management Planning Framework for Alberta* (Alberta Water Council 2008) and a *Workbook for Developing Lake Watershed Management Plans in Alberta* (Alberta Lake Management Society, 2013). This Terms of Reference also reflects the results of a 2013 public engagement program that confirms the direction of the planning process (PLWMP, 2013B).

The Terms of Reference is organized into eleven sections. Section 1 provides an introduction to the Pigeon Lake Watershed Association and a description of the goal of a Watershed Management Plan. Section 2 provides a description of the Pigeon Lake watershed, which is the planning area for the PLWMP. Section 3 describes current conditions and issues in the Pigeon Lake watershed. The intended objectives of the PLWMP planning process are outlined in Section 4. Section 5 outlines the roles and responsibilities of those involved in the planning process. Linkages to other regional initiatives are provided in Section 6. Section 7 provides a broad overview of the public engagement process. A work plan outlining the various stages of the planning process is included in Section 8. Information requirements are described in Section 9. Section 10 provides a proposed schedule for the planning process. Section 11, Plan Endorsement, outlines the approval procedure for the plan.

A companion report documents the public engagement plan that informed the creation of the PLWMP Terms of Reference (ToR). This report is entitled “PLWMP Engagement Report, What we heard from Pigeon Lake watershed community when asked “Are we on Track”- Work and Findings”.

A number of technical terms are used in the Terms of Reference. An extensive glossary is found at the end of the document, along with a list of references cited in the body.

## 1.2 History of Pigeon Lake Watershed Association (PLWA)

The PLWA (<http://www.plwa.ca/>) is a charitable, non-profit watershed stewardship group established in 2007. Its establishment provides a forum for the diverse stakeholders of the watershed. The PLWA brings people together to build a better understanding of Pigeon Lake and its watershed, to be an advocate for the lake, to promote the wise use of the land and to be an agent of change. The PLWA was established due to expressed public concerns about lake health, blue-green algae blooms, fish kills, sustainable land development, and resource development in the watershed.

The Mission of the PLWA is to enhance, preserve and protect Pigeon Lake and its watershed as a healthy and environmentally sustainable ecosystem for current and future generations. To achieve its mission, the PLWA engages with stakeholders, advocates environmentally beneficial practices and policies, and takes a leadership role in watershed protection and management.

The activities of the PLWA are governed by a Board of Directors, accomplished through working committees, and managed through the implementation of planned activities. Membership donations and grants fund the PLWA.

### 1.3 Goal of a Watershed Management Plan

In 2007, soon after its establishment, the PLWA commissioned a State of the Watershed Report (Aquality 2008), which provided a synthesis of environmental information about the Pigeon Lake watershed. The Report recommended undertaking a planning process that would result in the completion of a Watershed Management Plan for the Pigeon Lake watershed. Based on this report recommendation and the ongoing concerns of watershed stakeholders, the PLWA is now undertaking this watershed management planning process.

**The goal of the Pigeon Lake Watershed Management Plan is to promote the watershed's natural environment and water quality by recommending action-oriented watershed policies and beneficial practices that support the long-term health, protection and restoration of the watershed.**

The plan will address land-based source controls (point source and non-point source) and practices, which reduce nutrients and other pollutants from entering the lake. The plan will also recommend nutrient trapping practices that promote the protection and enhancement of buffering natural systems of the watershed's natural environment.

### 1.4 Guiding Principles

The plan will be developed in partnership with watershed residents, stakeholders and decision-makers, and will be based on a shared understanding of Pigeon Lake's water resources and the environmental, economic and social demands on the resources. Plan recommendations are to be focussed on sectors that use, affect or regulate the water resource, and sectors that are affected by related impacts. As an advisory and advocacy body, the PLWA will provide the support and basis for implementation of the plan by other engaged watershed stakeholders such as local government and industry.

Municipalities are a key watershed stakeholder, because of their ability to influence and where appropriate to enact bylaws. The plan in no way diminishes the regulatory duties and responsibilities of local government. Adoption of the WMP in whole or part by individual municipalities is voluntary. Therefore the onus is on the PLWA to provide opportunities for engagement and clear rationale for moving forward with specific beneficial practices.

The sense of urgency by Pigeon Lake stakeholders requires that the PLWMP:



1. Be action-oriented
2. Not delay current initiatives of the PLWA or local governments
3. Deliver plan components in modules that will promote early implementation.
4. Rely on an adaptive management approach (see glossary) in which actions are based on best available evidence.
5. Engage stakeholders through-out the plan development process, especially those with the most ability to affect meaningful change

The PLWMP will balance the environmental, social, and economic and governance needs of the watershed:

**The Environment...**

Which requires sound governance, appropriate social policy and financial resources.

**The Economy...**

Which requires a healthy environment to optimize the social experience. Healthy agricultural and commercial sectors in the watershed and surrounding region are dependent on a healthy lake.

**The Social Fabric...**

To ensure that quality of 'place' to live and/or visit is maintained through enhancement, preservation and protection of the environment and the economy.

**Governance...**

To engage all four orders of governments (First Nations, local, provincial and federal) in promoting policies to preserve and protect the environment, the social fabric and the economy within the watershed.

## 2 WATERSHED CHARACTERISTICS

Pigeon Lake is located approximately 80 km southwest of Edmonton within the Counties of Leduc and Wetaskiwin. The Pigeon Lake watershed is in the Battle River sub-basin of the North Saskatchewan River Basin. The Pigeon Lake Watershed (PLW) has a land drainage area of 187 km<sup>2</sup> and the lake occupies 96.7 km<sup>2</sup> (Mitchell and Prepas 1990). The lake has a volume of some 603 million cubic meters and a shoreline of 46 kilometres (Aquality 2008). See Figure 2.1 for a map of the watershed.

Topography of the basin is level to gently rolling. Soils are predominantly orthic-grey luvisols. The natural vegetation cover is dominated by trembling aspen, white spruce and balsam poplar (Mitchell and Prepas 1990). Much of the land in the basin has been cleared for agriculture. Oil and gas development is the other key economic activity in the watershed. Recreational use and development is extensive and continues to increase.

Surrounding Pigeon Lake are (see Figure 1, next page):

- Two Counties:
 

Leduc County	County of Wetaskiwin
--------------	----------------------
- Ten incorporated Summer Villages:
 

Argentia Beach	Ma-Me-O Beach
Crystal Springs	Norris Beach
Golden Days	Poplar Bay
Grandview	Sundance Beach
Itaska	Silver Beach
- Several unincorporated hamlets or community areas:
 

Mulhurst Bay	Gilwood Beach
Westerose	Sunset Harbour
Mission Beach	Viola Beach
Village of Pigeon Lake	
- Two Provincial Parks:
 

Pigeon Lake Provincial Park	Zeiner Provincial Park
-----------------------------	------------------------
- Pigeon Lake First Nation Reserve 138A
- Recreational Developments e.g. church and youth camps, golf courses, and related campgrounds (not shown on map)

Administratively, portions of the PLW fall within two Counties, ten incorporated Summer Villages and the Pigeon Lake Reserve (IR 138A). These jurisdictions control development in the watershed. Of particular note, Leduc County has developed a North Pigeon Lake Area Structure Plan (NPLASP) (Leduc County. 2011) for its portion of the watershed and the County of Wetaskiwin has completed its Pigeon Lake Watershed Area Concept Plan (PLACP) (County of Wetaskiwin. 2014), which will affect the majority of its lands within the watershed.

The study area map (Figure 2.1) also illustrates that the watershed is divided into some fifteen sub-watersheds, each with tributary drainage systems.

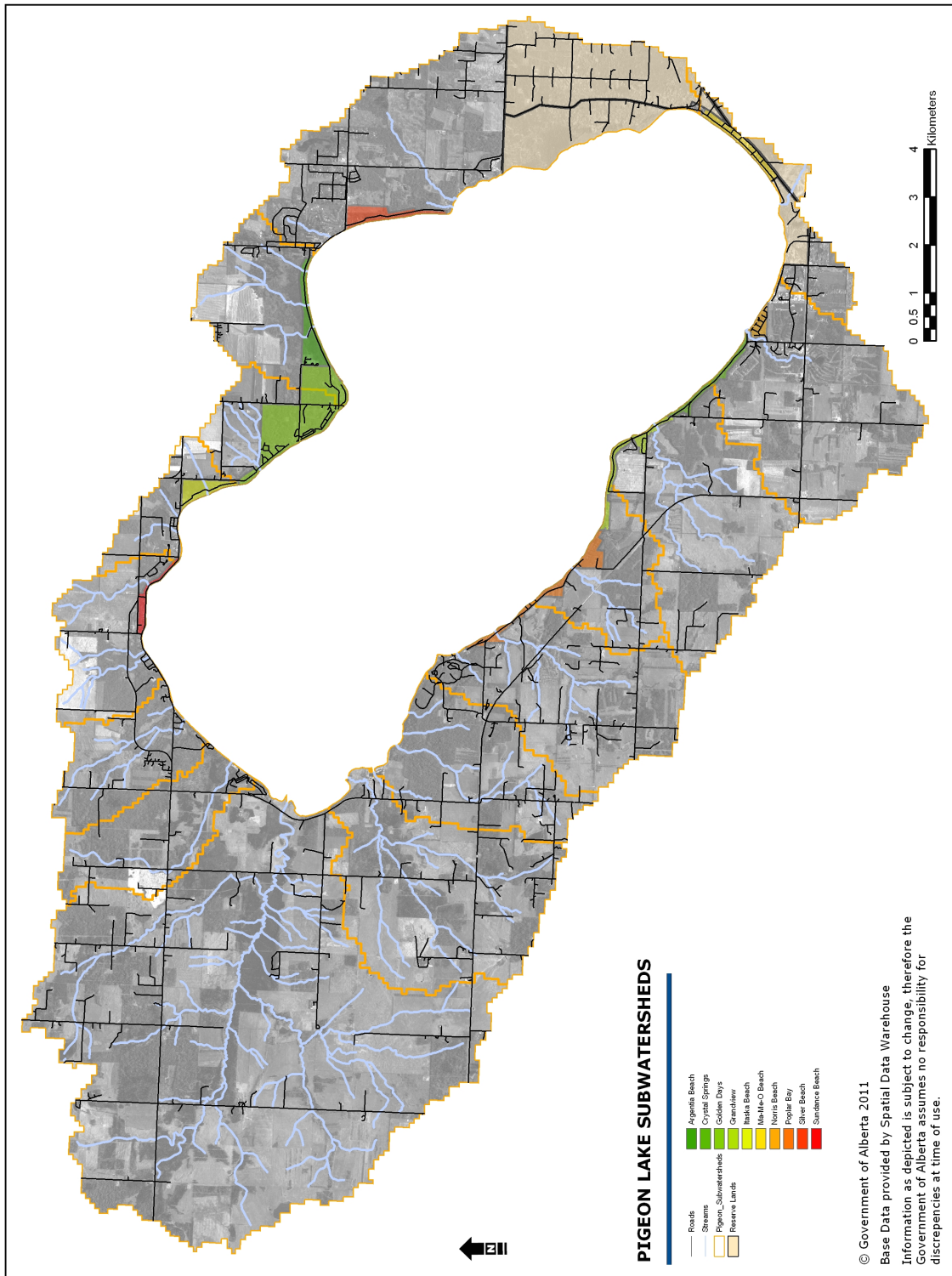


Figure 2.1 Pigeon Lake Watershed Study Area

### 3 CURRENT ISSUES

Land use changes, increased nutrient loading, changing environmental factors and related ecosystem changes are all contributing factors in the decline of the watershed health and lake water quality. A key indicator has been the growth of cyanobacteria and outbreaks of toxic blue-green algae. Collectively these issues are creating pressures on the lake and negatively impacting the quality of life of those who live, work and play in the watershed.

Public perceptions of issues are identified in the State of the Watershed Report (Aquality. 2009) and in meeting minutes from Annual General Meetings of the PLWA ([www.plwa.ca](http://www.plwa.ca)) and include:

- Deteriorating water quality; nutrient loading
- Toxic cyanobacteria (blue-green algae) blooms
- Declining fish stocks; fish die-offs; changing fish populations and size
- Shoreline (riparian zone) degradation and habitat loss; loss of wetlands; shoreline erosion
- Higher density development around the lake and its effects on the watershed; stormwater runoff; wastewater management
- Oil and gas activity and operations
- Agricultural practices

Rather than focussing on lake water quality symptoms, the issues that the PLWMP will be addressing are the underlying source causes of human-related nutrient release from the lands (watershed) surrounding the lake. As recommended in the Pigeon Lake State of the Watershed Report:

*“External and internal nutrient inputs are a concern to the health of Pigeon Lake. Land use practices, sewage and manure management around the lake should be managed to minimize further nutrient loadings to the lake. Another concern is the lack of healthy and functional riparian area around the lake, and the potential loss of wetlands”* (Aquality. 2007. p 40).

In summary, two aspects are critical underlying issues:

1. Sources of human generated nutrients
2. Maintenance and enhancement of natural buffers and filters (wetlands, riparian and shoreline buffers) to mitigate and absorb nutrients.

## 4 OBJECTIVES OF THE PLANNING PROCESS

The PLWA, as a volunteer-driven watershed stewardship group, has the capacity to undertake objectives that focus on relatively short-term deliverables that are less technical in nature. The PLWA will work with the Government of Alberta and ENGO organizations on more technical long-term tasks such as monitoring and advancing the state of knowledge (e.g. nutrient balance) and supporting monitoring efforts.

### 4.1 Plan Objectives

Following from the PLWMP goal (Section 1.3), the objectives of the PLWMP are to address topics in a modular fashion, which will include:

1. Identification of land use practices and trends that could adversely affect the future sustainability of Pigeon Lake and its watershed,
2. Identification of beneficial practices for adoption by the agricultural community, cottagers, and other land owners, residents and watershed users to address impacts on the watershed,
3. Support for engaged stakeholders who wish to implement strategies for the sustainable use and management of land and water resources in the watershed; and,
4. Preparation of reports and recommendations in consultation with stakeholders and the public so that the PLWMP meets local and regional needs.

The PLWMP will rely on others to:

1. Enhance the state of knowledge about the watershed and lake ecosystems, nutrient budget and dynamics and cyanobacteria dynamics;
2. Identify critical data gaps and recommend priority research, mapping and monitoring activities to permit better strategic responses;
3. Develop a watershed model that predicts water quality changes over time;
4. Identify a range of lake health and water quality mitigation strategies and evaluate their relative effectiveness- including source (watershed) and lake health interventions;
5. Address water quantity and lake level issues.

For example, Alberta Environment and Sustainable Resource Development (AESRD) has undertaken or nearly completed:

1. Two year water quality monitoring program (with the Alberta Lake Management Society providing sampling support).
2. Updated nutrient budget for Pigeon Lake.
3. Paleolimnology assessment of Pigeon Lake bed sediments to form a historic record of nutrient levels.
4. Predictive model (bathtub) to test effectiveness of various water quality management options.

## 5 ROLES AND RESPONSIBILITIES

The structure of the PLWMP is intended to be inclusive and engaging.

The PLWMP will be directed by the PLWMP Steering Committee. Under the direction of the Steering Committee, PLWMP task groups will undertake planning tasks. Other concurrent tasks by the PLWA, APLM, and outside agencies will be coordinated at a variety of levels through the Watershed Council, PLWA Board and PLWMP Steering Committee.

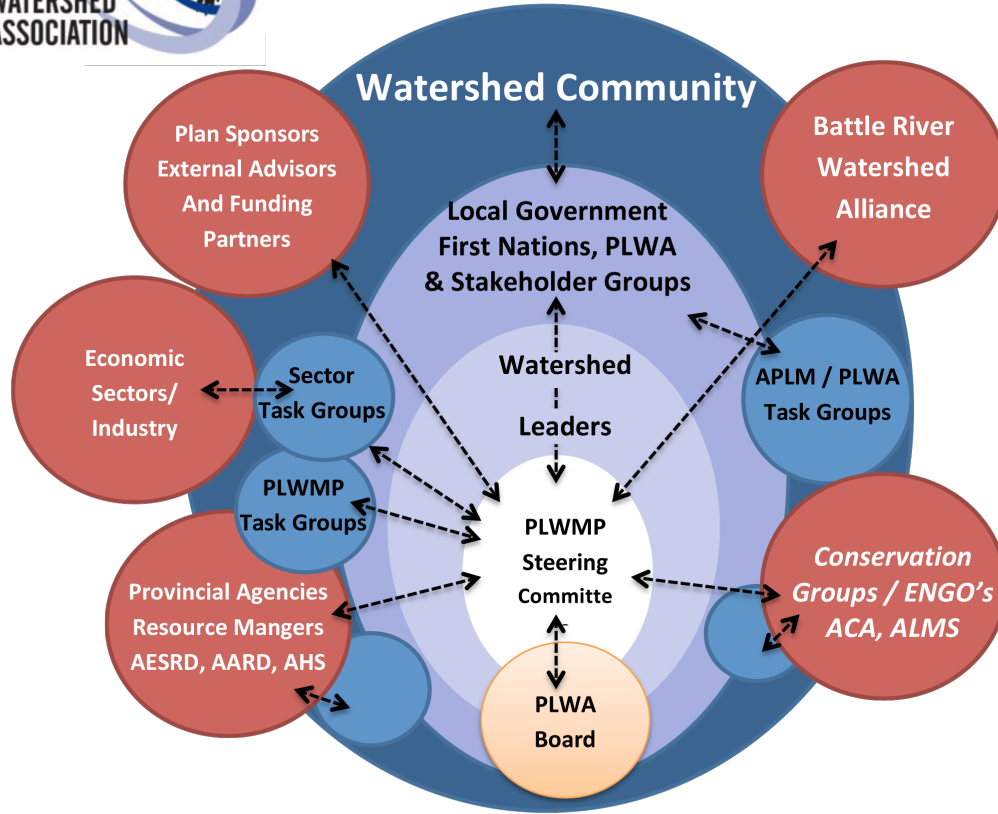
Figure 5.1, “PLWMP Circles of Involvement”, (see following page), provides a picture of how the PLWMP will engage the watershed stakeholders and how the plan will interact with other organizations that are also undertaking related initiatives. The PLWMP interacts with the following individuals, representative organizations, and local government:

- Watershed Community: everyone associated with the Pigeon Lake watershed including residents and users.
- Organized representative watershed groups: including local government (e.g., Counties and Summer Villages), First Nations, PLWA and other stakeholder groups (e.g., APLM, Pigeon Lake Regional Chamber of Commerce and Lakedell Agricultural Society)
- Watershed Leaders Group: Broad representative group of watershed stakeholders
- PLWA Board: responsible for establishment and implementation of the PLWMP.
- Task Groups: working groups of stakeholders, PLWA and local government representatives with technical advisors.
- External agencies: sponsors, ENGO’s, provincial resource and program managers operating in the watershed, and
- Economic sectors and industries: land development, business, agricultural and resource development sectors










## PLWMP Circles of Involvement

Revised: June 17, 2012



### LEGEND

-  **Watershed Community:** everyone associated with the Pigeon Lake watershed including residents and users
-  **Local Government, First Nations, PLWA and Stakeholder Groups:** Organized representative watershed groups such as the APLM, PLRCC and PLWA
-  **Watershed Leaders:** Broad representative group of watershed stakeholders
-  **PLWMP Steering Committee:** Core group of sponsors committed to making the most of the PLWMP process
-  **PLWA Board:** responsible for establishment and direction of the PLWMP
-  **Task Groups:** working groups of stakeholders, PLWA and local government reps with technical advisors
-  **External Organizations:** Sponsors, ENGO's, Provincial Resource and Program Managers operating in the watershed

*There is room for everyone who wants to be involved. As we get going there will be more bubbles of activity. All groups and individuals in the watershed can find a place to engage and contribute to the process of enhancing the health of the lake. The PLWMP process, learning and borrowing from the experience of others but open to the creative thinking of how separately but connected we can make a significant difference.*

Figure 5.1 Circles of Involvement



## **5.1 Steering Committee Participants**

The Pigeon Lake Watershed Association is the plan sponsor. A number of participating organizations have been identified at the outset and other organizations will be identified as the plan unfolds.

## **5.2 Pigeon Lake Watershed Association**

The Pigeon Lake Watershed Association Board of Directors, as the proponent or sponsoring organization, shall be responsible for:

- Appointing the Chair of the Steering Committee;
- Confirming the membership of the Steering Committee;
- Approving the PLWMP Terms of Reference;
- Approving of annual budgets for the PLWMP;
- Applying for grants and receiving donations to fund PLWMP activities;
- Identifying and engaging plan sponsors;
- Engaging consultants or other organizations to complete aspects of the PLWMP;
- Disbursement of funds to pay for PLWMP expenses pursuant to pre-approved budgets; and
- Approval of the PLWMP through its various phases following consultation with watershed stakeholders.

## **5.3 Local Government and First Nations**

The member municipalities of the Association of Pigeon Lake Municipalities (APLM) are plan participants and will provide representatives on the PLWMP Steering Committee. APLM representatives and/or Individual municipalities may wish to provide specific representation on the steering committee. The municipalities of the APLM will play an active role in the direction and priorities of the plan and the implementation of its recommendations. Representation will be sought for Pigeon Lake Reserve residents and their local First Nation councils.

## **5.4 Battle River Watershed Alliance (BRWA)**

As a plan partner, the BRWA has committed significant technical and staff resources to the PLWMP. The BRWA will have representation on the PLWMP Steering Committee and will play an active role in the development of the PLWMP outcomes as a technical expert.

## **5.5 Alberta Lake Management Society (ALMS)**

As a plan partner, ALMS has committed staff resources to provide management support and advice for the PLWMP. ALMS will have representation on the PLWMP Steering Committee and will play an active role in the development of the PLWMP outcomes as a technical expert.

## **5.6 Government of Alberta (GoA)**

Provincial government agencies have supported the PLWMP by supplying representatives to the steering committee. These agencies include:

- Alberta Environment and Sustainable Resource Development (AESRD)
- Alberta Agriculture and Rural Development (ARD)



- Alberta Health Services (AHS)
- Alberta Tourism Parks and Recreation (ATPR)

The Province, as a plan partner, will have representation on the PLWMP Steering Committee and will play an active role in the development of the PLWMP outcomes as a technical expert.

## 5.7 Granting Organizations

The PLWA will actively solicit financial support from granting organizations and corporations. Benefits and acknowledgements will be dependent on the requirements of the granting organizations and individual arrangements between the PLWA Board and the granting organization. Organizations providing major grants will become a PLWMP Donor, and will receive logo recognition in PLWMP publications.

To date, three organizations have responded with major grants that recognize the importance of the PLWMP and its work in the Pigeon Lake Watershed. These granting organizations are:

- **Royal Bank of Canada:** In August of 2012 the Royal Bank of Canada announced a \$25,000 grant through its Blue Water grant program ([bluewater.rbc.com/](http://bluewater.rbc.com/)).
- **Leduc County:** In the fall of 2012, Leduc County allocated a onetime grant of \$15,000.
- **Alberta Culture and Community Spirit:** in the summer of 2013 The Honourable Diane McQueen presented a \$35,000 cheque for a matching grant from the Community Initiatives Program.

In addition to the above, numerous individuals have given of their time and financial resources in support of the PLWMP.

## 5.8 PLWMP Project Organization

A number of committees and working groups are envisioned in moving the PLWMP forward.

### 5.8.1 Steering Committee

#### Mandate

The Steering Committee for PLWMP has been appointed to direct the development of the PLWMP project scope and to recommend the activities required to complete the Plan including the public engagement process.

#### Composition

Members of the Steering Committee will include a broad representation of local government representatives, watershed residents, users and stakeholders including agricultural, cottagers, permanent residents, Counties and Summer Villages, businesses and industry, the provincial government and the Battle River and North Saskatchewan Watershed Alliances. Steering Committee members should be recommended by their constituent organizations and are approved by the Pigeon Lake Watershed Association.

## Decision Making

Decisions made by the Steering Committee will be through consensus. “*Consensus*” will have been achieved when the members of the Steering Committee in attendance at a meeting can “live with” the decision taken and no one is absolutely opposed to it. The guidance document for decision-making is *Consensus Decision-Making Toolkit* (CASA/AWC, 2010) Decisions will be based on an adaptive management approach, relying on best available evidence.

## Meetings

The Steering Committee will meet periodically, at the call of the Chair. If a Committee member cannot attend a meeting they may appoint an alternate to attend on their behalf.

## Responsibilities

The Steering Committee is responsible for:

- Recommending to the PLWA and sponsor agencies the Plan’s:
  - Steering committee terms of reference
  - Steering Committee Membership
  - Project scope, objectives, timelines and budget
  - Means, methods and resources to accomplish tasks
- Ensuring that constituent organizations are kept advised of the activities concerning the Plan
- Reviewing available data and determining additional information required
- Identifying issues to be addressed and tasks to be completed
- Identifying watershed stakeholders and approaches to engage them in the Plan
- Communicating to watershed stakeholders the objects and progress of the Plan

The Steering Committee may determine the structure required to manage the development and implementation of the Plan, including the establishment of:

- Task group(s) to advance plan components and report to the Steering Committee
- Ad hoc technical committee(s) to advise the Steering Committee on specific issues

### 5.8.2 Pigeon Lake Watershed Leaders Group

An annual meeting of watershed leaders will review PLWMP progress and coordinate related initiatives by others. This group would focus on elected representatives and/or senior administrators. Representative groups may include:

- Pigeon Lake Watershed Association - Board of Directors
- Association of Pigeon Lake Municipalities (APLM) members (Counties and Summer Villages
- Battle River Watershed Alliance (BRWA)
- Pigeon Lake Reserve – Four First Nations
- Pigeon Lake Regional Chamber of Commerce (PLRCC)
- Lakedell Agricultural Society (LAS)
- Alberta Environment and Sustainable Resource Development (AESRD)
- Alberta Tourism Parks and Recreation (ATPR)
- Alberta Agriculture and Rural Development (ARD)
- Alberta Health Services (AHS)

- Alberta Lake Management Association (ALMS)
- Alberta Conservation Association (ACA)
- PLWMP Financial Sponsoring Organizations
- Sectoral Representatives (e.g. Agriculture, Resource Industries, Golf Clubs, Fish and Game Associations, Conservation Groups)

### **5.8.3 PLWMP Steering Committee Chair**

Detailed planning and advancement of the PLWMP agenda will be undertaken under the leadership of the PLWMP Steering Committee Chair. Meetings will be called at the request of the Chair. The Chair's responsibilities will include:

- Reporting to the PLWA Board, PLWMP steering committee and Pigeon Lake Watershed Council
- Setting meeting schedules and agendas for the PLWMP steering committee and task groups
- Managing external communications about the PLWMP and being the official voice of the PLWMP
- Managing contract staff activities and evaluating outcomes on behalf of the PLWA Board.

### **5.8.4 Task Groups and Technical Committees**

The PLWMP is intended to address topics in a modular priority manner in order to manage the work within the resource capacity of the PLWA. Ad hoc Task Groups with related technical support will be organized around discrete topics. Engaging stakeholders and local decision makers at the working level is vital to producing outcomes that can be implemented. Linking stakeholders to technical experts is intended to occur periodically. The PLWA may potentially partner with other organizations already working on a topic, such as the APLM. Task groups potentially could include:

- Watershed Beneficial Management Practice Topics: working groups to address a range of topics identified in Section 7.
- Communications and Engagement: working group to direct the communication and engagement program of the PLWMP.

A Terms of Reference, approved by the PLWMP Steering Committee, will direct the work of each task group.

## **6 REGIONAL LINKAGES**

### **6.1 Legislative and Policy Context**

A number of Acts, regulations and policies affect collective action to improve the health of the lake and watershed. To better understand this legislative and policy context, the PLWA commissioned a study, entitled “The Law and Policy Framework Operating in the Pigeon Lake Watershed” authored by the Environmental Law Center (Watt and Unger 2008). This study outlines the jurisdictional mandates of local, provincial and federal government authorities.

### **6.2 Local Government Regional Initiatives**

The ten Summer Villages and two Counties have been working on strategies related to land use planning, development controls and sewage systems for a number of years. Some specific initiatives include:

#### **6.2.1 Statutory and Non-Statutory Plans**

In 2000, the Counties and Summer Villages adopted the “Pigeon Lake Watershed Management Plan” (Lilley and Earle. 2000) as a policy guidance document. This non-statutory plan supports a set of development principles to assess development proposals in the watershed and cooperation on regional infrastructure (sewer system). In 2011, the County of Leduc approved a North Pigeon Lake Area Structure Plan (Leduc County. 2011), which included a number of development principals designed to improve water quality. The County of Wetaskiwin is currently working on a Pigeon Lake Watershed Area Concept Plan (PLWACP) for their lands within the watershed (County of Wetaskiwin. 2014).

#### **6.2.2 Lake Health Initiatives**

The Counties and Summer Villages have formed the Association of Pigeon Lake Municipalities (APLM), which meets about matters of common concern for the watershed.

Together the APLM and PLWA have promoted the extension of a regional sewer system. This initiative has now progressed to a funded phase 1 trunk extension and expansion of the Mulhurst Wastewater Management Facility. The phase of the project is currently in construction (September 2014 completion). A lake hydrology study has also been jointly developed with the PLWA, which identifies all the inflows and outflows of the lake (Worley Parsons 2010).

#### **6.2.3 Other Regional and Watershed Initiatives**

Through the PLWMP process, the PLWA will, where appropriate, support efforts of the authorities and ENGO organizations responsible for existing regional strategies and planning processes. Regional strategies deal with numerous resources and issues in a region. It is not the intention of the PLWMP to replace existing plans, but rather to enhance or support them, and assist in implementation. Consultation with the responsible authorities through the PLWMP planning processes will assist in defining how coordination and enhancements may occur. Regional existing plans or ongoing planning in the study area include:

- Battle River Watershed Alliance:
  - State of the Watershed Report
  - Public Engagement Strategy
  - Watershed Management Plan (recommendations have been developed for the drought and non-point source pollution management components, and the riparian areas and source water protection components are currently underway)
- North American Waterfowl Management Plan (NAWMP);
- Alberta Conservation Association: Shoreline Riparian Assessments
- Alberta Environment and Sustainable Resource Development:
  - Battle River Water Management Plan
  - Pigeon Lake Enhanced Water Sampling Program and Nutrient Budget
- Alberta Health Services: Protocol development for blue green algae monitoring and health warnings
- Land Use Framework - North Saskatchewan Regional Plan

Related to the latter point, the *Alberta Land Stewardship Act* (ALSA; Government of Alberta 2009) is the authorizing legislation for regional land-use planning in Alberta, as described in the Land-use Framework (Government of Alberta 2008). ALSA establishes how regional plans are created, amended and reviewed. Regional plans developed under ALSA are "legislative instruments and, for the purposes of any other enactment, are considered to be regulations" (Government of Alberta 2008, Section 13). In essence, regional plans developed under ALSA are binding on provincial and local governments and other decision makers, and will have an impact on industrial, recreational and other land users.

## 7 WATERSHED ENGAGEMENT

Engagement of watershed communities, stakeholders and individuals is essential to a successful PLWMP planning process. These stakeholders must have the opportunity to understand the current state of the watershed, provide input and be encouraged to become effective stewards of the watershed. The goal is to create and maintain dialogue with watershed stakeholders and the general public and to develop a multi-stakeholder decision-making framework that will ease implementation and ensure long-term viability of the PLWMP.

The objectives of the PLWMP engagement plan are to:

- Facilitate the understanding of watershed residents, users and stakeholders about watershed issues and beneficial management practices.
- Obtain guidance from stakeholders and the public during all phases of plan development.
- Incorporate community and stakeholder values in addition to technical and scientific information in making decisions about the management of the watershed.
- Engage stakeholders in developing plan outcomes.

### 7.1 Communication and Engagement Strategy

The International Association of Public Participation (IAP2) Spectrum of Public Participation will guide the consultation with the public and other stakeholders. Essentially a multi-targeted engagement program will be designed around:

- The need of the PLWA to involve stakeholders and build capacity;
- The need for stakeholders to be involved in the plan;
- The needs and expectations of individual audiences that come into contact with the PLWMP;
- The medium of communication (ranging from social media to stakeholder advisory committees);
- The capacity and limitations of the PLWA to drive the process; and
- The capacity and desire of stakeholders to be engaged.

For the PLWMP to be successful all stakeholders that live work and play in the watershed including representative organizations, elected municipal representatives and the provincial government need to be engaged in creating and implementing the PLWMP.

### 7.2 Engagement Plan

A task group under the PLWMP Steering committee has prepared a public engagement plan, entitled *Pigeon Lake Watershed Management Plan: Watershed Stakeholder Engagement Strategy* (PLWMP. 2013a) which outlines:

- Purpose of engagement strategy;

- Stakeholder types, contacts, perspectives and potential areas of interest;
- Approach
- Levels of engagement
- Public engagement process
- Public engagement techniques and tools
- Process timeline; and
- Engagement strategy implementation;

The *Pigeon Lake Watershed Management Plan: Watershed Stakeholder Engagement Strategy* was accepted by the PLWMP Steering Committee.

Throughout 2013, a number of watershed engagement events and surveys were utilized to share the PLWMP plan fundamentals with watershed stakeholders. The results of this engagement program were published in a document entitled *PLWMP Engagement Draft Report, What we heard when we asked: "Are we on Track"?: Conclusion and Next Steps* (PLWMP.2013b).

Key conclusions of the "Are we on Track" engagement program include:

1. The PLWMP Steering Committee can with confidence move ahead in the creation of the Pigeon Lake Watershed Management Plan.
2. The PLWMP Terms of Reference (TOR) can be finalized.
3. Five clear priority topics (in addition to the already underway Cosmetic fertilizers and Model Land Use Bylaw): Storm/Surface Water; Riparian Restoration; Priority Landscapes Conservation; Working with the Agricultural Community; and Land Development (beyond the 800 metres from the shoreline that is being addressed with the Model Land Use Bylaw).
4. Given that the enforceable regulations, supported by education, are desired, the possibility of bylaws must be explored for each appropriate topic.



## 8 WATERSHED MANAGEMENT PLANNING PROCESS

The PLWMP will be implemented in a number of component or topical areas, over a period of years. Each module will follow a planning process consistent with *Water for Life: Alberta's Strategy for Sustainability* (Government of Alberta. 2003), the Government of Alberta's *Framework for Water Management Planning* (Alberta Environment. 2001) and the Alberta Lake Management Society's *Workbook for Developing Lake Watershed Management Plans in Alberta* (Alberta Lake Management Society. 2013).

The watershed management plan and individual topic modules will follow a step by step planning cycle that creates a living document that can adapt to changing knowledge and circumstances. The PLWMP planning process will generally adopt the GoA recommended steps for watershed management planning as per Figure 8.1.

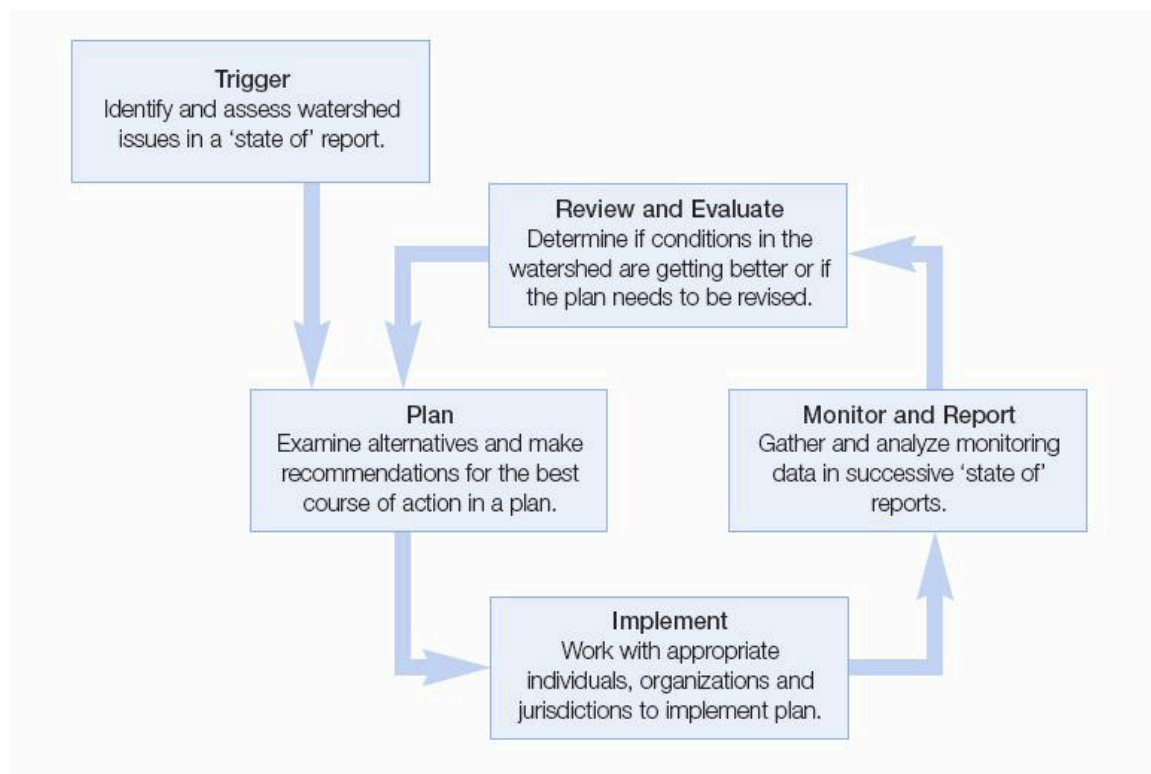


Figure 8.1 Watershed Management Planning Process  
(Government of Alberta, No Date, p. 9)

The PLWA is a volunteer watershed stewardship group with limited capacity and authority to implement recommendations. As described in Table 8-a, the PLWA will interact with a number of organizations to accomplish the planning cycle..



**Table 8—a PLWMP Roles and Responsibilities**

Roles during the WMP planning cycle	PLWMP Steering Committee	PLWA	Local Government	GoA and ENGO's	Individuals and Organizations
<b>Plan</b>	Research Policy and Implementation Advice	PLWMP Resource Support	Leadership Support	Technical assistance	Participate
<b>Implement</b>		Support and education	Implement policies and bylaw	Support and technical assistance	Implement beneficial practices
<b>Monitor</b>		Coordination	Coordination	Science based monitoring	
<b>Evaluate</b>		Coordination	Coordination	Science based data assessment	

As the engagement plan unfolds organizations and individuals will have the opportunity to define how they would like to participate in the watershed planning process.

### 8.1 Watershed Management Components

A number of topics to be addressed by the PLWMP have been identified. However as the plan develops and stakeholders are engaged, the list of topics and their content is expected to evolve.

An initial set of potential topics has been identified as follows:

- Watershed Beneficial Practices – Fertilizers and Soil Nutrient Practices
- Watershed Beneficial Practices - Model Land Use Bylaws for existing and infill development

The next highest priority topics as identified in the public engagement program “What We Heard” are:

- Watershed Beneficial Practices – Storm/Surface Water Management
- Watershed Beneficial Practices – Riparian/Shoreline Restoration and Management
- Watershed Beneficial Practices – Agricultural Beneficial Practices
- Watershed Beneficial Practices – Land Development Practices
- Watershed Beneficial Practices – Land Conservation and Stewardship
- Pigeon Lake Watershed Atlas and Protecting Priority Landscapes
- Watershed Beneficial Practices – Oil and Gas Sector

Topic priorities are further discussed in Section 9. Each topic will be guided by a specific Terms of Reference approved by the Steering Committee and the final outcome is to be vetted and approved by the steering committee. A working group and supplemental professional resources will be set up under the direction of the steering committee.

## 9 INFORMATION REQUIREMENTS

Watershed management planning is a complex multi-stakeholder endeavour. It is an incremental problem involving cumulative effects of changes in land use and land use practices where increased sources of nutrients are gradually added, while the natural defenses provided by ecosystems are gradually removed. The scale of the problem is large: Pigeon Lake is 603 million cubic meters in volume, approximately 97 square kilometers in size with a shoreline of 46 kilometers. The cyanobacteria outbreaks have had significant impacts on the socio-economic fabric of the watershed. There are high expectations for the PLWA to take actions to stop and ultimately reverse the declining trend in lake health. And there are a multitude of potential mitigation measures for which the PLWA could invest time and energy.

The PLWA needs to act strategically and be effective with limited resources. The PLWMP is a critical tool to assist in decision-making. The PLWA relies on an adaptive management approach and needs a better foundation of information to initiate strategies that effect positive change in the health of the watershed. As much as possible the PLWA needs better baseline information.

A set of directly related information needs have therefore been identified including:

- Beneficial Practices Research
- Socio-Economic Impact Assessment
  - Prepare set of baseline indicators and losses as a result of water quality
- Mapping of Watershed and Priority Landscapes
  - Watershed atlas which illustrates baseline and historic conditions
  - Identify priority landscapes including Environmentally Significant Areas, wetlands, peatlands, riparian areas, etc.
  - Conservation and ecological networks, natural corridors
  - ACA shoreline health mapping integration
  - Riparian health mapping

Improvements to the scientific evidence behind beneficial practices by others would be very beneficial to confirm assumptions:

- Enhanced Water Sampling update: differentiated water quality sampling strategy (as opposed to aggregated) at sub lake basin level in combination with mapping and characterization of lake sub drainage basin areas cover types, agricultural intensity, land use.
- Development of an updated nutrient balance.
- Paleolimnology core sampling to record the fertility of the lake going to at least 1000 years in the past.
- Development of a predictive nutrient model for Pigeon Lake to better assess effectiveness of Watershed and Lake Management options,

## 10 PROPOSED IMPLEMENTATION FRAMEWORK

The timeline for a modular approach for the PLWMP may vary considerably based on number of factors including:

- Stakeholder interest.
- Funding sources, availability and topic orientation.
- Internal management knowledge, resource capability and capacity limitations.
- External technical resource availability.
- Emerging events and public dialogue.

Flexibility in the work program is very important for a small watershed stewardship group. Flexibility is required related to the priority ordering and packaging of topics. Topics are often interconnected. The PLWA continues to seek out and acquire grants to support the PLWMP work. Planning initiatives will only proceed based on committed funds.

Initial priorities already underway include:

- Watershed Beneficial Practices – Fertilizers and Soil Nutrient Practices
- Watershed Beneficial Practices - Model Land Use Bylaws for existing and infill development

Based on the results of the “Are We on Track” engagement report on plan fundamentals, the following topics were identified as priorities: Storm/Surface Water; Riparian Restoration; Priority Landscapes Conservation; Working with the Agricultural Community; and Land Development.

## **11 PLAN ACCEPTANCE**

As the Terms of Reference and as each topic of the PLWMP is produced, a sign off procedure begins.

For the Terms of Reference, the PLWMP Steering Committee must accept the Final Report based on a consensus of the members present. Steering Committee Members are expected to be authorized to provide their acceptance. The PLWA Board must also approve the Terms of Reference. The Terms of Reference will then be presented to the Association of Pigeon Lake Municipalities for their information and posted to the PLWMP and PLWA web sites.

For BMP Topic Reports, when the PLWMP Steering Committee has signed off, the Report will be presented to the Association of Pigeon Lake Municipalities, the Pigeon Lake Watershed Association, and affected stakeholder groups.

## GLOSSARY

This report adopts the glossary of terms commonly in use in the Province of Alberta for Water and Watershed planning, entitled “Glossary of Terms Related to Water and Watershed Management in Alberta – 1<sup>st</sup> Edition” -<http://environment.gov.ab.ca/info/library/8043.pdf>. A few definitional gaps have been filled from a variety of other sources, identified with the glossary definition.

Key terms for use in the Pigeon Lake Watershed Management Plan are:

### **Adaptive Management**

A dynamic system or process of task organization and execution that recognizes the future cannot be predicted perfectly. Planning and organizational strategies are reviewed and modified frequently as better information becomes available. Adaptive management applies scientific principles and methods to improve management activities incrementally as decision-makers learn from experience, collect new scientific findings, and adapt to changing social expectations and demands. (SEM)

### **Alberta Water Council**

A provincial advisory body, including sector representatives from industry, non-government organizations (NGOs), the Government of Alberta and Provincial Authorities, and other governments, established as part of the Water for Life strategy to provide advice to the Government of Alberta regarding water issues. (WCAG)

### **Algae**

Simple single-celled (phytoplankton), colonial, or multi-celled, mostly aquatic plants, containing chlorophyll and lacking roots, stems and leaves. Aquatic algae are microscopic plants that grow in sunlit water that contains phosphates, nitrates, and other nutrients. Algae is either suspended in water (plankton) or attached to rocks and other substrates (periphyton). Their abundance, as measured by the amount of chlorophyll a (green pigment) in an open water sample, is commonly used to classify the trophic status of a lake. Algae are an essential part of the lake ecosystem and provide the food base for most lake organisms, including fish. (NALMS)

### **Algal Bloom**

A heavy growth of algae in and on a body of water that is often triggered by environmental conditions such as high nitrate and phosphate concentrations. The decay of algal blooms may reduce dissolved oxygen levels. (NSWA)

### **Benchmarking**

The process of identifying best practices indicating superior performance. Benchmarks are adopted as targets for optimal organizational performance, and may include standards or environmental management processes. (G&G glossary)

### **Beneficial Management Practices (BMPs) (Beneficial Management Practices)**

Techniques and procedures that have been proven through research, testing, and use to be the most effective and appropriate for use in Alberta. Effectiveness and appropriateness are determined by a combination of: (1) the efficiency of resource use, (2) the availability and evaluation of practical alternatives, (3) the creation of social, economic, and environmental benefits, and (5) the reduction of social, economic, and environmental negative impacts. (BRBC)

### **Blue-Green Algae**

A group of phytoplankton, which often cause nuisance conditions in water. Some produce chemicals toxic to other organisms, including humans. They often form floating scum as they die. Many can fix nitrogen (N<sub>2</sub>) from the air to provide their own nutrient. (NALMS)

### **Collaboration**

A process through which parties that see different aspects of a problem can explore constructively their differences and search for (and implement) solutions that go beyond their own limited vision of what is possible. Collaboration is a mechanism for leveraging resources; dealing with scarcities; eliminating duplication; capitalizing on individual strengths; building internal

capacities; and increasing participation and ownership strengthened by the potential for synergy and greater impact. (SEM)

### **Conservation**

1. The planning, management, and implementation of an activity with the objective of protecting the essential physical, chemical, and biological characteristics of the environment against degradation.

(EPEA)

2. The process of managing biological resources (e.g., timber, fish) to ensure replacement by re-growth or reproduction of the part harvested before another harvest occurs. A balance between economic growth and environmental and natural resource protection. (G&G glossary)

### **Cumulative Effects**

The combined effects on the aquatic environment or human developments arising from the combined environmental impacts of several individual projects. (WCAG)

### **Drainage Basin**

The total area of land that contributes water and materials to a lake, river, or other water body, either through streams or by localized overland runoff along shorelines. (SWQG)

### **Ecosystem**

A community of interdependent organisms together with the environment they inhabit and with which they interact. (BRBC)

### **Ecosystem Functions**

Processes that are necessary for the self-maintenance of an *Ecosystem* such as primary production, nutrient cycling, decomposition, etc. The term is used primarily as a distinction from values. (NALMS)

### **Environment**

The components of the earth, including air, land, and water, all layers of the atmosphere, organic and inorganic matter, living organisms, and their interacting natural systems. (EPEA)

### **Environmental Indicator**

A measurement, statistic or value that provides a proximate gauge or evidence of the effects of environmental management programs or of the state or condition of the environment. (NALMS)

### **Environmental Outcome**

The desired environmental end state defining the specific conditions or functions that one expects for the environment. An outcome is an event, occurrence, or condition that results from an activity or program that has an actual effect on resources, the environment, or Albertans. (IHCR)

### **Eutrophic (*Hypereutrophic, Mesotrophic, Oligotrophic*)**

Pertaining to a lake or other body of water characterized by large nutrient concentrations such as nitrogen and phosphorous and resulting high productivity. Such waters are often shallow, with algal blooms and periods of oxygen deficiency. (NALMS)

### **Framework**

An organized structure of policies, legislation, programs and tasks created to achieve a specific outcome. There can be frameworks for broad policies and strategic initiatives at various scales (e.g. provincial, regional, sector, media); programs and program delivery; and short-term tasks and projects. (SEM)

### **Guideline**

A specific performance measure that is not legally binding unless designated in legislation. It is a guide or indication of a future course of action. It describes how something will be accomplished. It may contain numerical performance measures and may deal with multiple uses of water. (BRBC)

### **Healthy Aquatic Ecosystem (Healthy Lake)**

An aquatic environment that sustains its ecological structure, processes, functions, and resilience within its range of natural

variability. Alberta Water Council. 2008

### **Nutrient**

An element essential for plant or animal growth. Major plant nutrients include nitrogen, phosphorus, carbon, oxygen, sulphur, and potassium. (AARD Web)

### **Outcome *Shared Outcome***

The result of either planned or unplanned actions. For planning purposes, "outcomes" are the desired endpoint and should guide the development and implementation of related programs. Outcomes can be broad and long-term in nature or focused. They are used in both direction setting and performance measurement. (G&G glossary)

### **Partnership**

A relationship in which individuals or organizations share resources and responsibility to achieve a common objective, as well as any resulting rewards or recognition. It often includes a formal contract, new resources and shared risks and rewards. The structure includes a central body of decision-makers whose roles are defined. The links are formalized. Communication is frequent, the leadership is autonomous and the focus is on specific issues. Partnerships are a form of collaboration. (SEM)

### **Point-Source Pollution *Non-Point Source Pollution***

Pollution that originates from one, easily identifiable cause or location, such as a sewage treatment plant or feedlot. (WFL)

### **Policy**

1. A governing principle, plan, or consistent course of action developed in order to meet recognized needs and to achieve specific measurable outcomes. Policies are normally broad, conceptual documents that outline approaches and/or considerations to be taken into account by decision makers. Policies do not act as constraints, but provide information. (SEM)
2. A statement of intent that is not legally binding. It sets direction and expectations for activities. (BRBC)

### **Pollutant**

A contaminant in a concentration or amount that adversely alters the physical, chemical, or biological properties of the natural environment. (USA - EPA)

### **Public and Stakeholder Involvement**

The process used to obtain advice or recommendations from a community and engage them in decision-making. Public and stakeholder involvement is an umbrella term that includes a range of interactive approaches including information and education, consultation, collaboration, partnerships, and delegated authority. (SEM)

### **Riparian**

Pertaining to the banks of a river, stream, waterway, or other, typically, flowing body of water as well as to plant and animal communities along such bodies of water. (NALMS)

### **Shore**

The edge of a body of water and includes the land adjacent to a body of water that has been covered so long by water as to wrest it from vegetation or as to mark a distinct character on the vegetation where it extends into the water or on the soil itself. (PSSSPH)

### **Stakeholder**

An individual, organization, or government with a direct interest in a particular process or outcome. (SEM)

### **State of the Watershed Report**

A document that identifies the current condition of a watershed including the physical, chemical, and biological characteristics of its surface and groundwater and the pressures acting on it. (Partnerships)

### **Stewardship**

A principle or approach whereby citizens, industry, communities, and government work together as stewards of the province's

natural resources and environment. In general terms, stewardship means managing one's life, property, resources, and environment with regard for the rights or interests of others. This can apply to a person, company, community, government or group. Stewardship is an ethic and a value that results from public education and partnerships. It is people-focused in the sense that it relies on the desire and ability of people to make good decisions on their own accord that help resource and environmental outcomes. (SEM)

### **Strategy**

A perspective, position, or plan developed and undertaken to achieve goals. It is the bridge between policy and concrete actions that outlines how a policy will be implemented to achieve its goals. (SEM)

### **Surface Water**

Water bodies such as lakes, ponds, wetlands, rivers, and streams, as well as groundwater with a direct and immediate hydrological connection to surface water (for example, water in a well beside a river). (SSRB)

### **Sustainability**

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. (UN)

The balancing of opportunities for growth with the need to protect the environment. It reflects a vision of a vibrant economy and a healthy environment. Regarding renewable resources (e.g.: water, timber, fish, and wildlife), sustainability involves managing renewable natural resources so that their status, condition, or use is maintained over time. In this context, the use of a renewable resource, or impacts on it from other human activities, should not exceed its capacity to maintain itself through re-growth, reproduction, and management practices. Regarding non-renewable resources (e.g.: coal, oil, gas, and minerals), sustainability involves the development of resources in a responsible manner. This means protecting the environment during the construction and operation phases and ultimately reclaiming the land disturbed by development. In this context, non-renewable resource development is a temporary land use. (SEM)

### **Upland**

An area of dry land surrounding or upstream of a water body. (WCW)

### **Water Act**

A piece of provincial legislation in Alberta used to protect the quality of water and manage its distribution. The *Water Act* regulates all developments and activities that might affect rivers, lakes, or groundwater. (WFL)

### **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)

### **Water for Life: Alberta's Strategy for Sustainability**

The Government of Alberta's water management approach, outlining a comprehensive set of strategies and actions that will ensure Albertans have safe, secure drinking water, healthy aquatic ecosystems, and a reliable quality water supply for a sustainable economy. (GWMT)

### **Water Management**

The protection and conservation of water and aquatic ecosystems, including their associated riparian area. In Alberta, several agencies have a mandate in this area. Alberta Environment is responsible for water quality, quantity monitoring, and water allocations. Under the *Water Act* a Director can set Water Conservation Objectives to protect minimum flow and aquatic ecosystem health. Stakeholders can recommend Water Conservation Objectives to a Director via a Water Management Plan or an Approved Water Management Plan. Alberta Sustainable Resource Development (SRD) manages crown lands including the bed and shores of all water bodies. SRD, through its Fish and Wildlife Division, is also responsible for fisheries and wildlife management. In addition, the Federal Department of Fisheries and Oceans upholds a no-net-loss policy in its mandate to protect fisheries habitat under the Federal *Fisheries Act*. (Partnerships)

### **Water Quality**



The chemical, microbiological, and physical characteristics of water. (FWMP)

### **Water Quantity**

The volume or amount of water. (FWMP)

### **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**

The area of land that catches precipitation and drains into a larger body of water such as a marsh, stream, river, or lake. A watershed is often made up of a number of sub-watersheds that contribute to its overall drainage. (WRCG)

### **Watershed Approach *Place-Based Approach***

A way of thinking and acting that focuses efforts within a watershed, taking into consideration both ground and surface water flow. This approach recognizes and plans for the interaction of land, water, plants, animals, and people. Focusing efforts at the watershed level gives the local watershed community a comprehensive understanding of local management needs and encourages locally led management decisions. (WFL)

### **Watershed Management *Water Management***

The protection and conservation of water and aquatic ecosystems, including their associated riparian area. Because land use activities on the uplands of a watershed can affect ground and surface water quality and quantity, a broader, more comprehensive approach to planning is often required. A Watershed Management Plan may look at water quantity, water quality, aquatic ecosystems, riparian area, as well as a variety of land use issues as they impact water. Watershed management plans require water and land use managers to work together to ensure healthy watersheds. (Partnerships)

### **Watershed Management Plan *Water 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)

### **Watershed Management Planning *Watershed Management Plan***

A comprehensive, multi-resource management planning process involving all stakeholders within the watershed, who, together as a group, cooperatively work toward identifying the watershed's resource issues and concerns as well as develop and implement a watershed plan with solutions that are environmentally, socially and economically sustainable. (NSWA)

### **Watershed Planning and Advisory Council (WPAC)**

Collaborative, independent, volunteer organizations with representation from all key partners within the watershed. Their mandate is to engage governments, stakeholders, other partnerships, and the public in watershed assessment and watershed management planning, while considering the existing land and resource management planning processes and decision-making authorities. (Partnerships)

### **Watershed Stewardship Group (WSG)**

Community-based groups made up of volunteer citizens, often supported by local businesses and industries, who have taken the initiative to protect their local creek, stream, stretch of river, or lake. These proactive groups develop on-the-ground solutions to ensure the protection of their specific watersheds. (WFL)

### **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. (WRCG)

## LITERATURE CITED

- Aquality Environmental Consulting Ltd (Aquality). 2008. Pigeon Lake State of the Watershed Report. *Prepared for Pigeon Lake Watershed Association*. Edmonton, AB  
Online at: <http://www.pigeonlakewatershedassociation.com/Reports--Resources>
- Alberta Water Council. 2008. Recommendations for a Watershed Management Planning Framework for Alberta. Edmonton AB.  
Online at: <http://www.albertawatercouncil.ca/Publications/tabid/59/Default.aspx>
- Alberta Environment. 2001. Framework for Water Management Planning. Edmonton AB  
Online at: <http://environment.gov.ab.ca/info/library/6367.pdf>
- Alberta Environment (AESRD). 2008. Glossary of Terms Related to Water and Watershed Management in Alberta – 1<sup>st</sup> Edition. Edmonton AB. On line at: <http://environment.gov.ab.ca/info/library/8043.pdf>
- Alberta Environment and Water (AESRD). 2012. Management Practices Guide for New Development Near Water Bodies in Alberta's Settled Region. Edmonton AB  
Online at: <http://environment.gov.ab.ca/info/library/8554.pdf>
- Alberta Lake Management Society. 2013. Workbook for Developing Lake Watershed Management Plans in Alberta. Edmonton Alberta. Online at: [http://alms.ca/wp-content/uploads/2014/02/ALMS\\_WMPWorkbook.pdf](http://alms.ca/wp-content/uploads/2014/02/ALMS_WMPWorkbook.pdf)
- Alberta Water Council. 2008. Recommendations for a Watershed Management Planning Framework for Alberta. Edmonton AB  
On line at: <http://www.albertawatercouncil.ca/LinkClick.aspx?fileticket=6xyO8NkXdtY%3d&tabid=59>
- Battle River Watershed Association. 2012. Terms of Reference for the Battle River and Sounding Creek Watershed Planning Process: Phase Two, Camrose AB  
Online at: <http://www.battleriverwatershed.ca/publications/161/view>
- Casey, Richard. 2011. Water Quality Conditions and Long Term Trends in Alberta Lakes. Government of Alberta. Edmonton AB  
On line at: <http://environment.gov.ab.ca/info/library/8544.pdf>
- County of Wetaskiwin. 2014. County of Wetaskiwin – Pigeon Lake Watershed Area Concept Plan-, Wetaskiwin AB
- Clean Air Strategic Alliance and Alberta Water Council (CASA/AWA). 2010. Consensus Decision-Making Toolkit, a Matha Kostuch Legacy. On line at: <http://www.casahome.org/ConsensusProcess/HowCASAWorks/Usingconsensus.aspx>
- Fiera Biological Consulting Ltd. (Fiera). 2012. Review of the “County of Wetaskiwin Pigeon Lake Area Concept Plan - Draft for Public Discussion - March 16th 2012 Version” for Development in the Pigeon Lake Watershed. Edmonton AB  
Online at: <http://www.plwa.ca/files/> (Imbedded in PLWA review of County of Wetaskiwin Pigeon Lake Area Concept Plan)
- Government of Alberta (GOA). No Date. Enabling Partnerships: A Framework in Support of Water for Life: Alberta's Strategy for Sustainability. Edmonton AB 16 pages  
On line at: <http://www.waterforlife.gov.ab.ca/docs/EnablingPartnerships.pdf>
- Government of Alberta (GoA). 2000. Water Act. W-3 RSA 2000. Alberta Queens Printer. Edmonton AB  
Online at: <http://www.qp.alberta.ca>
- Government of Alberta (GOA). 2003. Water for Life – Alberta's Strategy of Sustainability. Edmonton AB  
Online at: <http://environment.gov.ab.ca/info/library/6190.pdf>
- Lilley Environmental Consulting and Dr. Chris Earle (Lilley and Earle). 2000. Pigeon Lake Watershed Management Plan. Sherwood Park, AB  
Online at: [http://www.townlife.com/download/uploads/documents/0000/0191/management\\_plan.pdf](http://www.townlife.com/download/uploads/documents/0000/0191/management_plan.pdf)
- Leduc County. 2011. North Pigeon Lake Area Structure Plan. Nisku. AB  
Online at: <http://www.leduc-county.com/long-range-planning/types-of-statutory-plans/area-structure-plans/north-pigeon-lake-asp>
- Mitchell, P. and E. Prepas. 1990. Atlas of Alberta Lakes. University of Alberta Press, Edmonton, AB. 675 p.  
Online at: <http://alberta-lakes.sunsite.ualberta.ca/>
- Pigeon Lake Watershed Management Plan Steering Committee. 2013a. Pigeon Lake Watershed Management Plan: Watershed Stakeholder Engagement Strategy.
- Pigeon Lake Watershed Management Plan Steering Committee. 2013b. PLWMP Engagement Draft Report, What we heard when we asked: “Are we on Track?": Conclusion and Next Steps.
- Schindler, DW and JR Vallentyne. 2008, The Algal Bowl – Over *Fertilization* of the World's Freshwaters and Estuaries. The University of Alberta Press, Edmonton, AB. 334pp

- Worley Parsons. 2010. Hydrologic Assessment of Pigeon Lake: Hydrogeology, Water Quality, and Water Balance. Prepared for Pigeon Lake Watershed Association Edmonton, AB.  
Online at: <http://www.pigeonlakewatershedassociation.com/Reports--Resources>
- Watt, D and J Unger. 2008 (addendum 2009). The Law and Policy Framework Operating in the Pigeon Lake Watershed. Prepared for the Pigeon Lake Watershed Association by the Environmental Law Centre. Edmonton, AB. 90 pp.

