OLDMAN WATERSHED COUNCIL

watershed management – watershed health

PRIORITIES FOR THE OLDMAN WATERSHED:

Promoting action to maintain and improve our watershed

:: 2011 ::

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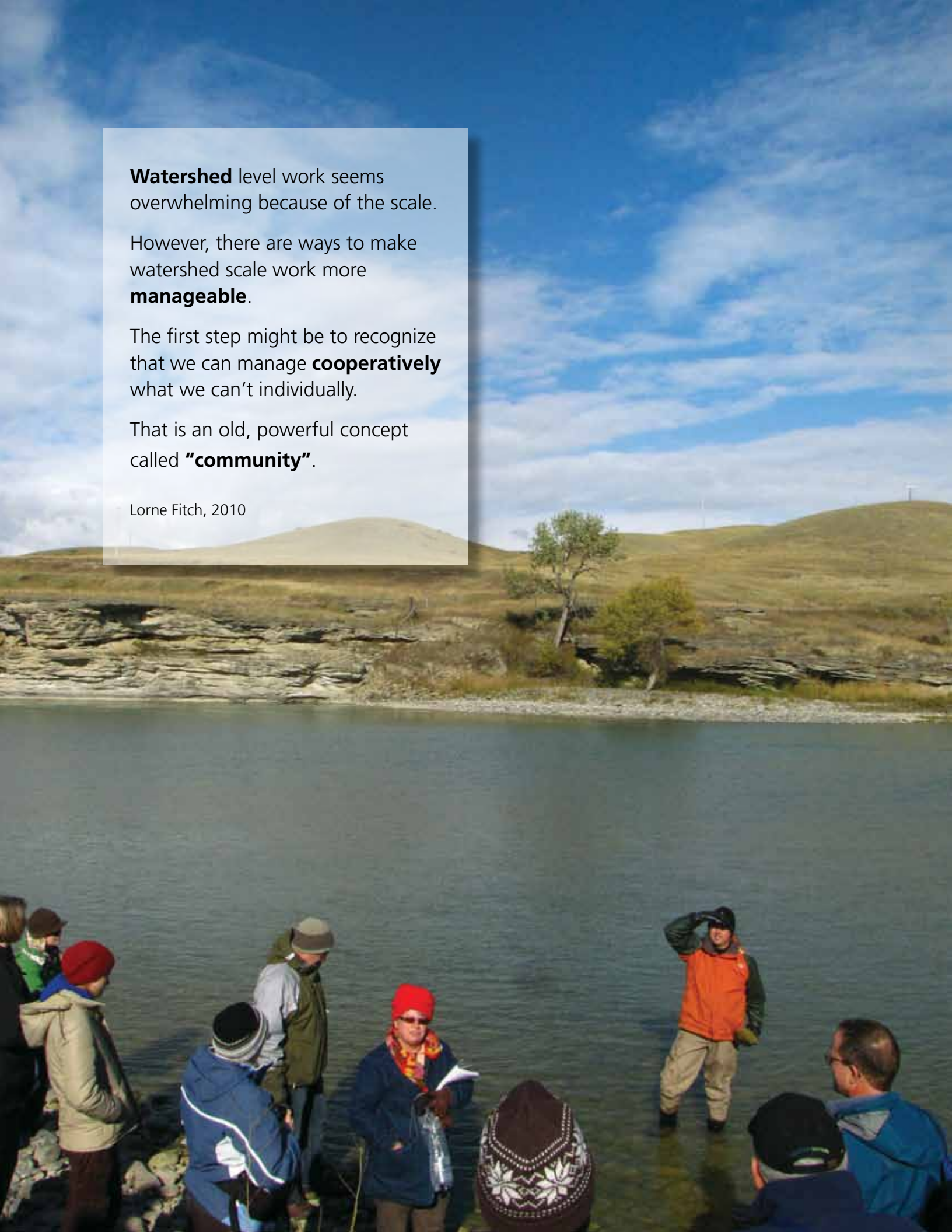

Watershed level work seems overwhelming because of the scale.

However, there are ways to make watershed scale work more **manageable**.

The first step might be to recognize that we can manage **cooperatively** what we can't individually.

That is an old, powerful concept called **"community"**.

Lorne Fitch, 2010

Acknowledgements

At a time when there appears to be more than enough water for the needs of southern Albertans – and those beyond – the Integrated Watershed Management Plan team has been grappling with whether and how this situation can be sustained over the long term. The valuable work previously completed during the State of the Watershed (SOW) report, Visioning, and Risks and Priorities processes, has provided a solid foundation for the team of OWC Board members to draft a planning roadmap for the Oldman Watershed.

Detailed background work by Cheryl Dash, environmental planner with Alberta Environment and Water, and Rosemary Jones, senior parks planner for Alberta Tourism, Parks and Recreation, kept us conversant with what had already been accomplished and what we needed to achieve. They helped us blend the SOW recommendations, vision for the watershed of southern Albertans, 34 priorities of the Core group representing diverse interests in the area, and other initiatives such as the Land Use Framework and South Saskatchewan River Basin Water Management Plan that will impact the Oldman.

The OWC board, as a whole, deserves kudos for establishing the team so it could play a direct role in developing this roadmap. Thanks to OWC board members Shane Petry, who co-chaired the SOW team and provided the continuity and broad experience for this phase of the planning effort, Bill Dolan, whose expertise and analytic approach spurred us on, Cheryl Fujikawa, whose passion for the watershed is exceeded only by her knowledge of and concern for water and Rodney Cyr, who has a special attachment to the headwaters.

The team also welcomed the commitment of new board member Shirley Pickering, who jumped in wholeheartedly after the process started.

Thanks also to the OWC Science, Urban and Rural Teams who go above and beyond with their direct-action, hard work and guidance.

We thank in advance those with public, and private interests and influence, who have helped us see the significance of the finite resource of the Oldman system. We are confident they will take seriously our calls for change where it's needed.

Special thanks to Stephanie Palechek who led the OWC efforts as executive director and kept us on track through this process before moving on to other important endeavors. Her replacement, Shannon Frank, has picked up admirably where Stephanie left off.

And we look forward to continuing planning efforts with the help of planning assistant Linda Cerney.

Richard Burke, Chair
OWC Watershed Management Planning Team 2011

Watershed **Planning Team**

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OWC Board Member, Trout Unlimited Canada - Oldman River Chapter
Chair, OWC Watershed Planning Team

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Watershed Planning: **Our Community Vision**

"A healthy, resilient watershed where people, wildlife and habitat thrive."

Oldman **Watershed Council**

The goal of the OWC Integrated Watershed Management Plan (IWMP) is to engage and empower watershed residents and decision makers to determine environmental outcomes and develop an implementation strategy that will maintain and improve the Oldman watershed. This document is the basis of that strategy.

After a number of years of hard work by the Oldman Watershed Council, in collaboration with watershed residents and stakeholders, significant progress has been made to ensure all facets of the watershed – environment, social, cultural and economic – are represented and considered in the IWMP.

In 2010, the State of the Watershed report was prepared by the OWC, a planning Vision was developed with and confirmed by the residents of the watershed, and a Core Team of stakeholders assessed risks and identified priorities within the watershed.

In 2011, the OWC Board of Directors appointed a Watershed Planning Team to take the critical next steps toward development of the Integrated Watershed Management Plan. We would like to extend our sincere appreciation to the members of this Team who graciously accepted the challenge and have skillfully synthesized the previous work into this document *Priorities for the Oldman Watershed: Promoting action to maintain and improve our watershed.*

We have a long way to go to achieve the goals outlined in this document, but by working together we will be able to meet the great challenge ahead. We rely on the Oldman watershed for our high quality of life and must maintain and improve it for ourselves and for future generations.

Priorities for the Oldman Watershed: Promoting action to maintain and improve our watershed has been carefully reviewed and is hereby endorsed by the Oldman Watershed Council Board of Directors.

Terry Kerkhoff, Chair Oldman Watershed Council
Representing Mayors and Reeves Association of Southwest Alberta

Watershed Management Principles

- Nothing happens in isolation. Everything is connected by the land and water in a watershed.
- Upstream is connected to downstream.
- Water management planning should be based on watersheds.
- What happens on the land is reflected in the water.
- Clean water is critical to the sustainability of our local communities and environment.
- The watershed planning process needs to be community-based and inclusive of all stakeholders.
- Management strategies need to be adaptive to changing conditions and situations.
- Decisions need to be made considering the best available science, local knowledge and experience.
- Monitoring and research are an essential part of water management.
- Large scale landscape improvements require long-term commitment and participation.
- Building momentum through implementation achievements is critical to reaching watershed goals and long-term success.
- Opportunities to learn and participate must be made available.

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Executive **Summary**

The Oldman watershed is facing unprecedented, cumulative pressures from human activities, complicated by the uncertainty of climate change impacts and ongoing concerns about water supply and use in our naturally semi-arid environment. Recreation, logging and oil and gas development on the eastern slopes of the Rocky Mountains, headwaters for our rivers and source of our water supply, are of particular concern.

To manage all these issues, the Oldman Watershed Council (OWC) has been mandated by the Government of Alberta (GOA) to complete an Integrated Watershed Management Plan (IWMP) for the Oldman basin that reflects what residents of the area want to see their watershed look like now and into the future. During phase one of the IWMP process, a community vision and preferred watershed outcomes were established to guide the rest of the plan. Phase two involved identifying the risks that could hinder the achievement of the community's vision and prioritizing the risks based on impact to the watershed. Phase three is this *Priorities for the Oldman Watershed: promoting action to maintain and improve our watershed*. Phase four will involve developing and implementing action plans to reach the eight goals outlined here.

The activities identified in the action plans will take multiple partners to implement and the OWC sees its role in three ways: facilitate the discussion and build partnerships; provide recommendations to agencies with legislative responsibilities, and lead in areas where staff and the membership can make a difference.

The eight goals in the *Priorities for the Oldman Watershed: Promoting action to maintain and improve our watershed*, in order of priority for developing action plans, are:

1. Improve the understanding and strengthen the commitment of residents to the health of the Oldman watershed.
2. Optimize the availability of water for the natural ecosystem while supporting the social and economic needs of the community.
3. Manage and protect the integrity of headwaters and source waters.
4. Identify and prioritize thresholds to manage threats and impacts on terrestrial and aquatic habitat.
5. Understand groundwater and how it interacts with surface water.
6. Identify water quality outcomes and assess factors impacting them for adaptive watershed management.
7. Prevent and control invasive species.
8. Understand the status and implications of emerging contaminants.

The Oldman watershed is facing unprecedented, cumulative pressures from human activities, complicated by the uncertainty of climate change impacts and ongoing concerns about water supply and use in our naturally semi-arid environment.

Because Goal One is necessary to achieve all the other goals, it will be consistently updated in order to communicate information about progress to Oldman watershed residents.

These goals address the current issues and concerns of the community. They encompass all areas of the watershed from the mountains to the foothills and prairies but focus will be on key areas identified in each action plan. Most of the goals have an objective to understand the problem, which will require filling information gaps, most notably for groundwater and emerging contaminants. Monitoring gaps and a lack of baseline data to identify impacts and trends, especially in the headwaters, also require that information be collected and used to inform decision-making. It is critical to take the most appropriate and effective action based on sound science.

The actions taken to reach these goals will help achieve sustainable watershed management where the natural environment can support our economic, social and cultural needs well into the future. Although the current challenges facing the Oldman watershed are large, this plan will bring together the people who have the capacity and desire to make lasting changes.

The OWC's Watershed Planning Team, led by the OWC Board of Directors, created this strategic roadmap based on input from individuals representing a wide range of interests to ensure that all stakeholders are invested in it and will assist in implementing the action plans. New and innovative partnerships will need to be formed because only by working together will these lofty goals become achievable. Fortunately, with a mandate from the Government of Alberta, the necessary scientific expertise, several teams of dedicated volunteers and many strong partnerships, the Oldman Watershed Council is well prepared to lead the community to accomplish these goals.

Recommendations to all levels of government, a key partner with regulatory and water management responsibilities, are included. Their adoption will be vital to the success of the IWMP.

This document is a roadmap for the OWC and its partners for the long term and will be reviewed and updated regularly to adapt to changing conditions and address urgent issues.

Planning **Background**

The Oldman Watershed Council has been given a mandate by the Government of Alberta to complete an Integrated Watershed Management Plan in support of the Water for Life Strategy. This strategic roadmap is a key piece that will guide the development of eight Action Plans.

Albertans continue to care about the health of the aquatic environment, as well as issues concerning water quality and potential future water shortages, especially in southern Alberta. They are also aware of the impacts of climate change, unprecedented economic growth and development, and population demands on Alberta's water resources.

The Government of Alberta's Water for Life: Alberta's Strategy for Sustainability (2003) has proven to be a strong foundation for building local commitment to protecting watersheds and ensuring local sustainability, with an emphasis on working with partners – the Alberta Water Council, Watershed Planning and Advisory Councils and Watershed Stewardship Groups.

The Oldman Watershed Council (OWC) is one of eleven Watershed Planning and Advisory Council's (WPACs) in the province of Alberta working toward fulfilling the goals of the Water for Life: Alberta's Strategy for Sustainability (2003) and reflected in the Water for Life: A Renewal (2008):

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

WATER FOR LIFE KEY DIRECTIONS

- Knowledge and Research
- Partnerships
- Water Conservation

The Oldman Watershed Council (OWC) was formed in September 2004 when the Oldman River Basin Water Quality Initiative (ORBWQI) merged with the Oldman Basin Advisory Committee (BAC). Today, the OWC is an on-the-ground volunteer organization with a dynamic Board of Directors, a number of active teams and a membership of more than 200 individuals and groups who collectively support the responsible management of the watershed.

As an action-oriented, not-for-profit organization with committed volunteers, a wealth of expertise and strong partnerships, the OWC is well positioned to take on the challenge of planning for the future of the watershed and improving it for all residents. Key activities of the OWC include providing recommendations and advice to the Alberta Government, working with municipalities, promoting environmental stewardship practices, improving and sharing knowledge, building stakeholder partnerships and engaging watershed residents on issues related to land and water management.

THE WATERSHED AT A GLANCE

The Oldman watershed is located in the southwest corner of Alberta. Its boundaries reach west along the border of British Columbia, extending north to High River, east past Taber, and south across the 49th parallel into Montana, USA. The size of the watershed is approximately 25,000 km^2 and covers high alpine landscapes, rolling foothills, lush native grasslands, and productive agricultural land. The City of Lethbridge and several towns and hamlets are home to approximately 200,000 people within the watershed.

From west to east, forests give way to grasslands and agricultural land uses. Cultivated agriculture is the main land use activity in the watershed, with approximately 20% of the cultivated land requiring irrigation. Other land use activities include forestry, mining, recreation, and oil and gas extraction which, together with agriculture, have an influence on 60% of the total land base.

THE COMMUNITY VISION

In the spring and summer of 2009, the Oldman Watershed Council set out to build a foundation for the integrated watershed management plan (IWMP) by gathering community input and direction through the development of a watershed planning vision. Face-to-face interviews were conducted with people who live and work in the Oldman watershed including: residents, farmers, ranchers, business owners, government agents, and members of watershed groups and other non-profit organizations. These watershed residents were asked to discuss their vision for the watershed in the next 10, 20 and 50 years, identify barriers and opportunities and provide direction to the Council as the planning process continues. From the information gathered, and a number of additional surveys and public opportunities, a watershed planning vision was developed. To accompany this vision, a series of five qualitative outcomes were built to link planning and management decisions to the community vision.

Watershed Vision

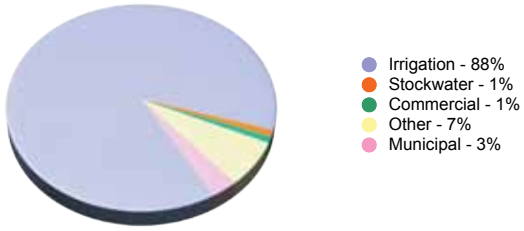
- A healthy, resilient watershed where people, wildlife and habitat thrive.

Watershed Outcomes

1. Environmentally aware, responsible and motivated watershed residents.
2. A safe and secure water supply.
3. Balanced allocations and wise management of water.
4. Abundant, healthy and biologically diverse aquatic and terrestrial ecosystems in particular riparian areas, native grasslands, headwaters, native fish, and forested areas.
5. Land managed for multiple use with minimal impact on natural, cultural and historic assets.

The Oldman Watershed Council has prepared a detailed process summary and results document titled: Oldman Watershed Planning Vision: A Process Summary that describes how the outcomes and vision were developed.

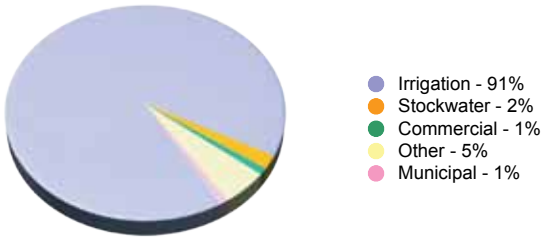
Water License Allocations in the Oldman Watershed (SSRB Report 2010)



Various land and water activities occur in the Oldman Watershed. The total number of surface water license allocations is currently dominated by agriculture, particularly irrigation. The second highest water license allocation is in the "Other" category sector which includes water management activities (i.e. water level stabilization projects and storage development), fish and wildlife habitat enhancement and water conservation.

Source: SSRB Water Supply Summary, 2010.

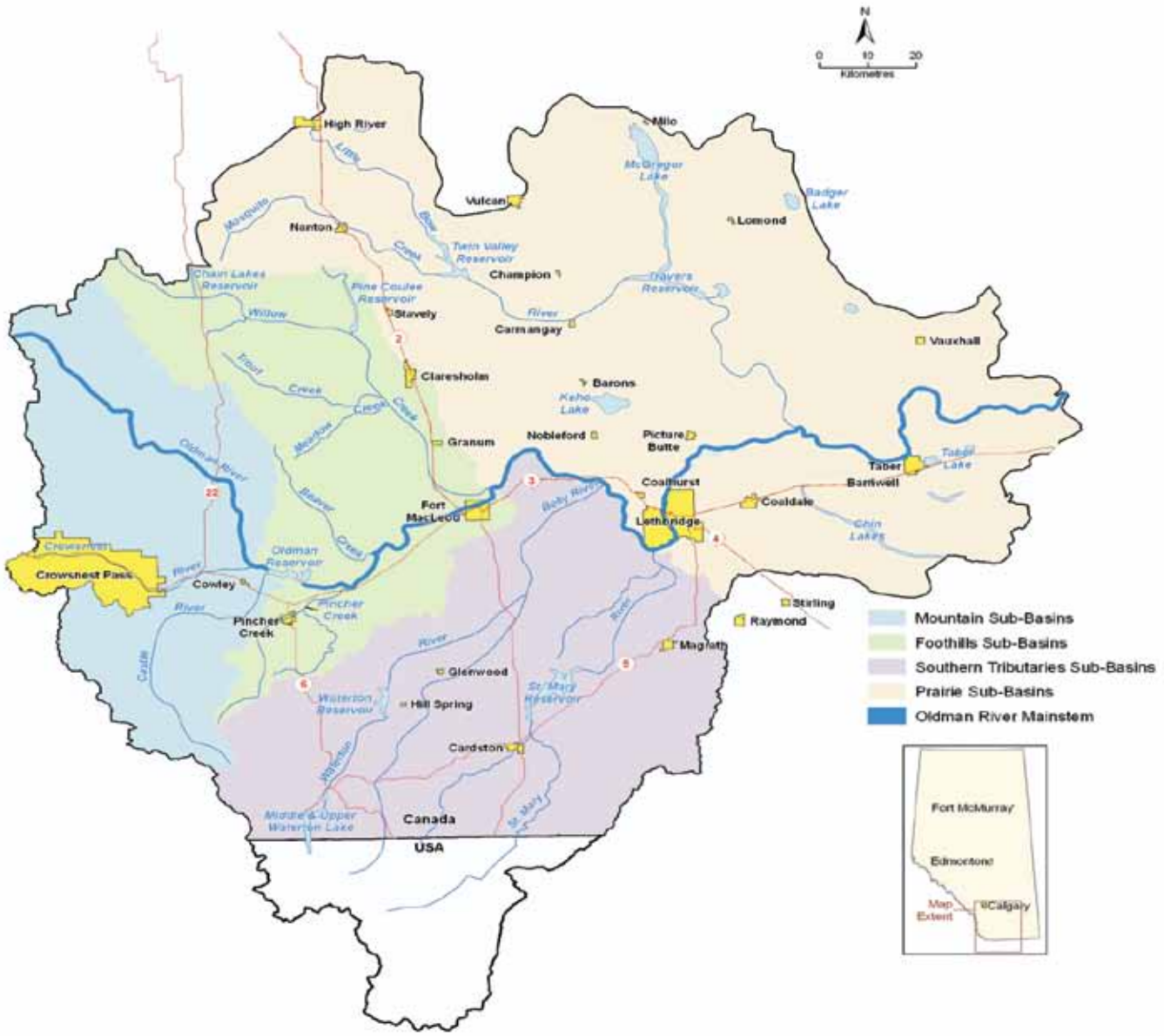
Current Surface Water Use in the Oldman Watershed (2006 Data)



Irrigation is the highest water use sector. Its infrastructure provides water to communities, industries, recreational facilities, waterfowl habitat, livestock and hydropower facilities.This chart represents the various land and water use activities within the Oldman Watershed and the percentage of total licensed surface water allocation actually used. Municipal and stockwater supplies are other vital water users.

Source: SSRB Water Supply Study, 2006.

Oldman Watershed



For many of us, water simply flows from a faucet, and we think little about it beyond its point of contact. We have lost a sense of respect for the wild river, for the complex workings of a wetland, for the intricate web of life water supports.

Sandra Postel, Last Oasis: Facing Water Scarcity

Sub-basins of the **Oldman Watershed**

Mountains

The Mountains Sub-basins include the Crowsnest River, Castle River, and Upper Oldman River. The headwaters of these streams arise in the high peaks of the continental divide. Dams are absent, so these streams have near-natural flows. Forestry and recreation, together with some mining and oil and gas, are the main land uses in these basins.


Castle River


Pincher Creek at the town of Pincher Creek

Foothills

The Foothills Sub-basins include Willow Creek, Pincher Creek and Beaver Creek. These creeks are fed by alpine snowmelt and natural springs. Agriculture is the primary land use in these sub-basins.

Prairie

The Prairie Sub-basins are characterized by slow meandering waterways, including the Little Bow River, Mosquito Creek and a number of small, closed creek systems. These basins have been extensively cultivated and the waterways are highly managed with a series of reservoirs and diversion structures.


Oldman River at the city of Lethbridge


St. Mary River at the town of Cardston

Southern Tributaries

The Southern Tributaries include the Waterton, Belly, and St. Mary rivers. These rivers originate in the mountains of Waterton-Glacier International Peace Park, then flow through grassland and agricultural land. Large dams and diversions store and direct river flows to many irrigation districts.

THE STATE OF THE WATERSHED REPORT

The Oldman River State of the Watershed (SOW) report released in the spring of 2010, provides the context from which the OWC may begin to consider planning at a more detailed or local level. To understand the relationship between the SOW and the integrated watershed management plan, it should be understood that the SOW used indicators to provide a snapshot of sub-basin (and overall watershed) health in a general context. This snapshot was based upon information available at the time and allowed for the use of consistent indicators for measurement across the Oldman watershed at a broad scale. It included expert opinion to help form final rankings throughout the Oldman watershed.

For example, in the Mountain Sub-basins, the assessment of environmental indicators (Terrestrial and Riparian, Water Quantity and Water Quality) resulted in rankings of "Good" for each indicator resulting in a "Good" overall ranking for the group of Mountain Sub-basins. However, large data gaps make assessment difficult at any sort of local scale. In contrast, data is plentiful in the Southern Tributaries Sub-basins which received an overall assessment of "Fair". However, the assessment considered the fact that the headwaters of the Waterton, St. Mary and Belly rivers reside in National Parks in Canada and the United States and are largely protected from adverse environmental impacts resulting from development and or water diversion. This basin-level assessment means that impacts resulting from water diversions at certain locations in each of the basins in Alberta are tempered by the scale of assessment.

These scale and indicator limitations are also clear when considering indicators such as land cover, particularly in the Mountains Sub-basins. The assessment of land cover is at a basin scale and considers rock and barren ground as a land cover type which can affect rankings relating to land cover (amount disturbed relative to amount available regardless of whether it is accessible) and also affects the assessment of linear disturbance (shows smaller amount of linear disturbance relative to size of land base). It is also important to fully appreciate that portions of the Mountains Sub-basins area (south-western Alberta in general) have some of the highest observed densities of linear disturbance in Western North America (Sawyer and Mayhood, 1998). In addition, significant data gaps exist for impacts from activities such as extensive recreational use (random camping, off-road vehicle use on authorized and unauthorized trails or roads etc.) making assessment of soil erosion and sediment inputs difficult. Similar generalizations and data gaps exist for the other sub-basins in the SOW.

It may be that further data gathering and or analysis is a necessary part of the planning process when planning at a more detailed spatial scale or when considering future management plans. A well thought-out planning exercise where participants are fully aware of the opportunities and limitations will undoubtedly result in a balanced watershed management plan for all who live in the Oldman watershed.

The State of the Watershed report provides a snapshot of the entire watershed under current land use and hydrologic conditions, and is a critical element in the overall planning process. The report describes land use in detail, identifies areas of knowledge gaps, future trends and developments, and provides an overall basin health assessment (see Table 1) as delineated in four sub-basins and the Oldman mainstem. The sub-basins identified were: Mountain, Foothills, Southern Tributaries, and Prairie.

Indicators were chosen as general measures of environmental quality to show trends in conditions in the sub-basin assessments. The indicators chosen for the OWC State of the Watershed Report were:

Terrestrial and Riparian Ecology: land cover; soil erosion rates; riparian health; and land use;

Although the Oldman River State of the Watershed report ranked water quality, quantity and land use effect on water along the watershed's length, the assessments had limitations.

TABLE 1: OVERALL STATE OF THE WATERSHED FOR ALL INDICATORS BY SUB-BASINS

	Sub-Basins					
Indicator	Mountain	Foothills	Southern Tributaries	Prairie	Mainstem	Oldman Watershed
Terrestrial and Riparian	Good	Good	Fair	Poor	Good	Fair
Water Quantity	Good	Fair	Poor	Fair / Poor	Poor	Fair
Water Quality	Good	Fair	Fair	Fair / Poor	Good / Fair	Good / Fair
Overall	Good	Fair	Fair	Fair / Poor	Fair	Fair

Water Quantity: trends in natural flow; actual use vs. natural flow; performance in meeting instream objectives and water conservation objectives in recent years; and irrigation and municipal water use efficiency: and

Water Quality: nutrients (nitrogen and phosphorus); total suspended solids (TSS); E.coli/fecal coliform.

The Oldman watershed is a complex environment, highly influenced by human development. The State of the Watershed report pulled the current information together to help us understand the overall health of the Oldman watershed, identify where future research is required and build a foundation for an educated decision-making approach in the integrated watershed management planning process.

IDENTIFYING RISK AND SETTING PRIORITIES

Building on the information gathered through the visioning work, and the baseline information from the State of the Watershed Report, the Oldman Watershed Council invited a Core Team of residents to represent the full range of sectors and interests to discuss risk and identify a preliminary set of planning priorities based on sound science, social desires and economic considerations.

The Core Team of 37 stakeholders who live, and/or work, in the Oldman Watershed were guided through a process to provide input on a set of priorities to be considered in the planning process. After four workshops, the Core Team identified 34 risks to the watershed and began setting some priority targets.

The Core Team members provided a subjective ranking of the Risk Statements, identifying the top 10 risks in most need of action. The full priority list is in Appendix B on page 40.

Top 10 Risk Statements:

1. Lack of understanding of cumulative effects
2. Degradation and loss of aquatic and terrestrial habitat
3. Headwater degradation
4. Financial incentive structures do not match our environmental objectives e.g., draining a wetland to increase crop production; more value to the landowner and decrease in value to the environment
5. Insufficient understanding/knowledge of watershed
6. Impaired water quality
7. Lack of conservation/inefficient use of water
8. Lack of knowledge of the relationship between groundwater and surface water
9. The presence of invasive and/or non-native species
10. Failing to define value of water (economic, social, environmental)

Broad recommendations were pulled together from workshop discussions to guide and be considered in the decisions being made by the Oldman Watershed Council Board of Directors while developing the integrated watershed management plan.

The Oldman Watershed Council has prepared a detailed process summary and results document titled: Oldman Watershed Planning Priorities: Process Summary and Recommendations to describe how the risks and priorities were discussed, developed and agreed upon.

"Every human should have the idea of taking care of the environment, of nature, of water. So using too much or wasting water should have some kind of feeling or sense of concern. Some sort of responsibility and with that, a sense of discipline."

The 14th Dalai Lama Tenzin Gyatso

PLANNING DEVELOPMENT

With the community planning vision and qualitative outcomes developed, the scientific background from the State of the Watershed released, and a set of priorities identified, the Oldman Watershed Council is well prepared to develop *Priorities for the Oldman Watershed: Promoting action to maintain and improve our watershed*. This roadmap, supported by extensive community input (Appendix A), will direct the OWC in planning and action in the watershed.

A Watershed Planning Team, appointed by the Board of Directors, sorted through the information to condense, bring focus and build a set of goals that would be implemented through Action Plans. It was clear that the OWC had many roles to play in watershed management but will need to rely on partnerships to make it happen. Part of the discussions involved identifying what the OWC could lead on, who the OWC could partner with, and what the OWC would provide recommendations on. This was a pivotal realization.

A series of Action Plans will be developed as the next step to complete the Oldman Watershed Council's Integrated Watershed Management Plan (IWMP). Recognizing that water quality and quantity are the main drivers for the Oldman Watershed Council, these Action Plans will consider both water and land and their interactions. As the Council continues to understand cumulative effects, air and biodiversity will be linked in one system.

These Action Plans will form watershed scale outcomes that will provide recommendations to decision makers, stakeholders, and residents in the watershed. These decision makers include all agencies, regulatory or otherwise, that have some responsibility for watershed management within their mandate.

"We never know the worth of water till the well is dry."

Thomas Fuller, Gnomologia, 1732

Issues and Challenges **in the Watershed**

Everything we do in the Oldman watershed has the potential to affect the quality and quantity of our ground and surface water.

Water is naturally limited in the Oldman watershed because of low precipitation and high evaporation. Meeting the rising water demands of a growing population is a major challenge to future growth in our region. Dams, canals, highways, farmland, parks, industries, commercial forests, towns and the City of Lethbridge are all part of the Oldman watershed. Approximately 10,000 oil and gas wells, 600 livestock feedlots, and 85 wastewater treatment facilities make their marks on the watershed.

Contaminants from these and other activities enter our streams, rivers and aquifers constantly, travelling with natural runoff over the land, seeping through the soil into ground water, or issuing from point sources such as storm water outfalls or irrigation return ditches. In addition, soil compaction, logging, dams, dugouts, hardtop driveways and roads all change the way water travels through our watershed, affecting both water quality and quantity.

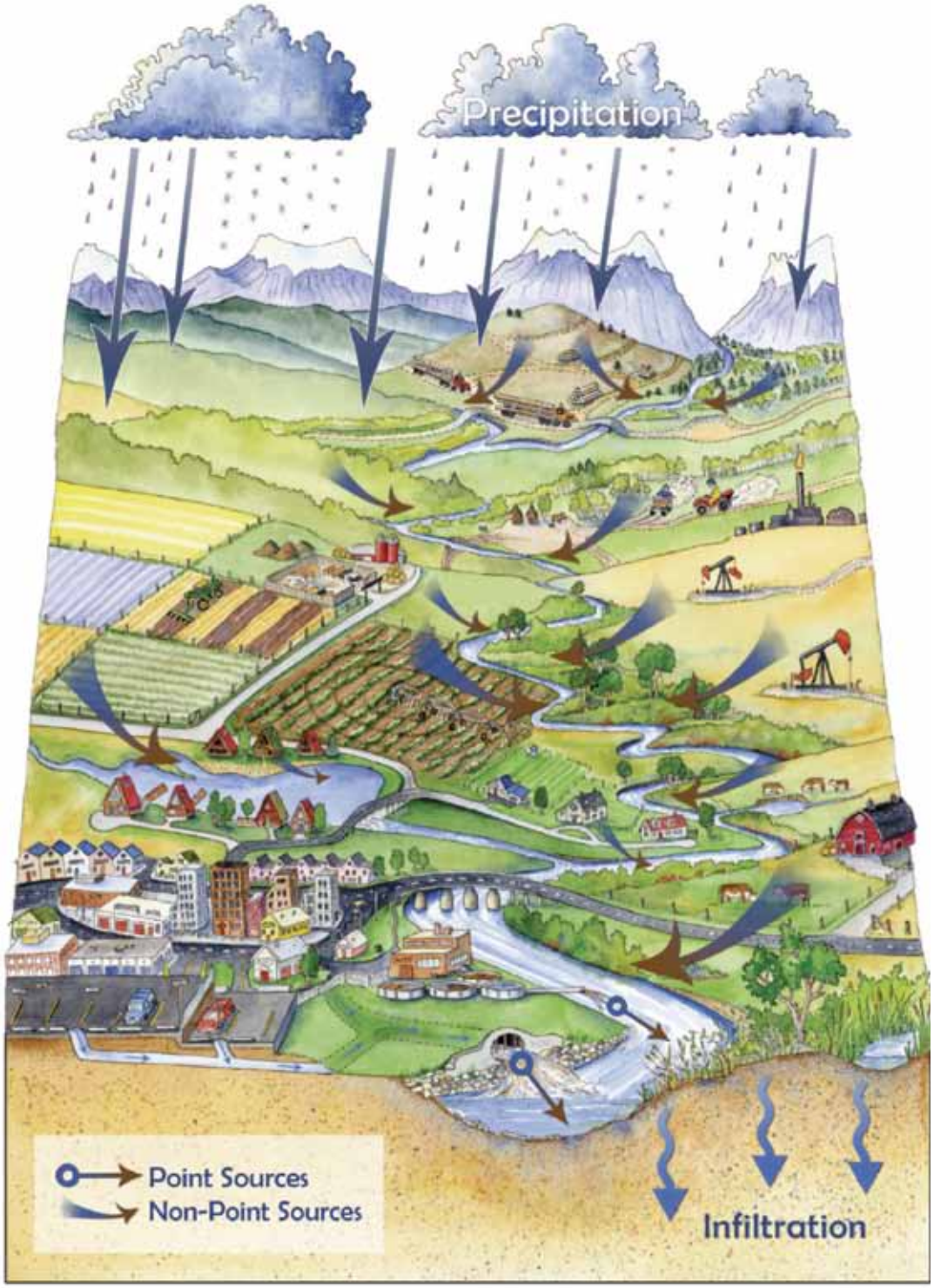
Economic growth patterns and other significant cultural factors are influencing a societal shift toward predominantly urban populations, with more intensive land use practices and residential development, as well as greater demand for recreational opportunities and developments. These factors lead to an abundance of issues and present considerable challenges for those committed to the maintenance of water quality and quantity within the watershed.

Threats to the watershed include:

- Urban, country residential, industrial and agricultural expansion
- Emerging contaminants
- Climate change unpredictability
- Increasing recreational activity in the headwaters
- Changing political landscape
- Demand for natural resources

An integrated watershed management plan outlines a process to address priority land and water resource issues across the watershed. This roadmap will enable residents, stakeholders and all levels of government in making responsible decisions. The implementation of its actions not only includes improvements to the environment, but also social, cultural and economic benefits. Working within watersheds gives people the opportunity to address not only water quality and quantity, but community and habitat issues and cumulative impacts of land use practices beyond the scope of single jurisdictions like towns or municipalities.

What is a **Watershed**?



WATER IS A UNITING FORCE

It cycles around the globe, falling from the sky, moving across the land, sinking into the soil, travelling down our rivers, or up our wells.

A watershed (or a basin) is an 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. No matter where you are, you're in a watershed.

Watersheds can range in size from a few hectares to thousands of square kilometres. The watershed for the Oldman River covers 25,000 sq km (about 15,500 sq mi), extending north to High River, east to Grassy Lake, west to the Crowsnest Pass, and south past the 49th parallel into Montana's Glacier International Peace Park.

The Oldman watershed has three very important jobs: 1) it captures water in the form of snow and rain, 2) it filters and stores the water in the ground, and 3) it releases water, as surface run-off or groundwater, into the Oldman River and its tributaries. Industry, farming and development on the uplands of a watershed can affect the quality and quantity of its ground and surface water.

Planning and **Legislative Considerations**

It is important to recognize that the OWC's IWMP is not the only planning exercise occurring. Provincial, regional, municipal and local scale activities are taking place in and around the Oldman River watershed. Ensuring that the Oldman watershed outcomes integrate with the other regional, provincial or local outcomes, as part of the system, is extremely important.

As Action Plans are being developed and recommendations drafted, planning teams will identify and link to the most appropriate plan, regulation or Act to ensure activities don't conflict with legislation or existing plans. The Oldman Watershed Council may provide recommendations to government if concerns or better applications are identified.

Some of the key plans, policies and legislative pieces are listed below. A more complete list, with the associated website, is found in Appendix C on page 43.

- Alberta *Agricultural Operation Practices Act*, Revised Statutes of Alberta 2000, Chapter A-7
- *Alberta Land Stewardship Act*, Statutes of Alberta, 2009 Chapter A-26.8
- *Alberta's Land-use Framework: South Saskatchewan Regional Advisory Council's Advice to the Government of Alberta*
- *Approved Water Management Plan for the South Saskatchewan River Basin (Alberta)*, August 2006
- *Environmental Protection and Enhancement Act*, Revised Statutes of Alberta 2000, Chapter E-12
- *Fisheries Act*, RSC, 1985, c. F-14
- *Fisheries (Alberta) Act*, Revised Statutes of Alberta 2000, Chapter F-16
- Master Agreement on Apportionment administered by the Prairie Provinces Water Board (PPWB)
- Municipal Sustainability Plans
- *Public Health Act*, Revised Statutes of Alberta 2000, Chapter P-37
- *Water Act*, Revised Statutes of Alberta 2000, Chapter W-3
- *Water for Life: Alberta's Strategy for Sustainability* (Recommendations for Renewal released November 2008)
- *Water Management Plans for the Upper Highwood and Upper Little Bow Rivers*

All of us in the Oldman watershed belong to some community, usually at a municipal or county level; it could be a small watershed group operating on one of the many tributaries to the major rivers.

At those levels, every community boundary includes a larger portion of the watershed than that of an individual property owner. Add the work of many communities (and watershed groups) together and much of the Oldman watershed might be found in those boundaries.

All of us that live in the Oldman watershed are part of it and are connected to one another.

Lorne Fitch, 2010

Priorities for the **Oldman Watershed**

A Watershed Management Plan provides broad guidance regarding water conservation and management, sets clear and strategic directions regarding how water should be managed, or results in specified actions.

(Glossary of Terms Related to Water and Watershed Management in Alberta, 2008)

The Oldman Watershed Council clearly understands that watershed management is a shared responsibility. The strength of the watershed management plan is that the goals and objectives of the plan were identified and prioritized through consensus and a collaborative process with representative stakeholders within the watershed. By involving stakeholders from every sector at the beginning, those who will be affected by the plan are aware of the priorities and can position themselves to contribute to and adapt to actions taken during the plan implementation. Partnerships will continue to be developed and strengthened as those who will implement the plan from communities and organizations are engaged.

During the spring and summer of 2011, the Watershed Planning Team for the Oldman Watershed Council began combining the issues brought forward by experts in various science disciplines (documented in the State of the Watershed report) and those identified by local people (attained through the community-based Phase 1: Visioning exercise and the collaborative, stakeholder-based Phase 2: Priority Setting and Risk Assessment process). After considerable deliberation as well as consultation with the OWC Teams, the Watershed Planning Team agreed to eight priority planning goals that incorporate the 34 risk statements from the Core Team deliberations. These eight planning goals will be further refined in local and watershed scale activities described in Action Plans. Although these goals appear to be broad and general, they provide a logical integration of issues that were identified.

The following pages identify the eight priority planning goals in order of priority, and provide details on scope and scale and their related objectives. Along with this information, Key Partners and the OWC Teams have been identified. Recognizing that the SOW is the foundational piece of information, the SOW gaps, trends and priorities have also been listed under each Goal. These were grouped by the Watershed Management Planning team according to the best fit.

While there is a natural linkage and interconnection between the eight goals and 27 objectives listed, the Watershed Planning Team has identified that Goal One – Improve the understanding and commitment of residents to the health of the Oldman watershed – must be developed and implemented in concert with the entire process. This goal supports, connects, communicates and emphasizes the Oldman Watershed Council's direction in understanding and improving the watershed. As the eight Action Plans are developed, education and communication activities will be identified to help improve the understanding of, and commitment to, the watershed.

GOAL ONE

Improve the understanding and strengthen the commitment of residents to the health of the Oldman watershed

Making changes to behaviour and seeing action on the landscape is paramount to achieve watershed planning goals. Continued support by knowledgeable watershed residents is vital. A targeted education and outreach program will be necessary to communicate the importance and benefits of the actions being taken. The OWC will also need to forge new partnerships, strengthen existing relationships, collaborate and coordinate with key groups and individuals in order to take on new projects to meet our unique challenges.

OBJECTIVES

- Develop an awareness program to communicate the issues and priorities for action in the watershed.
- Initiate partnerships to deliver watershed education programs to youth.
- Report and publish achievements and actions as they relate to the Oldman Watershed Priorities.

KEY PARTNERS

Watershed residents, media, schools, NGO's, Universities, Colleges

OWC TEAM CONNECTION

All teams – Communications and Outreach Team, Urban Team, Rural Team, Watershed Science Team

SOW LINKAGE

None identified, but is a foundational piece to fulfill the SOW and planning activities.

This goal is about educating and developing commitment and so it is linked to all goals. It is also linked to the OWC Strategic Plan 2011-2013 and was identified as a priority throughout Phase 1 and Phase 2.

Working with the community is the single most important activity while building a watershed plan. Without the commitment from residents and the collective understanding of direction, the implementation of a plan would be next to impossible. We need to make it personal.

The Watershed Planning Team, 2011.

GOAL TWO

[Optimize the availability of water for the natural ecosystem while supporting the social and economic needs of the community]

The Oldman watershed is located in a semi-arid ecosystem where drought is common and water is at a premium. High water withdrawal in drought years often means our rivers and creeks suffer from low flows. We must acknowledge that we need healthy, functional waterways to support human health, communities and prosperity and manage our scarce water accordingly. Management decisions in the past were made looking at individual operations or requests. Tradeoffs have been made and more may need to be considered as we manage our water into the future.

We must understand our past decisions, consider cumulative effects, identify targets and thresholds and develop strategies to make changes to address the environmental concerns we face today. Social, cultural and economic priorities must be considered.

We can work towards solutions for the future by understanding water supply and demand while striving for a fully functional conveyance system that minimizes water loss.

OBJECTIVES

- Understand the availability and variability of our water resource while considering cumulative effects.
- Optimize the efficiency and productivity of water that is withdrawn from our rivers.
- Understand how the unpredictability of climate change will affect the availability of water and the ability to maintain watershed integrity.
- Identify adaptive climate change management strategies to minimize risk to the environment, society and economy.
- Understand the demands and deficits in the system in order to meet ecological needs of the natural ecosystem.

KEY STAKEHOLDERS

Research institutions, industry, all levels of government, irrigation sector, NGOs

OWC TEAM CONNECTION

Board of Directors

SOW LINKAGE

- Expand public education and awareness of water and water use within the Oldman watershed.
- Consider modifying allocations and other options to achieve sustainable water use levels in the future, especially within the Southern Tributaries Sub-basins and Oldman River mainstem.
- Current natural flow data extends only to 2001. Up-to-date natural flows for all indicator hydrometric stations is needed.
- On unregulated streams, such as the Castle River and Lee Creek, there is no way to meet Instream Objectives (IOs) or Water Conservation Objectives (WCOs) that are set higher than natural flows. On such streams, instream targets should be limited to a target value or natural flow, whichever is less, to avoid a false impression of mismanagement. On regulated streams, the IOs and WCOs could be set higher than natural flow to provide instream benefits beyond that of natural conditions or to mitigate anthropogenic impacts. Such instream conditions could become targets for regulation of stream flow.
- Increased monitoring and systematic compilation of actual water use and return flow data are needed.
- Further studies of water supply and demand should be carried out to assess options for sustainability.
- Continue to monitor flows and land use changes in Beaver Creek and Little Bow River to determine what is causing the decrease in flows.
- Economic growth patterns and factors influencing a shift from rural to urban populations as well as increased pressure for intensive recreational developments (e.g., on Travers Reservoir, off highway vehicles (OHV) use, etc.) are difficult to measure within the Oldman watershed. Population changes have been noted in this SOW report. However, an indicator that measures economic growth within the watershed should be considered for future reports.
- Establish targets under a municipal planning framework for municipalities with increasing populations and land use pressures. These targets can establish short, medium and long-term goals or thresholds that reflect their capacity to supply municipal drinking water, and water for industrial or recreational purposes.
- The ability to use indicators in mass balance calculations and assessment of influences in the watershed scale is limited with the current data because of an absence of simultaneous data for concentrations of indicators and stream flow, which limits calculations of loadings.

GOAL THREE

[Manage and protect the integrity of headwaters and source waters]

Clean, potable drinking water is critical for human life and, therefore, a necessity for prosperous sustainable communities. Protecting water at its source, or before it arrives at our treatment facilities, is more ecologically and economically responsible and a preventative approach to water management.

A number of land use activities may impact the quality of our headwaters and source waters. It makes sense to reduce the risk of contamination by ensuring that good land management is practiced throughout the watershed, and especially when located near a drinking water source.

OBJECTIVES

- Identify and understand the hydrologically significant areas in the headwaters.
- Identify, mitigate and prevent threats to headwaters and source waters.
- Define the kinds, and intensity, of land use activities as they relate to source water and headwater significant areas.

KEY PARTNERS

All levels of government, research institutions, recreationists, industry, NGOs, landowners

What is an ecosystem?

An ecosystem is a biological environment consisting of all the organisms living in a particular area, as well as all the non-living (abiotic), physical components of the environment with which the organisms interact, such as air, soil, water and sunlight.

http://en.wikipedia.org/wiki/Ecosystem

OWC TEAM CONNECTION

Watershed Science Team, Rural Team, Urban Team

SOW LINKAGE

- Develop adaptation plans to manage potential declining flows in Beaver Creek and Little Bow River sub-basins. Trends in other Sub-basins should be updated on a regular basis: continue to monitor diversion rates, timing of withdrawals, and return flow volumes within the watershed.
- Add forest harvest data to supplement the land use assessment.
- The extent of forest harvest areas could be added to the land use disturbance for the Mountain, Foothills and Southern Tributaries sub-basins. Perhaps the harvest areas within the last 5 to 10 years could be added as well as the areas that have been reforested to regeneration standards.
- Incorporate random-use recreation data, if available, into the land use assessment.
- Random recreation data in terms of linear extent of active trails, number of users or number of random campsites was not readily available particularly in the Mountain, Foothills and Southern Tributaries sub-basins.

The management of point and non-point sources of pollution will be an important component of watershed planning in the Oldman watershed. The cumulative impact of all sources must be considered and carefully weighed in developing goals, objectives and actions in the watershed, or more specifically within a sub-basin. We can't just focus on an individual point source; an overall integrated approach will be essential for success.

The Watershed Planning Team, 2011.

"Water is the driver of Nature."

Leonardo da Vinci

Hydrologically significant areas most actively contribute to runoff generation and provide a direct hydrological link between landscape and primary source water bodies. They are the areas within a watershed where the distribution of surface water is concentrated or where groundwater is recharged or discharged i.e., lakes, rivers, swamps, springs and wetlands.

http://soilandwater.bee.cornell.edu/research/VSA/waterquality.html

GOAL FOUR

[Identify and prioritize thresholds to manage threats and impacts on terrestrial and aquatic habitat]

Our activities on the landscape play a critical role in determining ecosystem health. To promote healthy aquatic and terrestrial ecosystems, we must recognize the role that we play and identify the impacts of the many different types of land use within the watershed. These activities are interconnected, and awareness of these impacts will be instrumental in accurately assessing the overall health of the sub-basins and the Oldman watershed as a whole. Partnerships with landowners and land managers implementing beneficial management practices are essential to achieving change in the watershed.

OBJECTIVES

- Assess, understand and evaluate the threats to and impacts on terrestrial and aquatic habitat.
- Develop management strategies to address impacts on terrestrial and aquatic habitat.

KEY PARTNERS

All levels of government, research institutions, recreationists, industry, NGOs, land managers, land owners

OWC TEAM CONNECTION

Watershed Science Team, Rural Team, Urban Team

SOW LINKAGE

- Support the Cows and Fish program, especially in the Oldman River mainstem.
- Expand public education and awareness of water and water use within the Oldman watershed.
- Support implementation of good stewardship practices.
- Support rural beneficial management practices: off-stream watering systems, riparian zone protection, buffer strips, manure incorporation (Oldman River Basin Water Quality Initiative Five Year Summary Report 2005).
- Support urban beneficial management practices: storm water management; water conservation (Oldman River Basin Water Quality Initiative Five Year Summary Report, 2005).
- Continue with beneficial management practices, including field shelter belts, avoidance of overgrazing, summer fallowing, and reduced tillage.
- Consider implementing and monitoring source and erosion controls for all new developments and in areas with exposed earth; moving livestock watering, holding, and over wintering areas away from stream banks; and minimizing the width of stream crossings.
- Implement drainage erosion control measures including revegetation and reforestation as soon as possible following surface disturbance.
- Areas of moderate to high risk of soil erosion may require additional land management practices to ensure the continued health of riparian and aquatic life. Model soil erosion at a scale relevant to individual activities.
- Potential soil erosion rates were predicted by a computer model Agricultural Region of Alberta Soil Inventory Database (AGRASID) from a base map at a scale of 1:100 000. Depending on the land use issues, soil erosion could be modeled at a scale relevant to the

individual activities. For example, additional modelling could be done for areas within the Oldman watershed with fair to poor soil erosion rankings (i.e., 25 to >50% risk of erosion). Mapping of the local soils within these areas, to the soil series level, and using this information in the AGRASID model would generate local erosion risk values that can inform future management decisions.

- Undertake the monitoring programs to support adaptive management for environmental protection and mitigation, such as the plan recommended by the Highwood Management Plan Public Advisory Committee to assess performance of the Highwood Diversion Plan and support adaptive adjustments.
- Establish targets under a municipal planning framework for municipalities with increasing populations and land use pressures. These targets can establish short, medium and long-term goals or thresholds that reflect their capacity to supply municipal drinking water, and water for industrial or recreational purposes.
- The population of the municipalities outside of the towns and villages was assumed to be uniformly distributed, which may not always be the case.
- Currently, on unregulated streams (e.g., Castle River and Lee Creek) there is no way to meet IOs or WCOs that are set higher than natural flow. On such streams, instream targets should be limited to a target value or natural flow, whichever is less.
- On regulated streams, the IO and WCO could be set higher than natural flow to provide instream benefits beyond that of natural conditions or to mitigate human impacts. Such instream conditions could become targets for regulation of stream flow.
- Use data from the soon to be complete Grasslands Vegetation Inventory in five years to re-evaluate land cover.
- There are no land use data for the Peigan (North Piikani) and Blood (Kainai) Indian Reserves No. 147 and 148 in the Foothills and Southern Tributaries sub-basins. Land use data for the Peigan (North Piikani) and Blood (Kainai) Indian Reserves Nos. 147 and 148 should be incorporated into the five-year update of the State of the Watershed report.
- Land cover data for the Sub-basins is taken from the Native Prairie Vegetation Inventory and AVI based on aerial photography of 1992 to 1993 and 1988 respectively, while data for Waterton National Park was from interpretation of 1997 Landsat imagery. To present more recent data, the Statistics Canada census of 2006 was used to provide detailed information on agricultural lands and crop types. These data generally show that a larger area of each Sub-basins has been disturbed by agricultural activities compared to the older land cover data. This difference should not be considered a trend of increasing land conversion to agriculture. Rather, the difference reflects the way the data are collected, the accuracy of the original air photo interpretation (80%), as well as the difficulty of distinguishing vegetation classes that are fairly similar such as native prairie from seeded or tame pasture land.
- There were several limitations to the use of the agriculture land cover data from Statistics Canada. In several cases only a portion of the 2006 agricultural area of the MDs or Counties were located in the Sub-basins, so the land use was assumed to be uniformly distributed over the portion of each municipality or county, which may not always be the case.
- Livestock data, in the form of animal unit months (AUMs) for publically-managed land and location of confined feeding operations (CFOs) for private lands are presented in this report. The AUM data provide information on the land's carrying capacity but the CFO data does not. Further reports should consider an indicator that combines carrying capacity information for both public and private livestock operation.
- Economic growth patterns and factors influencing a shift from rural to urban populations as well as increased pressure for intensive recreational developments (e.g., on Travers Reservoir, off highway vehicles (OHV) use, etc.) are difficult to measure within the Oldman watershed. Population changes have been noted in this report. However, an indicator that measures economic growth within the watershed should be considered for future reports.
- The ability to use indicators in mass balance calculations and assessment of influences in the watershed scale is limited with the current data because of an absence of simultaneous data for concentrations of indicators and stream flow, which limits calculations of loadings.
- Biodiversity could be considered as an indicator of aquatic ecology in future state of the basin reports.

GOAL FIVE

[Understand groundwater and how it interacts with surface water]

Source waters may be surface water, such as a lake, reservoir or river, or groundwater; the Oldman watershed contains both. With the Oldman watershed closed to new surface water allocations, the demand for groundwater will increase. Research is required to determine the quality and availability of groundwater, the extent of current use and its relationship with surface water. Currently our knowledge is limited. The priority is to ensure that aquifers are protected and groundwater/surface water interaction and integrity are sustained across the watershed.

OBJECTIVES

- Develop an education program about groundwater and the importance of protecting it.
- Research the availability and quality of groundwater and its interaction with surface water.
- Understand the impacts of different land use activities on ground and surface water interactions.

KEY PARTNERS

All levels of government, science and research community, education systems, well drillers, groundwater users, NGOs

OWC TEAM CONNECTION

Watershed Science Team, Communications and Outreach Team, Rural Team

SOW LINKAGE

- Research on availability of groundwater, the extent of current use, and the relationship between groundwater use and surface water flows is needed, particularly since closure of surface water to new licenses allocations.
- A groundwater indicator should be identified and included in future State of the Watershed reports.

"In every glass of water we drink, some of the water has already passed through fishes, trees, bacteria, worms in the soil, and many other organisms, including people... Living systems cleanse water and make it fit, among other things, for human consumption. "

Elliot A. Norse, Animal Extinctions

GOAL SIX

[Identify water quality outcomes and assess factors impacting them for adaptive watershed management]

We all rely on good quality water; not just drinking water, but water in general. It is important to recognize that water quality and water quantity are inseparable; they mutually affect our health, the economy and the ecosystem. Although much is known about point source (end of pipe) water quality and quantity, it is more difficult to track non-point source effects, eg., recreation activities, storm water management, agriculture, industry, etc. Consequently, we need to gain a better understanding of social trends and behaviours, and further enhance the levels of tracking and monitoring of non-point source water quality and quantity, starting in the areas within the watershed where the water quality has been identified as poor. Watershed assessments and ongoing monitoring will track water quality trends and pinpoint the priority areas in the watershed requiring action.

OBJECTIVES

- Assess water quality in the Oldman basin through a regular monitoring program.
- Identify water quality objectives along the mainstem and tributaries.
- Research and assess the causes of water quality issues from point and non-point sources.
- Understand the cumulative impact of land activities on water quality and quantity.
- Develop and recommend management strategies to mitigate water quality concerns.
- Communicate research and monitoring results to watershed residents and stakeholders.

KEY PARTNERS

Research institutions, all levels of government, NGOs

OWC TEAM CONNECTION

Watershed Science Team, Communications and Outreach Team

SOW LINKAGE

- Consider development of "Riparian Policies" throughout the watershed to protect areas that are key to managing water quality indicators, such as total suspended solids (TSS) and fecal coliforms.
- Trends in water quality indicators could not be determined for many sites of interest in the Oldman watershed because of a lack of water quality data collected on a regular basis. Most of the data available and used were collected for reasons other than long-term statistical analysis and, therefore the period of record was relatively short.
- The ability to use indicators in mass balance calculations and assessment of influences in the watershed scale is limited with the current data because of an absence of simultaneous data for concentrations of indicators and stream flow, which limits calculations of loadings.

- Develop a watershed-wide monitoring approach for nutrients (nitrogen and phosphorus), total suspended solids (TSS) and fecal coliforms that will support watershed-wide assessments.
- A monitoring program that will support watershed adaptive management plans and decision making processes has to be developed. This program could use the existing data to the extent possible and provide regular data to update trends, loadings, and future mass balance modelling. Review all current monitoring programs to determine how well they are providing the information base required for adaptive management.

"All the water that will ever be is right now."

National Geographic

GOAL SEVEN

[Prevent and control invasive species]

After habitat destruction, invasive species are considered the next greatest threat to biodiversity and the health of our water resource. The presence of these species in and around the Oldman watershed causes the loss of unique ecosystems and native species. Recognizing that water and land are interconnected, sustainable land management practices will benefit aquatic communities. The focus will be on understanding aquatic and riparian invasive species, their early detection and prevention.

"We must strive to become good ancestors."

Ralph Nader

To establish strong relationships with land owners and municipalities through consensus decision making will help to reduce conflicts and overlap with municipal bylaws and improve cross jurisdictional communication.

The Watershed Planning Team, 2011.

OBJECTIVES

- Establish a prevention and control program for invasive aquatic and riparian species.
- Identify species of concern, establish consensus and recommend management strategies.

KEY PARTNERS

Agricultural field staff, all levels of government, recreational boaters, anglers, aquatic industry, water infrastructure owners/users, land owners, NGOs

OWC TEAM CONNECTION

Rural Team, Urban Team, Communications and Outreach Team, Watershed Science Team

SOW LINKAGE

None identified, however actions are connected to land use and best management practice activities.

GOAL EIGHT

Understand the status and implications of emerging contaminants

Contaminants entering the Oldman watershed have the potential to affect the health of humans, crops, livestock and natural ecosystems.

These emerging contaminants can have a significant effect on our, personal, economic, social, cultural and environmental well-being.

Monitoring for, and early detection of, emerging contaminants is essential for the implementation of adaptation measures to minimize impacts on users and the environment.

"We have probed the earth, excavated it, burned it, ripped things from it, buried things in it.... That does not fit my definition of a good tenant. If we were here on a month-to-month basis, we would have been evicted long ago."

California Chief Justice Rose Elizabeth Bird (1936-1999)

OBJECTIVES

- Identify and prioritize potential emerging contaminants and their impacts.
- Raise awareness and understanding of emerging contaminants.
- Work in partnership with key research and industrial stakeholders to mitigate the effects of emerging contaminants in the watershed.

KEY PARTNERS

Research institutions, all levels of government, health regions, agriculture

OWC TEAM CONNECTION

Watershed Science Team, Board of Directors

SOW LINKAGE

None identified.

Recommendations

During the process leading to the development of these priorities, discussions with residents, stakeholders, and members of OWC working teams highlighted a number of recommendations to be considered by government agencies and the Oldman Watershed Council as planning and implementation proceeds. These recommendations may be specific to the Oldman basin or reflective of what is needed across the province of Alberta. Members of the Core Team clearly identified that Cumulative Effects Management (CEMS) was their first priority of concern and in need of action. Without a collective understanding and delivery of a CEMS approach in the watershed, haphazard development, growth and negative behaviours will continue.

The Oldman Watershed Council trusts that those agencies directly linked to the recommendations take them seriously and will provide feedback or support to strengthen their commitment ensuring our watershed, and those across the province, continue to thrive ecologically while social and economic needs are met.

RECOMMENDATIONS FOR GOVERNMENT

Cumulative Effects Management

Cumulative effects are the combined effects of past, present and future activities, over time, on the environment, economy and society in a particular place. The Government of Alberta has developed an approach to environmental management to manage cumulative effects and individual activities that adversely affect the environment. The Government needs to expedite this process to get a handle on the unprecedented growth and demands being placed on the environment.

Monitoring

The Government of Alberta needs to take the lead and responsibility for comprehensive water quality and quantity monitoring. Having current, consistent and high quality data to evaluate change on the landscape is paramount to making wise management decisions. Without this information the identification of emerging issues and tracking trends is difficult.

In partnership with the Oldman Watershed Council, government experts (local, provincial and federal) need to develop a watershed-wide monitoring program for nutrients (nitrogen and phosphorus), total suspended solids (TSS), fecal coliforms, invasive aquatic species and emerging contaminants that will support watershed-wide assessments.

Monitoring is a significant component in meeting the goals and achieving the actions in this plan. Understanding trends should be considered a priority.

Wetlands and Riparian Areas

A consistent and robust set of policies addressing development in or near wetlands and riparian areas for the Province of Alberta is a must. As the population of Alberta continues to grow, and changes in both urban and rural settings continue, these sensitive areas risk being altered. In addition to their ecological importance, wetlands and riparian areas are valuable for controlling flood water and thus help minimize damage costs and threats to public safety. Because these unique areas are valuable to all four pillars of a sustainable community (environment, economy, culture and society) their good management needs to be a top priority.

Multi-jurisdictional Communication and Cooperation

The Province of Alberta is shifting towards an integrated environmental management system using partnership and place based approaches. All levels of government (local, provincial and federal) need to communicate and work together to streamline planning projects, requests and expectations of WPACs and their stakeholders.

Water Conservation Objectives

The Government of Alberta must show leadership in reviewing existing water conservation objectives to restore and protect the aquatic ecosystem in regulated and unregulated rivers and streams in the province.

Stewardship

Good stewardship (taking care of our watershed) needs to occur at many different levels and scales. Stewardship practices linked to watershed priorities need to be promoted and maintained through education programs, recognition programs, incentive programs, implementation funding and support.

Sediment and Erosion Control

Municipal and Provincial Governments need to work with land developers and industry to create an erosion control monitoring and implementation program for all new developments and areas with exposed earth. This could include developing an awareness or education component to complement the regulatory one.

Research and Innovation

New problems require new solutions. Old problems require new solutions. The Provincial and Federal governments should cooperate and show leadership in supporting innovation and research to understand and mitigate watershed issues. This could include a number of incentive programs.

Traditional Knowledge

The Oldman basin landscape is a reflection of European and First Nations activities. Understanding and incorporating traditional knowledge into management strategies and actions will help to develop a culturally sensitive community.

The Government of Alberta should encourage First Nation participation and inclusion in all activities related to watershed management. WPACs require support and training to strengthen these relationships.

RECOMMENDATIONS FOR THE OLDMAN WATERSHED COUNCIL

After review of the Oldman Watershed State of the Watershed report, the following recommendations and actions highlight top priority areas of watershed/water management concerns for the Board to consider immediate action on.

Water Quantity Performance

Water quantity and quality are linked. To understand the quality issue, we need to understand quantity and how it performs in the overall system. The mainstem downstream of Oldman River Reservoir and two of the four sub-basin tributaries are rated as poor or marginally poor in the SOW. The SOW indicates that actual use of the allocated water supply is substantially less than the allocation and if these allocations were fully implemented there would be significant increasing deficits to junior licenses and instream objectives, particularly in the Southern Tributaries and on the mainstem during low flow periods. The SOW also draws attention to the application of current instream objectives and water conservation objectives as effective management tools and flags the need for these objectives to be reassessed and adjusted to provide a more accurate picture of actual supply and demand. It is further indicated that water supply and water quality are showing signs of a declining trend in some streams of the Foothills and Prairie Sub-basins. This trend requires further assessment as it may be related to changes in land use and water management practices.

Key actions:

- Further studies of surface water supply and demand should be carried out to assess for alternative water management options (groundwater, surface water, storage, etc.) to find the best water balance for human and environmental water demands in key main stem reaches and tributaries. This updated information base should enable a cumulative effects strategy to be taken to direct further detailed assessment of identified water supply challenged mainstem reaches and tributaries and to examine management of the main water storages for opportunity to reduce these deficits. This activity needs to be supported by the development of integrated water resource management modeling tools supported by established performance criteria to assess for improving water quantity management. It should be noted that these tools will also assist in assessing water quality performance in water quantity terms.
- Further flow and water quality monitoring programs and studies are needed to determine factors impacting water quantity. Given that water quantity and quality are linked, the scope of these programs and studies should include addressing water quality concerns, particularly in the Foothills and Prairie Sub-basins. The SOW has indicated that Beaver Creek and Little Bow River are showing declining trend in annual natural flow and that other tributaries within the Foothills sub-basin are showing signs of possible flow decline trends during some months of the year. Some of these tributaries are showing increasing trends to poorer water quality for almost all of the parameters. As part of addressing these issues, it is recommended that watershed-wide monitoring for nutrients, total suspended solids, and fecal coliforms be developed to support watershed-wide assessments with a current focus on the Foothills and Prairie Sub-basins. As well, a comprehensive land use assessment should be completed to identify source water impacts on problematic tributaries within these two sub-basins.

Headwater Management

Contradicting views and information about the state of the headwaters indicate further research is required to determine the actual headwaters condition. While the SOW identifies that the Mountain sub-region is in overall 'good' condition, anecdotally, residents and stakeholders disagree. Gaps in knowledge need to be filled before a true assessment of the cumulative impact of headwater activities have, or will have, on the watershed.

With current headwater management and protection in the Oldman watershed, further headwater degradation is at risk if action is not taken immediately. It is the OWC's responsibility to highlight and thoroughly investigate what is happening in the headwaters through research and targeted communication activities. The OWC can work with government agencies and non-government organizations to build trust and respect to take control and manage activities on the landscape now, for long term productivity in the watershed.

Timeline and **Priorities**

Over the next five years, the Oldman Watershed Council will lead in the development, assessment and review of eight Action Plans as identified in this document. Stakeholders and the OWC will have opportunities to revisit these priorities during this time period to adapt to changing issues and needs in the watershed. This document provides the OWC with direction and clarity of purpose.

After consideration of the State of the Watershed, the Visioning process and the Core Team risk and priority setting work, the Watershed Management Plan Team recommends that the priority for Action Plan development follow the list below.

ACTION PLAN DEVELOPMENT PRIORITY

1. Improve the understanding and strengthen the commitment of residents to the health of the Oldman watershed.
2. Optimize the availability of water for the natural ecosystem while supporting the social and economic needs of the community.
3. Manage and protect the integrity of headwaters and source waters.
4. Identify and prioritize thresholds to manage threats to and impacts on terrestrial and aquatic habitat.
5. Understand groundwater and how it interacts with surface water.
6. Identify water quality outcomes and assess factors impacting them for adaptive watershed management.
7. Prevent and control invasive species.
8. Understand the status and implications of emerging contaminants.

As a reminder, the Watershed Planning Team identified that Goal One be developed and implemented in concert with the entire process. Improve the understanding and commitment of residents to the health of the Oldman watershed connects, communicates and directs the broader strategic purpose of the Oldman Watershed Council.

These Action Plans are like a roadmap for the watershed, laying out where we want to go and how we want to get there. They will focus on actions that need to be completed in order to meet our goals and objectives. The Action Plan format will also include a measurement of success for each action, partner agencies that will assist in implementation, a target timeframe to complete the action, specific target areas in the watershed for the action, and a reference to the specific objective that each action will accomplish.

Conclusion

Watershed Planning: Our Community Vision

"A healthy, resilient watershed where people, wildlife and habitat thrive."

The Oldman Watershed Council recognizes that the landscape is changing; there are increasing demands and competition for resource access and use. Various levels of government responsible for the management of these lands and resources are being challenged to meet and or manage these demands while protecting the integrity and needs of the watershed.

By developing the *Priorities for the Oldman Watershed*, the Oldman Watershed Council has a roadmap to more thoroughly understand the watershed condition. During this time, socioeconomic and environmental circumstances will change and the needs and priorities of watershed residents and stakeholders will change as well. As a result, this document is meant to be adaptive, not written in stone. The OWC, with advice from its members, has the ability to adjust objectives and modify Action Plans to meet the changing needs in the watershed.

Continued community engagement and commitment; research and innovation; knowledge and action are paramount. The key to success is the development of achievable Action Plans in which watershed stakeholders and residents work together. We are all part of this watershed.

The *Priorities for the Oldman Watershed: Promoting action to maintain and improve our watershed* will be reviewed annually by the Oldman Watershed Council Board of Directors to confirm relevance and ensure progress towards meeting the watershed goals is being made. If the actions we take are not allowing us to reach our goals, we may need to revise actions or add new ones, or alter our goals to be more realistic. In five years, the implementation results will be taken out to the community and stakeholders again for a thorough review and revised as required.

Glossary and **Acronyms**

Alluvial Aquifer
Subsurface geological unit along a river or stream that is hydraulically connected to the surface water body. This is an unconfined aquifer but not all unconfined aquifers are in alluvial deposits (Bow River Basin Council, 2008).

Anthropogenic Impacts – human impacts on the environment
The effect resulting from human activity (i.e. deforestation, overgrazing) to the biodiversity and other resources within the environment (http://en.wikipedia.org/wiki/Anthropogenic).

Aquatic Ecosystem
The Water Act defines the aquatic environment as the components of the earth related to, living in or located in or on water or the beds or shores of a water body, including but not limited to: 1. all organic an inorganic matter, and 2. living organisms and their habitat, including fish habitat, and their interacting natural systems (Alberta Environment, 2011).

Ecological Goods and Services (EGS)
Economic and social benefits resulting from the natural processes of a healthy environment and biodiversity. These are available to all of society and are essential to sustaining a healthy and prosperous way of life. They include groundwater recharge, flood and erosion control, wildlife habitat, productive soils, carbon dioxide sequestration and abundant clean air and water (Bow River Basin Council, 2008).

Goal (as used in this report)
A goal is the desired result a person or a system envisions, plans and commits to achieve; personal or organizational desired end-point in some sort of development within a finite time period through setting deadlines Objectives, Goals, Strategies. (http://en.wikipedia.org/wiki/Objective_(goal)).

Groundwater
Water located beneath the ground surface in soil pore spaces and in the fractures of geologic formations. A formation of rock/soil is called an aquifer when it can yield a useable quantity of water. Groundwater that is in an aquifer that readily flows naturally under the ground to surface water bodies is considered surface water for licensing purposes in Alberta (Alberta Environment, 2006).

Hydrologically Significant Areas
Hydrologically significant areas most actively contribute to runoff generation. They are the regions more susceptible to producing runoff which provide a direct hydrological link between landscape and primary source water bodies. They are the areas within a watershed where the distribution of surface water is concentrated i.e., lakes, rivers, swamps (http://soilandwater.bee.cornell.edu/research/VSA/waterquality.html).

Headwaters
The source for a stream, located in the upper tributaries of a drainage basin (South Saskatchewan Regional Advisory Council, 2011).

Instream Objectives (IO)
Flows that are to remain in the stream to protect instream values or some portion of them. IOs in the Oldman watershed have been developed using a variety of methodologies, some of which have a more scientific basis and provide a higher degree of protection than others. Some IOs provide limited protection of the aquatic environment (Oldman Watershed Council, 2010a).

Integrated Land Management (ILM)
The strategic planned approach to managing and reducing the human-caused footprint on public land. ILM is not a plan or a process. ILM is a way of doing business and a way of thinking, by sharing the land and working together so that land users can reduce their impact on the land (South Saskatchewan Regional Advisory Council, 2011).

License Allocation
The Water Act defines allocation as the volume, rate and timing of a diversion of water (Oldman Watershed Council, 2010a).

Mainstem
In relation to hydrology, a mainstem is "the primary downstream segment of a river, as contrasted to its tributaries". Another common term for the mainstem, the final large channel of a riverine system, is the trunk. Water enters the mainstem from the river's drainage basin, the land area through which the mainstem and its tributaries flow (http://en.wikipedia.org/wiki/Main_stem).

Natural Flow
Natural flow is the flow in rivers that would have occurred in the absence of any man-made effects on, or regulation of, flow. For the purposes of water management, natural flow is a calculated value based on the recorded flows of contributing rivers; a number of factors concerning the river reaches (e.g. evaporation, channel losses, etc.); and water diversions. This is also known as "reconstructed flow" and "naturalized flow" (Alberta Environment, 2006).

Non-point Source
Pollution that cannot be traced to a single site or source. It is often characterized by garbage, trash, fertilizers, oils, pesticides and other waste and debris (La Salle River Watershed Planning Authority, 2010).

Objective (as used in this report)
An end that can be reasonably achieved within an expected timeframe and with available resources. In general, an objective is broader in scope than a goal, and may consist of several individual goals. Objectives are basic tools that underlie all planning and strategic activities. They serve as the basis for policy and performance appraisals. Objectives, Goals, Strategies (http://www.businessdictionary.com/definition/objective.html).

Point Source
Pollution from a single identifiable source, such as a wastewater effluent pipe discharging into a river (La Salle River Watershed Planning Authority, 2010).

Potable Drinking Water
Drinking water or potable water is water pure enough to be consumed or used with low risk of immediate or long term harm (http://en.wikipedia.org/wiki/Drinking_water).

Private Water Source
A surface or groundwater source that provides water to a single connection, most often a home or farm (Little Saskatchewan River Conservation District, 2010).

Public Water Source
A surface or groundwater source that provides water to a system with 15 or more service connections (Little Saskatchewan River Conservation District, 2010).

Riparian
The area along streams, lakes and wetlands where water and land interact. These areas support plants and animals, and protect aquatic ecosystems by filtering out sediments and nutrients originating from upland areas (South Saskatchewan Regional Advisory Council, 2011).

Semi Arid Ecosystem
What differentiates an arid ecosystem from a semi-arid ecosystem is the amount of precipitation the area receives. A semi-arid ecosystem can support more plant and animal species than an arid ecosystem. Plants like shrubs, small trees, succulents and some grasses can exist in semi-arid regions (http://www.ehow.com/facts_7473288_arid-semiarid-ecosystems.html).

Semi-Public Water Source
A surface or groundwater source that supplies a system that is not public or private and consists of less than 15 service connections, or supplies a single public facility such as a school or hospital (Little Saskatchewan River Conservation District, 2010).

Source Water
Raw/untreated water received for treatment to provide potable water to municipal, industrial or private users. Sources may include high quality groundwater, groundwater under the influence of surface water and surface water from a lake, stream, river or watercourse (South Saskatchewan Regional Advisory Council, 2011).

Terrestrial Ecosystem
A terrestrial ecosystem is an ecosystem found only on a landform. Five primary terrestrial ecosystems exist: tundra, taiga, temperate, deciduous forest and grassland. A community of organisms and their environment that occurs on the land masses of continents and islands. Terrestrial ecosystems are distinguished from aquatic ecosystems by the lower availability of water and the consequent importance of water as a limiting factor (http://en.wikipedia.org/wiki/Terrestrial_ecosystem).

Total Suspended Solids (TSS)
A qualitative measure of the solid organic or inorganic particles that are held in suspension in wastewater, effluent, or water bodies, determined by tests for "total non-filterable residue" (Oldman Watershed Council, 2010a).

Tributary

A tributary or affluent is a stream or river that flows into a mainstem (or parent) river or a lake. A tributary does not flow directly into a sea or ocean. Tributaries and the mainstem river serve to drain the surrounding drainage basin of its surface water and groundwater by leading the water out into an ocean or sea. A confluence where two or more bodies of water meet together, usually referring to the joining of tributaries (http://en.wikipedia.org/wiki/Tributary).

Water Allocation

The amount of water that can be diverted for use, as set out in water licenses or the Water Act. These allocations include maximum amounts of water that can be withdrawn as well as the rate of withdrawal. They are generally based on the maximum amount of water a licensee is expected to be consumed or required within the licensing period (Alberta Environment, 2007).

Water Conservation Objective (WCO)

The Water Act defines WCOs as the amount and quality of water necessary for the protection of a natural water body or its aquatic environment, or any part of them; protection of tourism, recreational, transportation or waste assimilation uses; or management of fish or wildlife. WCOs were established in the Oldman watershed following completion and government approval of the South Saskatchewan River Basin Water Management Plan (Oldman Watershed Council, 2010a).

Water Management Plans (Cabinet Approved)

Establish water allocation transfers and associated water conservation holdbacks under the Water Act. The plan may include the additional guidance items in a plan NOT approved by cabinet, but requires Cabinet authority to enable water allocation transfers (Alberta Environment, 2006).

Water Management Plans (not Cabinet Approved)

Provide guidance for water management decisions under the Water Act. This may include regulatory guidance, strategic directions or outline specific regulatory and non-regulatory actions (Alberta Environment, 2006).

Watershed Integrity

The quantity and quality of water a watershed produces relative to natural conditions and climate variability; a measure of the degree of natural ecological structure and function within a watershed (South Saskatchewan Regional Advisory Council, 2011).

Water Use

The combination of consumption and losses or, alternatively represents the difference between the amount of water diverted and the return flow (Alberta Environment, 2007).

Wetland

Land saturated with water long enough to promote wetland or aquatic processes as indicated by the poorly drained soils, vegetation and biological activity that is adapted to a wet environment (South Saskatchewan Regional Advisory Council, 2011).

Acronyms

AARD	Alberta Agriculture and Rural Development
AENV	Alberta Environment
AGRISID	Agricultural Region of Alberta Soil Information Database
ASRD	Alberta Sustainable Resource Development
ATPR	Alberta Tourism, Parks and Recreation
AUM	Animal Unit Months
BAC	Basin Advisory Committee
CEMS	Cumulative Effects Management System
CFO	Confined Feedlot Operation
DFO	Department of Fisheries and Oceans
EGS	Ecological Goods and Services
GOA	Government of Alberta
GVI	Grassland Vegetation Inventory
ILM	Integrated Land Management
IO	Instream Objective
IWMP	Integrated Watershed Management Plan
MD	Municipal District
NGO	Non Government Organization
OHV	Off Highway Vehicle
ORBWQI	Oldman River Basin Water Quality Initiative
OWC	Oldman Watershed Council
RAC	Regional Advisory Council
SOW	State of the Watershed
SSRB	South Saskatchewan River Basin
SSRP	South Saskatchewan Regional Plan
TSS	Total Suspended Solids
WCO	Water Conservation Objective
WPAC	Watershed Planning and Advisory Council

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Appendix **A**

Summary of Watershed Consultation

Process	Timeline	Description	Consultation Process						Contacts
Phase 1: Watershed Planning Vision and Qualitative Outcomes	April 2009 – March 2010	To set the foundation for the development of the integrated watershed management plan, this process set the foundation for the community watershed vision. The watershed planning Vision statement and a set of qualitative outcome statements were developed.	One-on-one interviews 37	Website questionnaire 50	Delphi Survey 155	Community Workshops (Cardston, Taber, Pincher Creek, Lethbridge, Nanton) 65	Youth Forum (grades 7 – 12) 33	Post Secondary 16	**356**
Phase 2: Risk Assessment and Priority Setting	September 2010 – March 2011	Building on the Visioning process, a group of stakeholders were pulled together to discuss risk and set priorities for watershed planning.	Core Team 38						**38**
Priorities for the Oldman Watershed	May 2011 – October 2011	The Oldman Watershed Council Board of Directors pulled together a team of Board members to discuss and build a roadmap for watershed planning for the next 5 years.	OWC Watershed Management Planning Team 11	OWC Board of Directors 17	Core Team 20	Community Information Sessions and Questionnaires 125			**173**
								Watershed Contacts	**567**

Appendix **B**

Summary of Risk Statements

During Phase 2 of the Integrated Watershed Management Planning process, the Core Team developed a list of 34 risk statements to be considered. The following list identifies the risk statements, the priority given to the statement and a brief description. Due to time constraints in the workshops, the descriptions were not thoroughly discussed with the Core Team.

A complete summary of the process and results can be in the document Oldman Watershed Planning Priorities: Process Summary and Recommendations.

Priority	Risk Statement	Definition/Descriptor
1	**Lack of understanding and management of cumulative effects**	*Lack of understanding and management of cumulative effects* Our plan needs to incorporate cumulative effects management approach as it unfolds.
2	**Degradation and loss of aquatic and terrestrial habitat**	*Degradation and loss of aquatic and terrestrial habitat* The degradation and loss of aquatic and terrestrial habitat are a known threat.
3	**Headwater degradation**	*Headwater degradation* With current headwater management and protection in the Oldman watershed there is a risk of further headwater degradation.
4	**Financial incentive structures do not match our environmental objectives e.g., draining a wetland to increase crop production; more value to the landowner and decrease in value to the environment**	*Financial incentive structures do not match our environmental objectives i.e. draining a wet land to increase crop production – more value to the landowner and less to the environment* Incentives structures (financial and non-financial) may not support environmental behaviours but instead promotes economic gain. Careful thought must be given to these programs to avoid negative consequences and consider cumulative effects.
5	**Insufficient understanding/knowledge of watershed**	*Insufficient understanding/knowledge of watershed* There is a general lack of understanding and awareness of the Oldman watershed on a regional level.
6	**Impaired water quality**	*Impaired water quality* There is a concern about current and future water quality in the Oldman watershed, in particular non-point and unregulated sources of contamination.
7	**Lack of conservation/inefficient use of water**	*Lack of conservation/inefficient use of water* There is a need to be efficient with the use of water. Users need to focus on conservation in their behaviours and operations.
8	**Lack of knowledge of the relationship between groundwater and surface water**	*Lack of knowledge of the relationship between groundwater and surface water* Since surface water can have an impact on aquifers and groundwater, there is a need to understand these relationships better to protect groundwater from further contamination and over use.
9	**The presence of invasive and/or non-native species**	*The presence of invasive and/or non-native species* The presence of invasive non-native species is an indicator of the health of the watershed.
10	**Failing to define value of water (economic, social, environmental)**	*Failing to define value of water (economic, social, environmental)* There is a failure to value, recognize and integrate the economic, social and environmental implications of watershed management, decisions and use. This includes First Nations and spirituality.

Priority	Risk Statement	Definition/Descriptor
11	**Risk of not knowing value of resources in the future**	*Risk of not knowing value of resources in the future* Not recognizing the potential value of natural resources will make planning a challenge in the future. We will need to have the ability to adapt to the changes but may end up being out of our control.
12	**Lack of baseline data - scientific data**	*Lack of baseline data - scientific data* There is need for more scientific research (i.e., baseline data, inventories) to confirm priorities and the costs and benefits of actions.
13	**Shortage of supply**	*Shortage of supply* There is limited storage/supply in the Oldman watershed. Unmonitored water use is a concern. There is also conflict associated with allocations.
14	**Shortage of water lead to unwise management of decisions**	*Shortage of water lead to unwise management of decisions* In dry years the demand for water surpasses the supply we have in the Oldman watershed. This has the potential to limit our growth possibilities and ecosystem health.
15	**Lack of effective legislation**	*Lack of effective legislation* There is lack of a coordinated coherent suite of regulatory and non-regulatory mechanisms effectively applied to address watershed risks. To provide effective legislation and enforcement, financial incentives and instill a stewardship ethic are needed.
16	**Emerging contaminants**	*Emerging contaminants* There are an increased number of contaminants entering the watershed that may not currently be monitored. These contaminants have the potential to impact human and animal health and ecosystems.
17	**Lack of human and fiscal resources**	*Lack of human and fiscal resources* Human and fiscal resources are not sufficiently focused to achieve the watershed plan.
18	**Lack of effective communication**	*Lack of effective communication* There is need to improve the level of effective communications.
19	**Existing commitments; -leases – quotas – extraction**	*Existing commitments; -leases – quotas – extraction* Leaseholders on public lands are concerned that changes due to planning and a multiple use philosophy may impact their economic opportunities. There may be a risk of acceptance if their concerns are not addressed.
20	**Lack of jurisdictional co-operation**	*Lack of jurisdictional co-operation* A lack of planning coordination with the various jurisdictions may result in unintended affects or impacts.
21	**Failure to consider climate change in management decisions**	*Failure to consider climate change in management decisions* The lack of knowledge and understanding around climate change inhibits the development of proactive management options.
22	**What if people don't have a personal level of connection to the watershed?**	*Personal level of connection to the watershed* The level of connection to the watershed is based on personal experience, land tenure/ownership, family history, and personal interest. Many individuals don't have this personal connection, and therefore have different levels of understanding on how their activities/actions individually or collectively influence the watershed.

Priority	Risk Statement	Definition/Descriptor
23	**There is a variance in social values and interest**	*There is a variance in social values and interest* Individuals have different social values and interest which impact how they behave in the watershed. These diverse perspectives need to be brought together and taken into consideration when planning programs.
24	**Lack of understanding of implications of change**	*Lack of understanding of implications of change* There are costs to acting or not acting. We need to integrate the costs and benefits into our/the decision making process.
25	**Political factors**	*Political factors* There is jurisdictional uncertainty and lack of collaboration with the various jurisdictions, often there are multiple or duplicate efforts, which creates inefficiency or confusion about which agency has jurisdiction. If there was more leadership and enforcement of existing legislation these issues would not be as big of a concern.
26	**Failure to respond due to cost and lack of resources**	*Failure to respond due to cost and lack of resources* There is insufficient allocation of funding for monitoring and developing solutions.
27	**Water supply variability over time**	*Water supply variability over time* The supply of water in the Oldman watershed is uncertain as the amount we receive depends on climate and seasonal variability. Planning for extremes (shortage or flood) requires cooperation.
28	**Changing ownership structures. i.e. small mixed farms to large corporate ranches; ranches to subdivisions**	*Changing ownership structures. i.e. small mixed farms to large corporate ranches; ranches to subdivisions* There have been an increased number of changes in ownership (land, business, corporate or small). As a result the social networks and structures are changing. Little is known how this will affect the overall economic, social and environmental foundations in the community.
29	**Competing interests**	*Competing interests* There are many competing interests that need to be addressed in a structured form to create shared outcomes.
30	**Unclear definitions of abundant healthy**	*Unclear definitions of abundant healthy* There is a need to define, measure and achieve abundant and healthy as they relate to the Oldman watershed.
31	**Current state of the watershed is considered acceptable?**	*Current state of the watershed is considered acceptable?* There is need to validate the current state of the watershed to make sound management recommendations. Individuals consider the current state of the watershed ok, while in reality certain areas need improvement.
32	**Extreme weather events (climate variability)**	*Extreme weather events (climate variability)* Due to extreme and unpredictable weather conditions we tend to be reactive rather then proactive.
33	**Quality of water being allocated won't meet the need of the user**	*Quality of water being allocated won't meet the need of the user* There is a concern about current and future water quality in the Oldman watershed, in particular non-point and unregulated sources of contamination.
34	**Resistance to change**	*Resistance to change* Strong leadership, attainable goals and knowledge can overcome resistance to change. e.g., headwater protection, ecological services

Appendix **C**

Legislation, Plans and Policies Involving Water and Watershed Management

Although care was taken to ensure that the following information is accurate and up-to-date, this summary is only a guide. This information is intended for general information purposes only and the original documents should be consulted.

PLANNING PROCESSES

1. ***Cabinet Approved Water Management Plan for the South Saskatchewan River Basin (Alberta),*** August 2006, Alberta Environment – Link - http://environment.alberta.ca/01233.html
   - The plan will provide guidance to decision makers and act as a foundation for future watershed management planning of sub-basins in the SSRB by Watershed Planning and Advisory Councils, as well as stewardship groups. It recognizes and accepts that limits for water allocations have been reached or exceeded in the Bow, Oldman, and South Saskatchewan River Sub-basins. It is also recognized that the limit of the water resource will be reached in the Red Deer River Sub-basin.
   - Watershed Planning and Advisory Councils (WPACs) are encouraged to consider the planning priorities in their watersheds and undertake future watershed management planning with this water management plan as a foundation.

2. ***Alberta's Land-use Framework: South Saskatchewan Regional Advisory Council's Advice to the Government of Alberta*** – Link - https://landuse.alberta.ca/Pages/default.aspx
   - Strategic Land use Principles: Plan for water – It is essential to determine the feasibility of all water conservation, supply and storage options. Because the supply and quality of water is so important, demand is likely to increase, and supply may be challenged in the region under any scenario. Headwater and source water protection and the need to manage land use to sustain water production and water quality are critically important.

3. ***Water for Life: Alberta's Strategy for Sustainability (Recommendations for Renewal released November 2008)*** – Link - http://www.waterforlife.alberta.ca/index.html
   - The Government of Alberta is committed to the wise management of Alberta's water quantity and quality for the benefit of Albertans now and in the future. The Water for Life: Alberta's Strategy for Sustainability is our response to develop a new water management approach and outline specific strategies and actions to address the province's water issues.

4. ***South East Alberta Watershed Alliance (SEAWA)*** – Link -http://www.albertawater.com/seawa/
   - Recognizing that the Oldman watershed is part of that overall regional system, the OWC Integrated Watershed Management Plan (IWMP) Team has worked hard to share information and make linkages where possible. In addition, we are ensuring our downstream WPAC, the SEAWA, is connected to OWC processes and decisions, and in return, the OWC is linked to their initiatives and strategies.

LEGISLATION

1. ***Alberta Land Stewardship Act, Statutes of Alberta, 2009 Chapter A-26.8*** – Link –https://landuse.alberta.ca/ALSA/Pages/default.aspx
   - This legislation was brought into law in October 2009. It is complementary to the policies outlined in the Land-use Framework and governs the establishment and implementation of regional plans.
   - Holds the authority to ensure integrated decision-making across the Government of Alberta; across air, land, water; and across social, economic and environmental realms. ALSA integrates provincial policies at a regional level and provides the context for land-use decision making within the region.

2. **Water Quantity – *Water Act*, Revised Statutes of Alberta, 2000 Chapter W-3** – Link – http://environment.alberta.ca/02645.html
Governs the diversion, allocation and use of water. Regulates and enforces actions that affect water and water use management, the aquatic environment, fish habitat protection practices, in stream construction practices, storm water manage.

Regulations:

- Water (Ministerial) Regulation (link above)
- Water (offenses and penalties) (link above)
- Bow, Oldman and South Saskatchewan River Basin Water Allocation Order (link above)
  - Little Bow - Highwood Water Diversion Project – Link - http://www.nrcb.gov.ab.ca/nrp/Decisions.aspx?id=166
  - Pine Coulee Water Management Project – Link - http://www.nrcb.gov.ab.ca/nrp/Decisions.aspx?id=168
- Oldman River Basin Water Allocation Order – Link - http://www.qp.alberta.ca/574.cfm?page=2003_319.cfm&leg_type=Regs&isbncln=0779724062
- Oldman River Basin Water Allocation Amendment Order, 109/2010 (not available on Queen's Printer)

Codes of Practice - Link - http://environment.alberta.ca/01330.html

- Temporary diversion of water for hydrostatic testing
- Pipelines and telecommunication lines crossing a water body
- Watercourse crossings
- Outfall structures on water bodies

Policies and Guidelines

- Water Conservation Objectives – Link - http://www.environment.alberta.ca/01724.html
  - Bow River sub-basin objectives
  - Oldman River sub-basin objectives
  - Red Deer River sub-basin objectives
  - South Saskatchewan River sub-basin objectives

Water Management Plans

- Water Management Plans for the Upper Highwood and Upper Little Bow Rivers
  - Volume 1 – Link - http://environment.gov.ab.ca/info/library/7977.pdf
  - Volume 2 – Link - http://environment.gov.ab.ca/info/library/7978.pdf

3. **Water Quality (also Air and Land) *Environmental Protection and Enhancement Act*, RSA 2000 Chapter E-12 –** Link - http://environment.alberta.ca/03147.html
Provides management of contaminated sites, storage tanks, landfill management practices and enforcement.

Regulations:

- Activities Designation Regulation (link above)
- Administrative Penalty Regulation (link above)
- Conservation and Reclamation Regulation (link above)
- Forest Resources Improvement Regulation

- Pesticide (Ministerial) Regulation (link above)
- Pesticide Sales, Handling, Use and Application Regulation (link above)
- Substance Release Regulation (link above)
- Wastewater and Storm Water Drainage (Ministerial) Regulation (link above)
- Wastewater and Storm Drainage Regulation (link above)

Codes of Practice – Link - http://environment.alberta.ca/03147.html

- Landfills
- Pesticides
- Release of Hydro Static Test Water
- Wastewater Systems Consisting Solely of a Wastewater Water Collection System
- Wastewater Systems Using a Wastewater Lagoon

4. ***Fisheries (Alberta) Act* – Alberta Sustainable Resource Development** (http://www.srd.alberta.ca/) This Act restricts the marketing of fish and licensing of Albertans to fish. It also states fishery guardians can be appointed to administer this act. http://www.srd.alberta.ca/MapsPhotosPublications/Publications/Legislation.aspx

5. ***Forest and Prairie Protection Act* – Alberta Sustainable Resource Development** (http://www.srd.alberta.ca/) This Act establishes regulations in regard to fire control, prevention and education in the forested and prairie land in Alberta. http://www.srd.alberta.ca/MapsPhotosPublications/Publications/Legislation.aspx

6. ***Forest Reserves Act* – Alberta Sustainable Resource Development** (http://www.srd.alberta.ca/) The Forest Reserves Act provides a process for acquisition of land in order to sustain a forest reserve. http://www.srd.alberta.ca/MapsPhotosPublications/Publications/Legislation.aspx

7. ***Forests Act* – Alberta Sustainable Resource Development** (http://www.srd.alberta.ca/) This Act establishes an annual allowable cut in coniferous and deciduous forests. It prohibits persons from damaging the forest in any way and allows the Minister to construct and maintain forest recreation areas. http://www.srd.alberta.ca/MapsPhotosPublications/Publications/Legislation.aspx

8. ***Public Lands Act* – Alberta Sustainable Resource Development** (http://www.srd.alberta.ca/) This Act deals with the selling and transferring of public land, as well as the management of rangeland and activities permitted on designated land. http://www.srd.alberta.ca/MapsPhotosPublications/Publications/Legislation.aspx

9. **Provincial *Agricultural Operations Practices Act (AOPA)*** - Natural Resources Conservation Board (NRCB) Outlines manure management standards for all farming and ranching operations in Alberta. It also provides producers and other stakeholders with a process for siting new and expanding confined feeding operations (CFOs).

10. **Provincial *Municipal Government Act (MGA)* - Municipal Affairs and Appended Regulations** Provides municipalities with authorities to regulate water on municipal lands, management of private land to control non-point sources, and authority to ensure that land use practices are compatible with the protection of aquatic environment.

11. **Provincial *Safety Codes Act* - Municipal Affairs** Regulates and enforces septic system management practices, including installation of septic field and other subsurface disposal systems.

12. **Regional *Health Authorities Act* - Alberta Health**
RHA have the mandate to promote and protect the health of the population in the region and may respond to concerns that may adversely affect surface and groundwater.

13. **Provincial *Wildlife Act* - ASRD**
Regulates and enforces on protection of wetland-dependent and wetland associated wildlife and endangered species (including plants).
http://www.srd.alberta.ca/MapsPhotosPublications/Publications/Legislation.aspx

14. ***Provincial Parks Act and Wilderness Areas, Ecological Reserves, Natural Areas and Heritage Rangelands Act* - Alberta Tourism, Parks and Recreation**
Both Acts can be used to minimize the harmful effects of land use activities on water quality and aquatic resources in and adjacent to parks and other protected areas. http://www.tpr.alberta.ca/about/legislation.aspx

15. **Alberta Irrigation Districts Act** Establishes the structure governance powers and duties for the information and operations of Irrigation Districts. http://www.gp.alberta.ca/documents/Acts/III.pdf

16. **Federal *Fisheries Act* - Department of Fisheries and Oceans** (http://www.dfo-mpo.gc.ca/index-eng.htm)
The Fisheries Act is federal legislation dating back to Confederation. It was established to manage and protect Canada's fisheries resources. It applies to all fishing zones, territorial seas and inland waters of Canada and is binding to federal, provincial and territorial governments. As federal legislation, the Fisheries Act supersedes provincial legislation when the two conflict. Consequently, approval under provincial legislation may not necessarily mean approval under the Fisheries Act. http://www.dfo-mpo.gc.ca/habitat/role/141/1415/14151-eng.htm

17. ***Navigable Water Protection Act* – Transport Canada** (http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-menu-1978.htm) The main purpose behind the Navigable Waters Protection Act is to ensure public access to, and efficient use of, our water ways. http://www.tc.gc.ca/eng/acts-regulations/acts-1985cn-22.htm

TRANSBOUNDARY

1. Master Agreement on Apportionment administered by the Prairie Provinces Water Board (PPWB) – Link - http: www.ppwb.ca/uploads/files/general/11//master-agreement-rev-feb-2009.pdf

2. Apportionment Operations Plan for the South Saskatchewan River Basin (Alberta) – Link - http://ssrb.environment.alberta.ca/pubs/SSRB-AOP.pdf

MUNICIPAL GOVERNMENT PLANS

Please note that most of the Municipal Land Use Bylaws, Area Structure Plans and Development Plans can be found on the Oldman River Regional Services Commission website: www.orrsc.com.

1. **Municipal Land Use Bylaws**
The bylaw that divides the municipality into land use districts and establishes procedures for processing and deciding upon development applications. It sets out rules that affect how each parcel of land can be used and developed and includes a zoning map.

2. **Municipal Area Structure Plans**
Adopted by Council as a bylaw pursuant to the Municipal Government Act that provides a framework for future subdivisions, development, and other land use practices of an area, usually surrounding a lake.

3. **Municipal Development Plans**
The plan adopted by Council as a municipal development plan pursuant to the Municipal Government Act.

ALBERTA WATER ACT STANDARDS AND GUIDELINES

1. Administrative Guide for Approvals to Protect Surface Water Bodies Under the Water Act
   http://environment.alberta.ca/01328.html
2. Administrative Guideline for Transferring Water Allocations
   http://environment.alberta.ca/01329.html
3. Alberta soil and groundwater remediation guidelines
   http://environment.alberta.ca/01058.html
4. Compulsory industry monitoring and Alberta's environmental regulatory program
   http://environment.alberta.ca/01528.html
5. Guide to Groundwater Authorization
   http://environment.alberta.ca/03587.html
6. Guideline for Preparing Agricultural Feasibility Reports for Irrigation Projects
   http://environment.alberta.ca/01127.html
7. Provincial wetland restoration/compensation guide
   http://environment.alberta.ca/01126.html
8. Surface water quality guidelines for use in Alberta
   http://environment.alberta.ca/01322.html
9. Water Act fact sheet: Drilling water wells in Alberta
   http://environment.alberta.ca/01327.html
10. Water Act fact sheet: Dugouts
    http://environment.alberta.ca/01324.html
11. Water legislation - Application plans
    http://environment.alberta.ca/01159.html
12. Water quality-based effluent limits (Procedures manual)
    http://environment.alberta.ca/01215.html

ALBERTA WATER ACT FACT SHEETS

1. Alberta Water Act
   http://environment.alberta.ca/03065.html
2. Approvals
   http://environment.gov.ab.ca/info/library/8262.pdf
3. Blue-green algal blooms
   http://environment.alberta.ca/01553.html

4. Drilling water wells in Alberta
   http://www.environment.alberta.ca/01327.html

5. Dugouts
   http://environment.alberta.ca/01324.html

6. Hydrostatic testing of pipelines
   http://www.environment.alberta.ca/01332.html

7. Licenses
   http://www.environment.alberta.ca/documents/WaterAct_Licences_FS.pdf

8. Management of Class "A" watercourses in Alberta
   http://environment.gov.ab.ca/info/library/8265.pdf

9. Provincial wetland restoration/compensation
   http://environment.alberta.ca/01857.html

10. Pipelines and telecommunication lines crossing a water body
    http://environment.alberta.ca/01333.html

11. Riparian Rights and Shoreline Modifications
    http://environment.alberta.ca/03417.html

12. Shoreline modification
    http://environment.alberta.ca/03067.html

13. Spring Run-off Flood Prevention
    http://environment.alberta.ca/03484.html

14. Stormwater management
    http://environment.alberta.ca/03059.html

15. Temporary diversion licenses
    http://environment.alberta.ca/03057.html

16. Transferring water allocations
    http://environment.alberta.ca/03061.html

17. Upstream oil and gas activity near a water body
    http://environment.alberta.ca/03063.html

18. Water license cancellations for non-use
    http://environment.alberta.ca/03069.html

19. Water priority system
    http://environment.alberta.ca/03292.html

ALBERTA WATER ACT REPORTS AND DATA

1. Alberta river water quality index
   http://environment.alberta.ca/01275.html
2. Alberta Water Well Information Database
   http://environment.alberta.ca/01314.html
3. Alberta's river basins (Flows, Precipitation, Snow Pack, Forecasted Runoff etc)
   http://www.environment.alberta.ca/apps/basins/default.aspx
4. Flood Hazard Identification Program
   http://environment.alberta.ca/01260.html
5. Groundwater observation well network
   http://www.environment.alberta.ca/apps/GOWN/
6. Maps and data summaries (Snow Course, Provincial Reservoir Levels, Precipitation Maps)
   http://www.environment.alberta.ca/forecasting/reports/index.html
7. South Saskatchewan River Basin Water Information Portal
   http://ssrb.environment.alberta.ca/index.html
8. Surface Water Quality Resources and Information
   http://environment.alberta.ca/01300.html
9. Surface water quality data
   http://environment.alberta.ca/01288.html
10. Surface Water Quality Program
    http://environment.alberta.ca/01256.html

ALBERTA ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT STANDARDS & GUIDELINES

1. A Guide to Content of Industrial Approval Applications
   http://environment.alberta.ca/01529.html
2. Air Monitoring Directive
   http://environment.alberta.ca/0996.html
3. Air quality model guidelines
   http://environment.alberta.ca/01004.html
4. Alberta soil and groundwater remediation guidelines
   http://environment.alberta.ca/01058.html
5. Alberta's user guide for waste managers
   http://environment.alberta.ca/01150.html
6. Ambient air quality objectives
   http://environment.alberta.ca/0994.html

7. Applications for Sour Gas Processing Plants and Heavy Oil Processing Plants - A Guide to Content
http://environment.alberta.ca/01054.html

8. Compulsory industry monitoring and Alberta's environmental regulatory program
http://environment.alberta.ca/01528.html

9. Conservation and easement
http://environment.alberta.ca/01321.html

10. Continuous Emissions Monitoring Systems (CEMS) Code
http://environment.alberta.ca/01003.html

11. Emission standards and guidelines
http://environment.alberta.ca/01000.html

12. Environmental assessment/evaluation
http://environment.alberta.ca/01495.html

13. Existing ambient air quality objectives
http://environment.alberta.ca/01005.html

14. Guidelines for Secondary Containment for Above Ground Storage Tanks
http://environment.alberta.ca/01085.html

15. Hazardous Waste Storage Guidelines
http://environment.alberta.ca/01214.html

16. Landfills and security
http://environment.alberta.ca/01084.html

17. Monitoring and reporting directives
http://environment.alberta.ca/01524.html

18. Petroleum storage tank site guidance documents
http://environment.alberta.ca/01123.html

19. Product fees and taxes
http://environment.alberta.ca/01320.html

20. Soil Monitoring Directive (2009) for Monitoring and Managing Soil Contamination under EPEA Approvals
http://environment.alberta.ca/01073.html

21. Source & Area emission standards
http://environment.alberta.ca/0995.html

22. Using Ambient Air Quality Objectives in Industrial Plume Dispersion Modelling and Individual Industrial Site Monitoring
http://environment.alberta.ca/0952.html

23. Water quality-based effluent limits (Procedures manual)
http://environment.alberta.ca/01215.html

ALBERTA AGRICULTURE - GUIDELINE

1. Agriculture and Water Quality: Beneficial Management Practice (BMP) Resources
http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/aesa5826

Appendix **D**

Municipalities Located Within the Oldman Watershed and Associated Sub-basin

State of the Watershed Sub-basin	Municipalities
Foothills	MD Pincher Creek No.9
	MD Ranchland No.66
	MD Willow Creek No.26
	Claresholm
	Fort Macleod
	Granum
	Pincher Creek
	Village of Barons
	Peigan (North Piikani) Indian Reserve No.147
Southern Tributaries	MD Pincher Creek No.9
	MD Willow Creek No.26
	Cardston County
	Cardston
	Magrath
	Glenwood
	Hill Spring
	Waterton
	Blood (Kainai) 148A Indian Reserve

State of the Watershed Sub-basin	Municipalities
Prairie	Carmangay
	County of Lethbridge
	MD of Taber
	MD Foothills No.31
	MD Willow Creek No. 26
	County of Warner
	Vulcan County
	Coaldale
	Coalhurst
	High River
	Nanton
	Picture Butte
	Barons
	Stavely
	Taber
	Vauxhall
	Lethbridge
	Vulcan
	Barnwell
	Champion
	Lomond
	Milo
	Nobleford
Mountains	Municipality of Crowsnest Pass
	Cowley
	MD Pincher Creek No.9
	MD Ranchland No.66

Appendix **E**

Community Information Sessions Summary of Watershed Issues

During the month of November and early December 2011, the Watershed Planning Team took the draft *Priorities for the Oldman Watershed: Promoting action to maintain and improve our watershed* to communities in the watershed. The following list identifies the main issues received by residents.

Water Issues:

- Headwaters management (protection and conservation)
- Water storage (future developments) and usage (monitoring and future allocations)
- Water quantity and quality
- Water management – water locations – where is our water coming from?
- Structure systems to redirect flow of water back to river during land flooding events
- Drainage flows through irrigation canal systems (water quality issue)
- Metering (water) should be standard
- Identification of what is currently protected and what needs to be protected (landscapes)
- Ground water understanding, mapping, protection and conservation

Program Issues:

- Funding for programs
- Building more partnerships to work on issues (agriculture, forestry, oil and gas, irrigation, golf courses, etc.)
- Open and ongoing communications, more public/community meetings
- Education and awareness – more knowledge about the watershed

Industry Issues:

- Fracking and increasing industry concerns
- Recreation access, user fees, acreage development, enforcement, ecotourism options
- Pharmaceuticals, chemical and phosphate monitoring, nutrients, soil organic matter (leaching, soil runoff), spring water runoff and non-point source pollution
- Energy sector monitoring
- Population – expanding communities – where's the water going to come from?
- Economic and social needs and growth

Government Issues (all levels):

- Government action and commitment
- Policy for the natural system (e.g. restricting use in riparian areas, beaver control)
- Enforceable regulation implemented
- Government accountability and cooperation between departments (sectoral issues) and other organizations
- Municipalities working with residents (septic concerns, coulee slumping, high sediment concerns during storm events)
- United States cooperation (Montana is within the Oldman watershed)
- Land-use Framework – How does the Oldman Watershed plan tie in with that one?

Personal issues:

- Private landowners voice not being heard
- Landowner recognition for environmentally sound practices
- Landowner assistance (getting appropriate information) and compensation

"We need to uncover people's connection in a way that **reinvigorates** their **commitment** to the **watershed**."

John Kolk, 2011

oldmanbasin.org