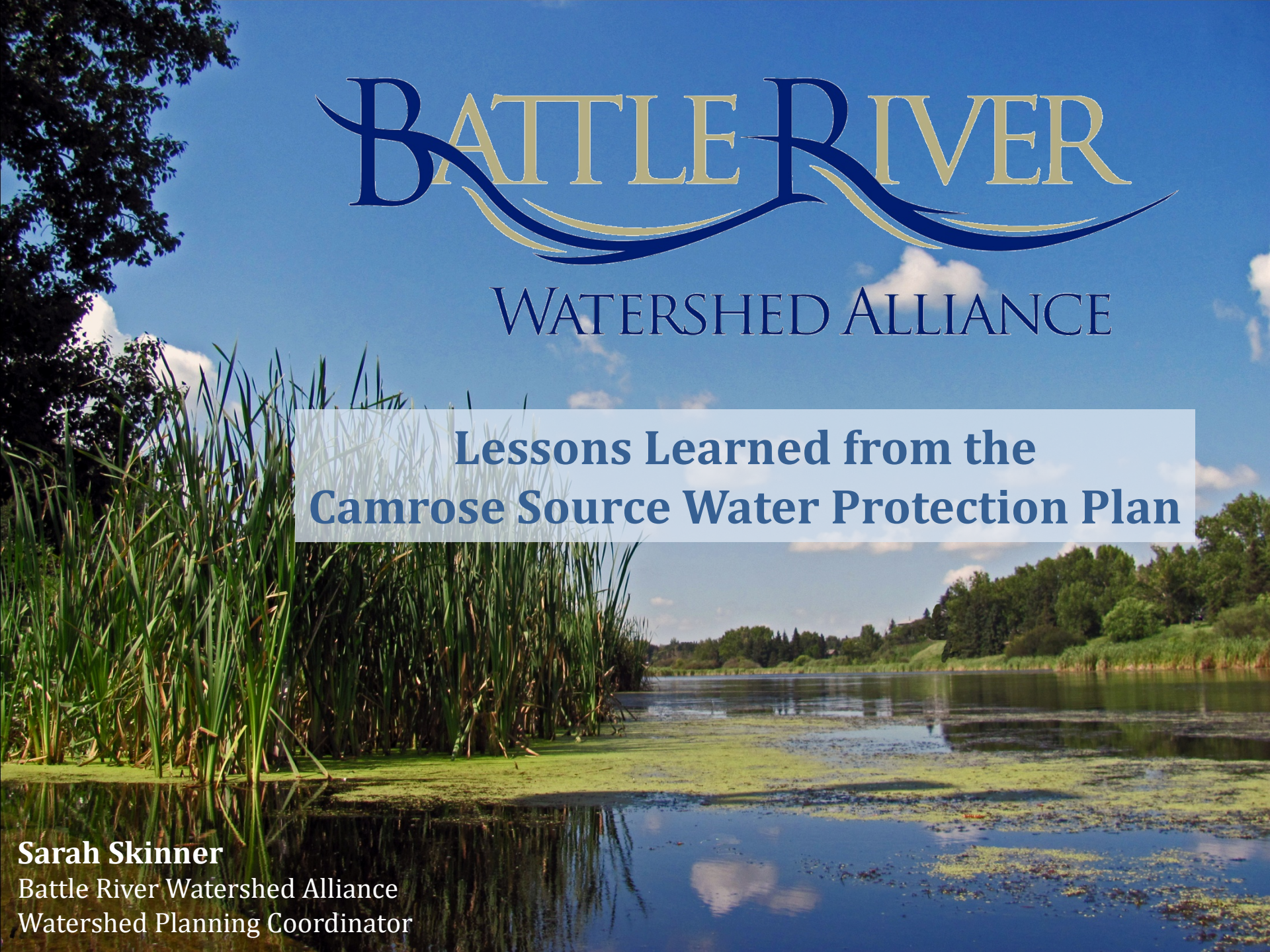


The logo for the Battle River Watershed Alliance features the words "BATTLE RIVER" in a large, stylized serif font. The letters are primarily gold, with the "B" and "R" having blue outlines. Below the text is a blue wavy line representing a river. Underneath the wavy line, the words "WATERSHED ALLIANCE" are written in a smaller, blue, serif font.

BATTLE RIVER

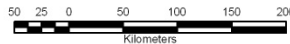
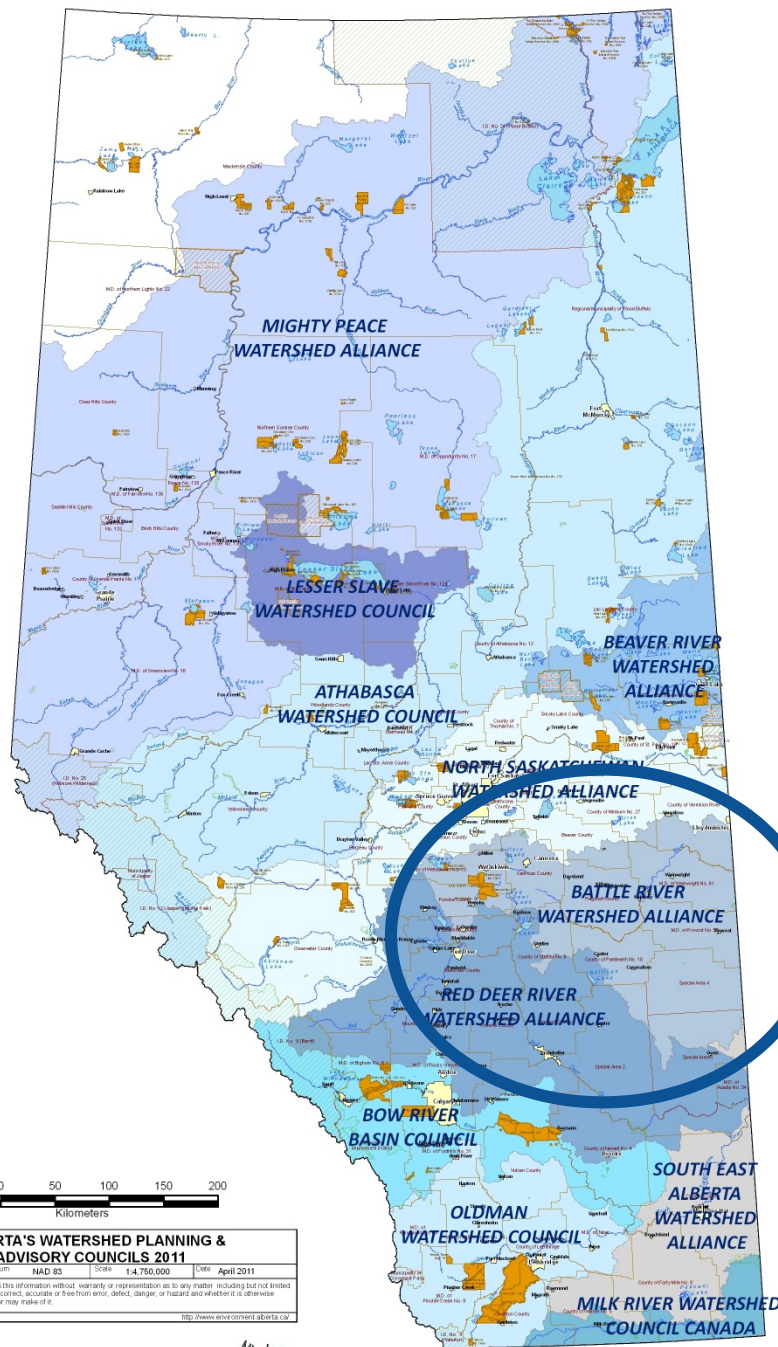
WATERSHED ALLIANCE

The background of the slide is a photograph of a natural landscape. In the foreground, there is a body of water, possibly a river or lake, with a dense patch of tall green reeds on the left bank. The water is covered with a layer of green algae or duckweed. In the distance, there are more trees and a clear blue sky with some light clouds.

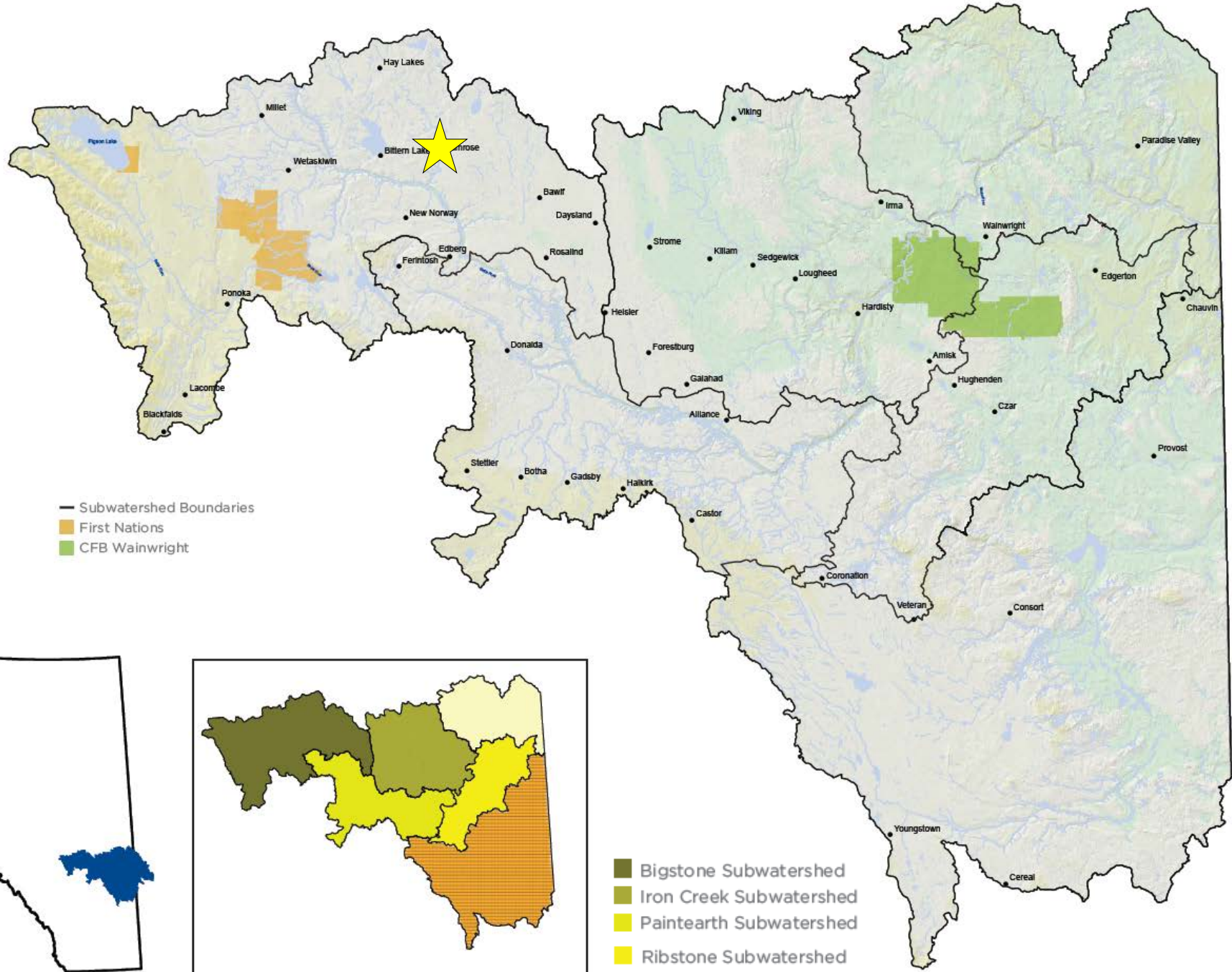
Lessons Learned from the Camrose Source Water Protection Plan

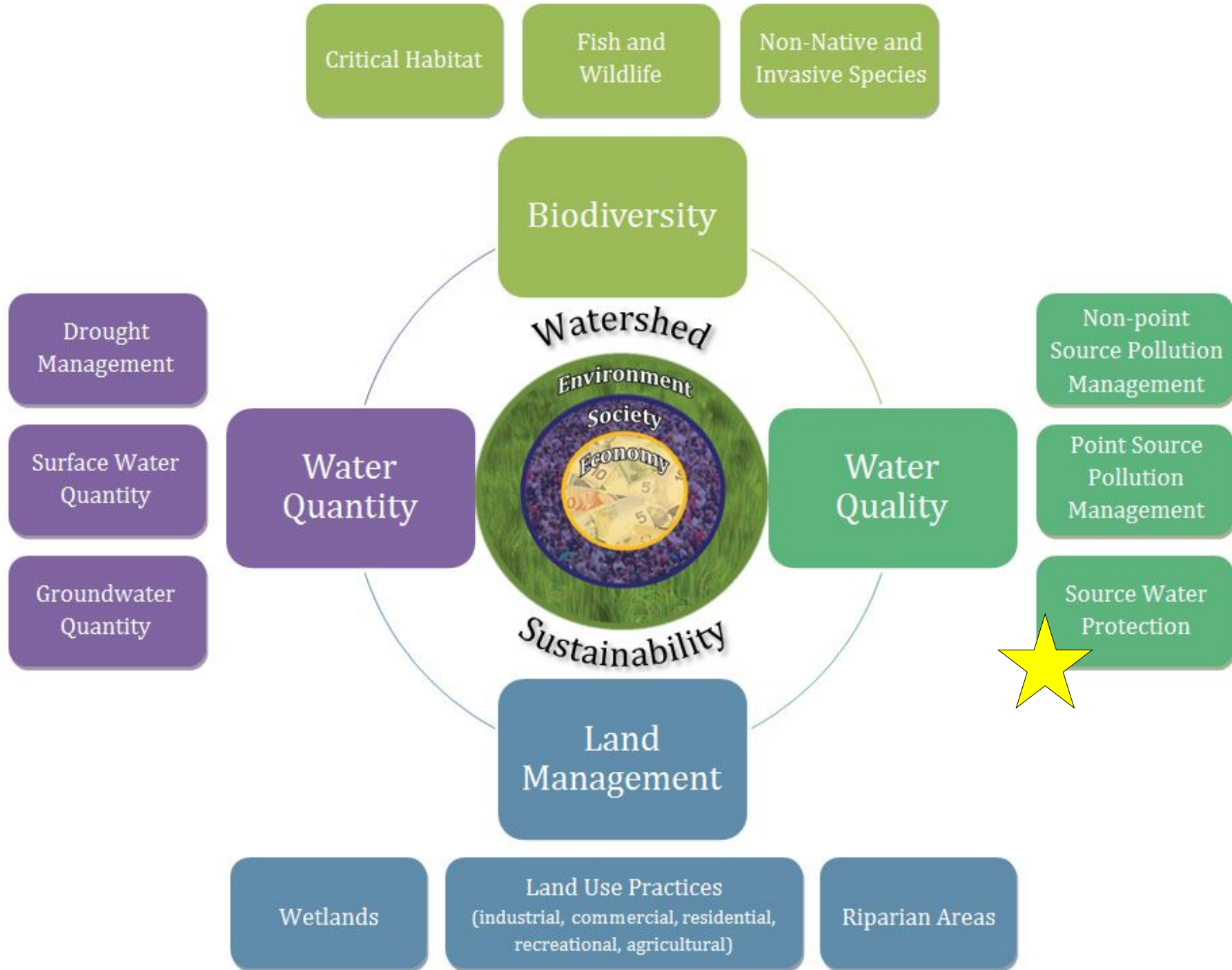
Sarah Skinner

Battle River Watershed Alliance
Watershed Planning Coordinator



ALBERTA'S WATERSHED PLANNING & ADVISORY COUNCILS 2011			
Projection	10 TM	Map ID	10101
The Minister and the Crown provide this information without warranty or representation as to any matter, including but not limited to whether the data / information is correct, accurate or free from error, defect, danger, or hazard and whether it is otherwise useful or suitable for any use the user may make of it.			
© 2010 Government of Alberta		http://www.environment.alberta.ca/	





Policy Objective:

Source water protection plans should be developed for the entirety of the Battle River and Sounding Creek watersheds in Alberta, with separate plans being developed for surface water and groundwater.

These plans should:

- protect the quality and quantity of ground and surface water sources
- identify appropriate management actions that should be taken to minimize or eliminate risks identified through source water risk assessments, and
- outline an implementation strategy to support management efforts.

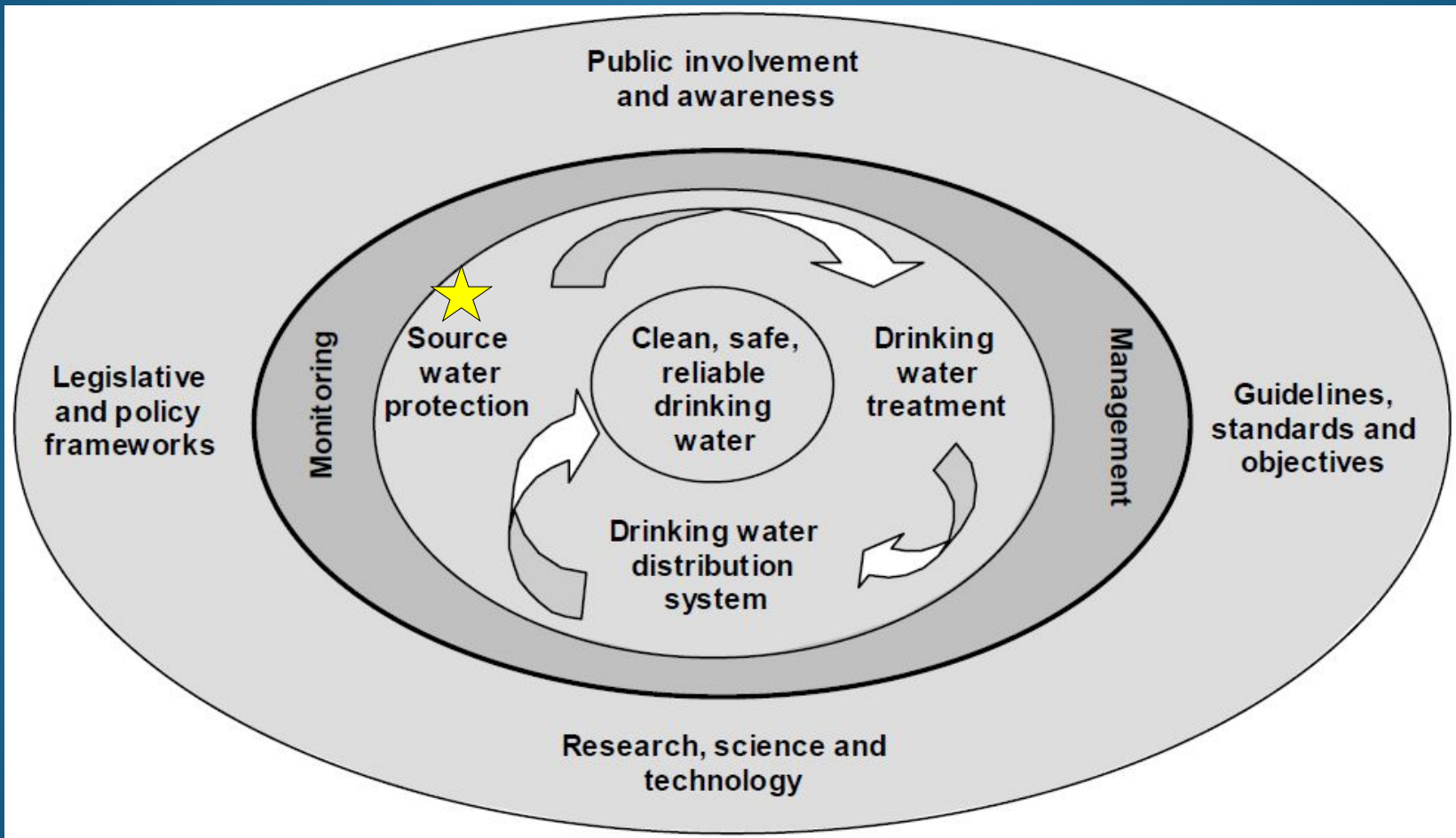
Source water protection planning should be led by a designated lead agency and undertaken as a collaborative effort by all stakeholder groups.

Implementation Guidelines:

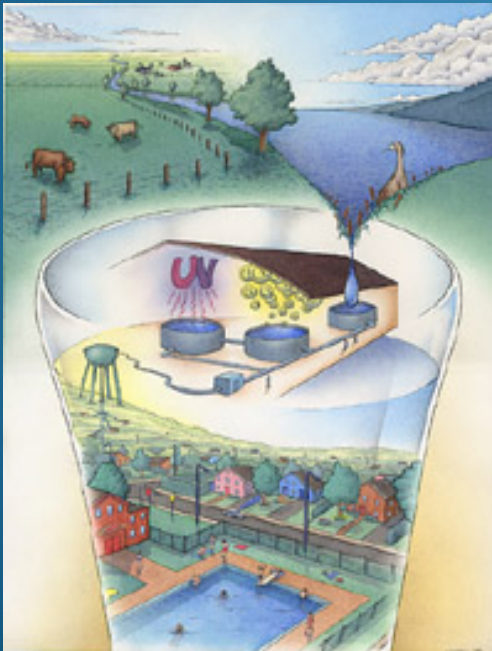
Guideline	Responsibility
<p>1.1: Municipal and First Nations governments should lead source water protection planning efforts in their jurisdictions.</p> <p><i>Rationale: Municipal and First Nations governments have an in-depth knowledge of local and regional drinking water systems and associated risks, challenges and opportunities. Source water protection planning is also an important component of municipal Drinking Water Safety Plans.</i></p>	<ul style="list-style-type: none">• Municipal governments• First Nations governments
<p>1.2: The Battle River Watershed Alliance should support and facilitate source water protection planning efforts in the Battle River and Sounding Creek watersheds.</p> <p><i>Rationale: Because source water protection planning may cross jurisdictional boundaries, it is important to have a coordinating body to facilitate collaborative planning efforts in the Battle River and Sounding Creek watersheds. The Battle River Watershed Alliance is well-positioned to fill this role.</i></p>	<ul style="list-style-type: none">• Battle River Watershed Alliance

“As part the City’s ongoing desire toward watershed protection, the City continually seeks ways to partner with other organizations to improve the quality of our water source, Driedmeat Lake. Over the years, the City and County have partnered on many initiatives. However, there has not been a formalized, overarching framework that guides the City and County’s activities toward watershed protection. In 2010, the City and County entered into two separate agreements whereby the City agreed to provide potable water to specific areas within the County. As part of that agreement, the City and County agreed that the protection of Driedmeat Lake and the entire Battle River watershed was critical to the future of the region, and that both parties would develop and implement a further joint agreement for the management of the lands within the City and County that drained into Driedmeat Lake. The Camrose Source Water Protection Plan was a direct outcome of that agreement.” - Jeremy Enarson, City of Camrose

Multi-Barrier Approach to Drinking Water Protection

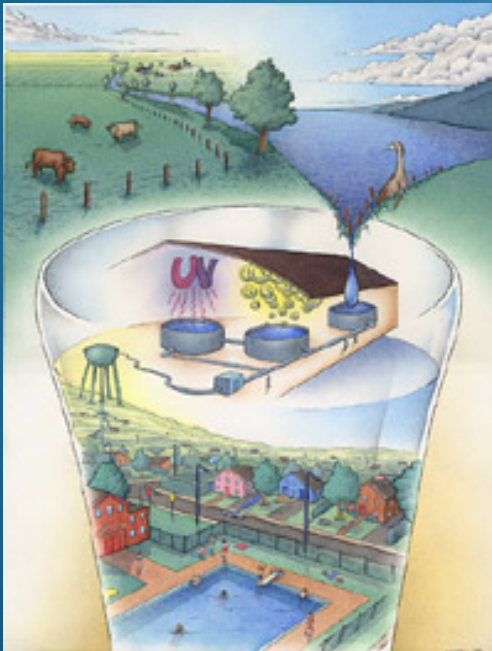


Source Water Protection: BRWA Definition



- ✓ First step in a multi-barrier approach to drinking water protection
- ✓ Protecting the quality and quantity of ground and surface water sources used for a variety of purposes (with a focus on drinking water protection)
- ✓ Identifying risks and implementing management actions to minimize those risks

Source Water Protection: BRWA Definition



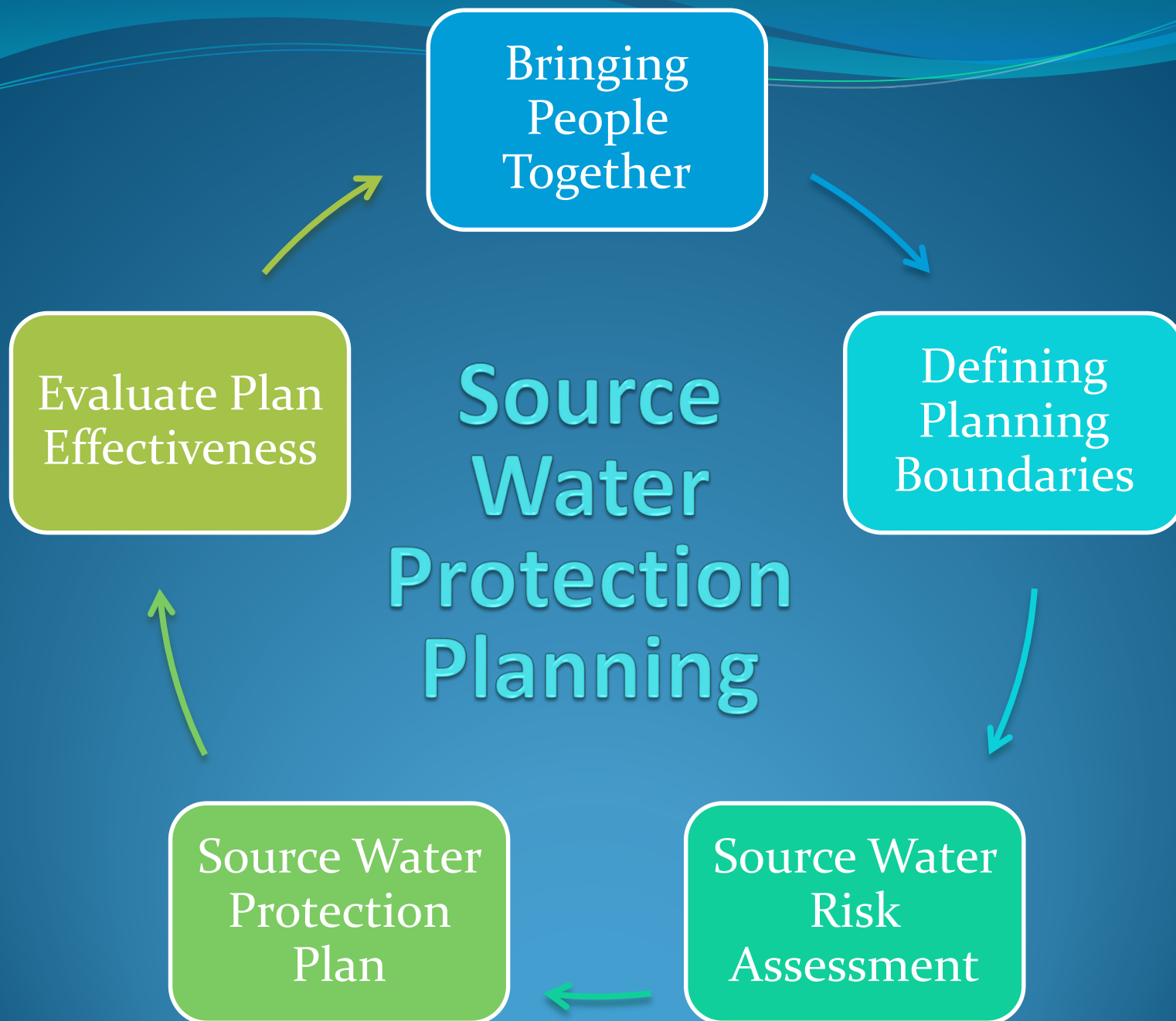
Beyond headwaters protection:

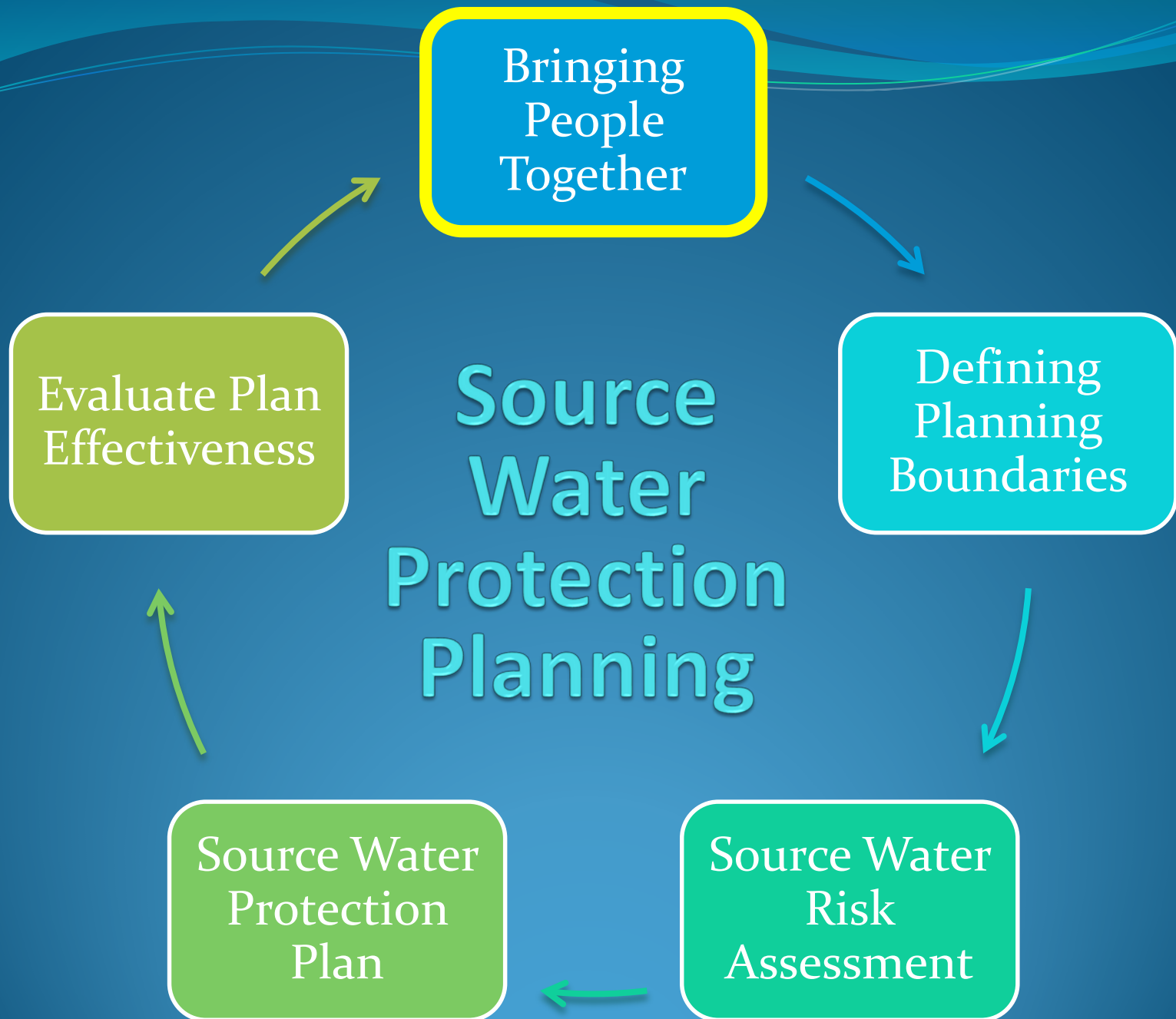
- ✓ Source water protection is about protecting the entire watershed upstream of a particular drinking water intake location



WATERSHED ALLIANCE

Source Water Protection Planning Process





Bringing People Together

Lead Agency:

- ✓ Facilitates source water protection planning efforts in a particular planning area
- ✓ Supports formation of working committee

Working Committee:

- ✓ Multi-stakeholder group that leads source water protection planning efforts in a particular planning area

Terms of Reference to guide process

Bringing
People
Together

Camrose Source Water Protection Initiative

Lead Agencies:

- ❑ Battle River Watershed Alliance (coordinator)
- ❑ City of Camrose
- ❑ Camrose County

Stakeholder Advisory Committee:

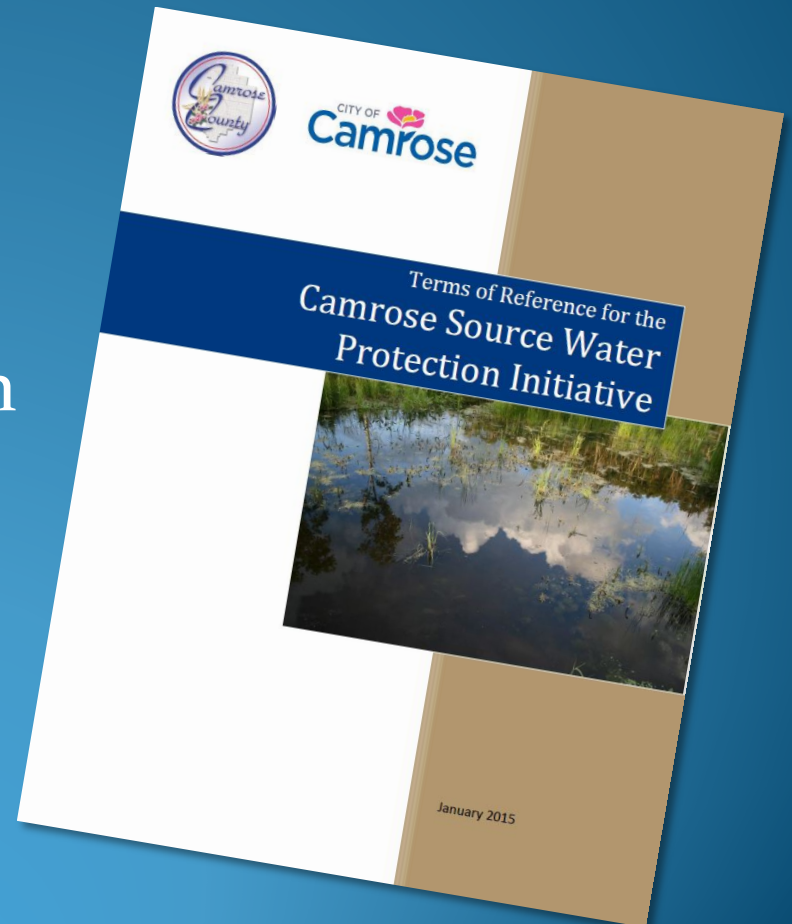
- ❑ Municipal staff and councilors
- ❑ City and County residents
- ❑ Technical advisors: environment, agriculture, health

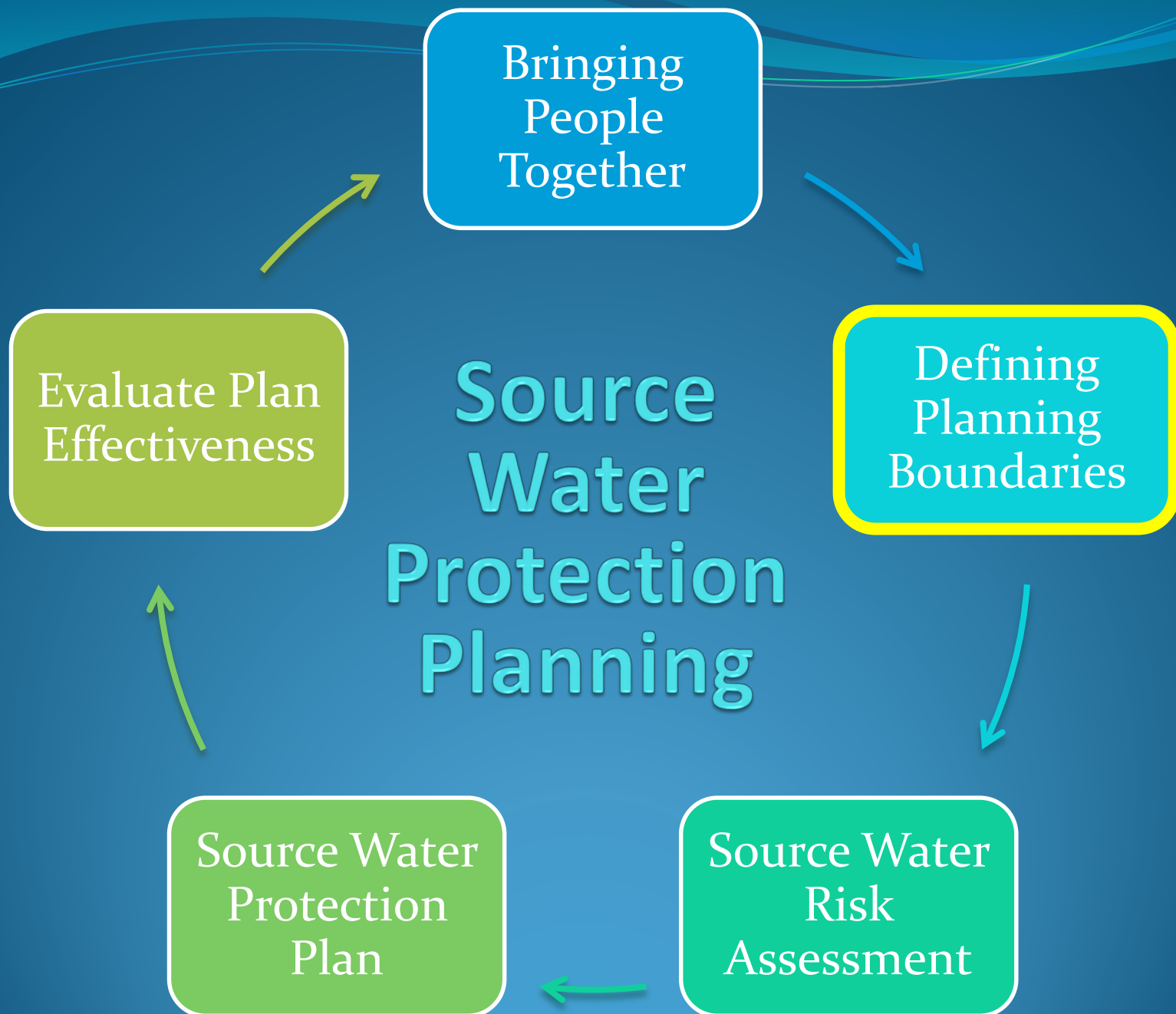
Bringing
People
Together

Camrose Source Water Protection Initiative

Defining Process/Scope:

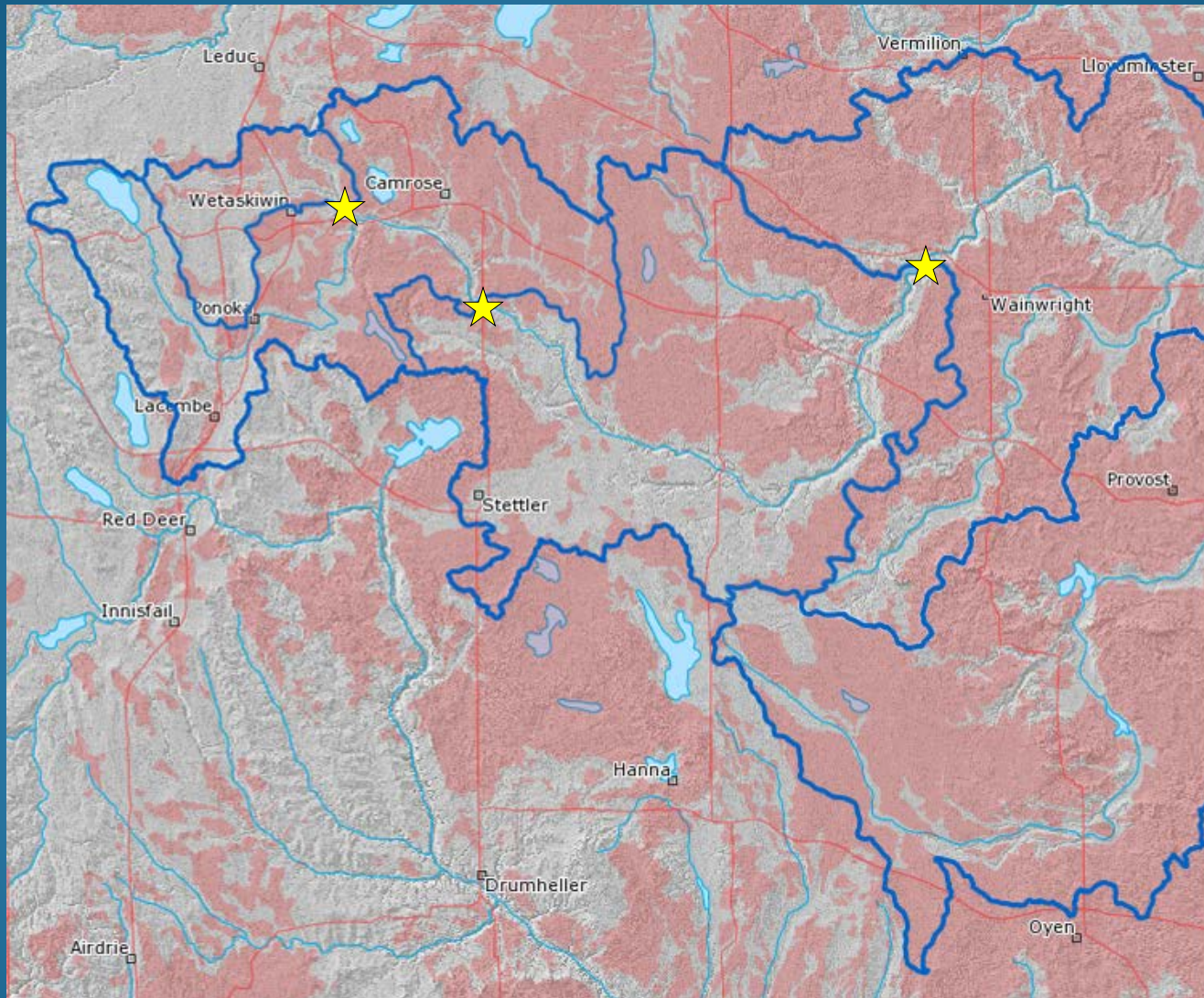
- ❑ Developed Terms of Reference to guide process
- ❑ Scope limited to protection of surface water quality within planning area
 - ❑ Groundwater and water quantity beyond scope of current project





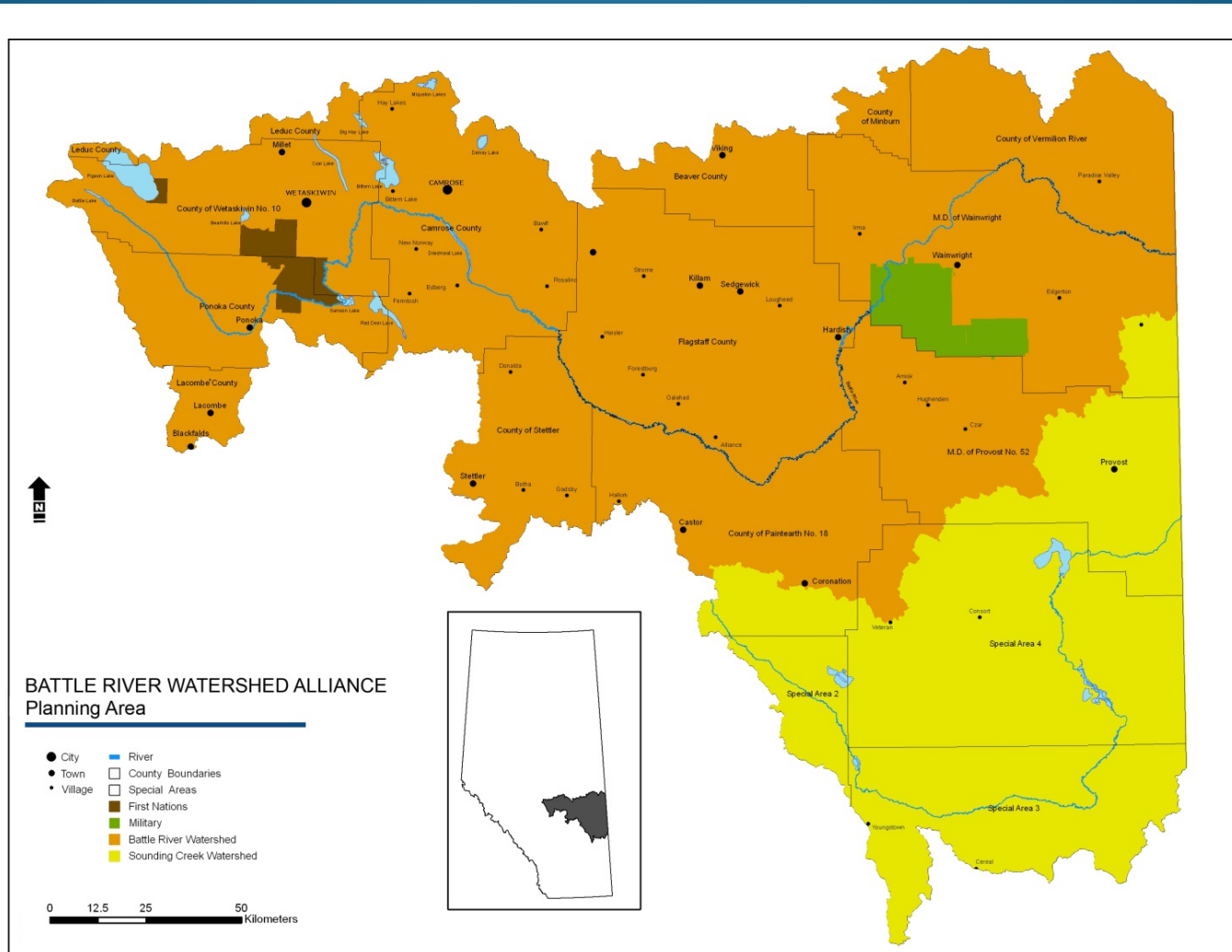
Defining Planning Boundaries

For surface water: entire watershed
upstream of the source intake



Defining Planning Boundaries

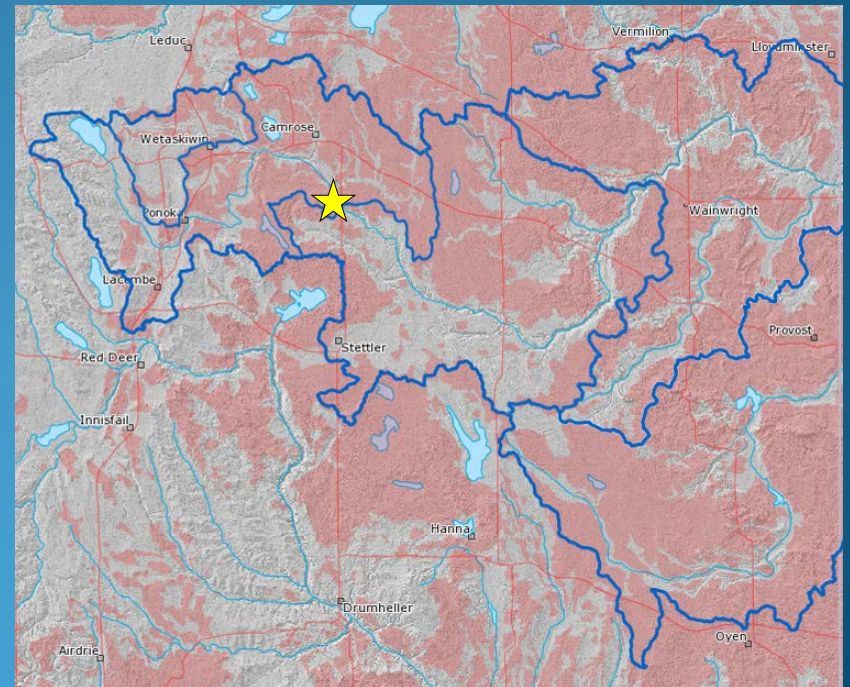
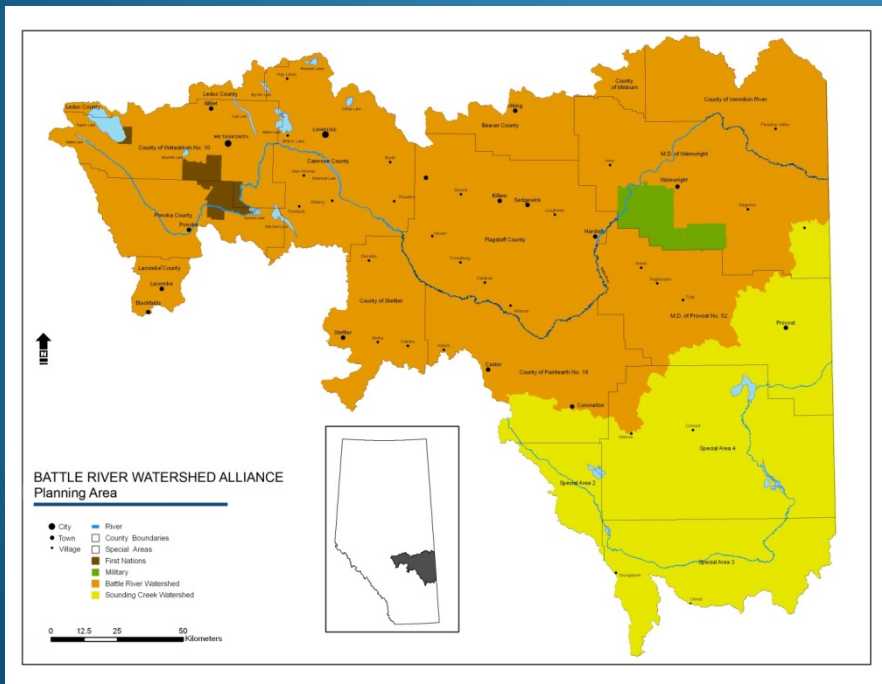
Municipal Boundaries



Defining Planning Boundaries

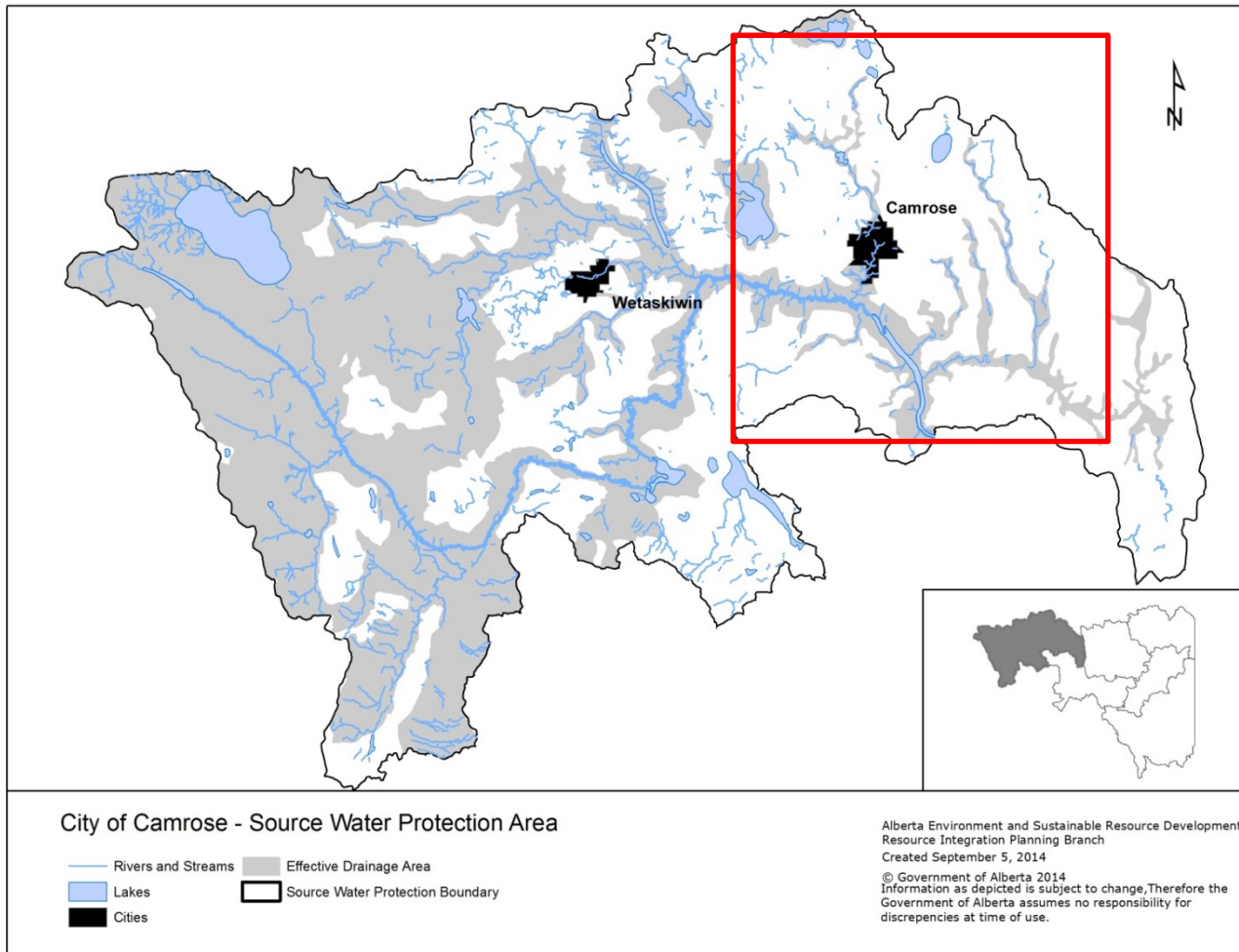
Camrose Source Water Protection Area:

- ✓ 5 counties
- ✓ 3 cities
- ✓ 10+ towns and villages



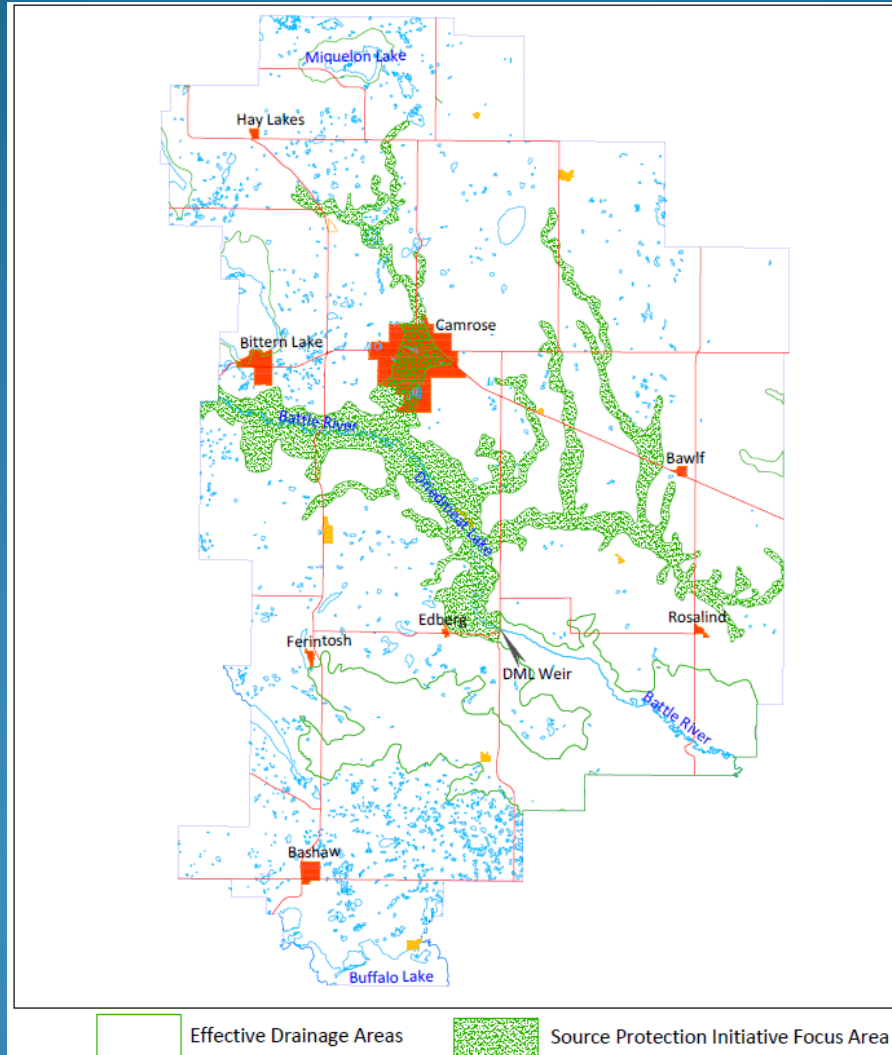
Defining Planning Boundaries

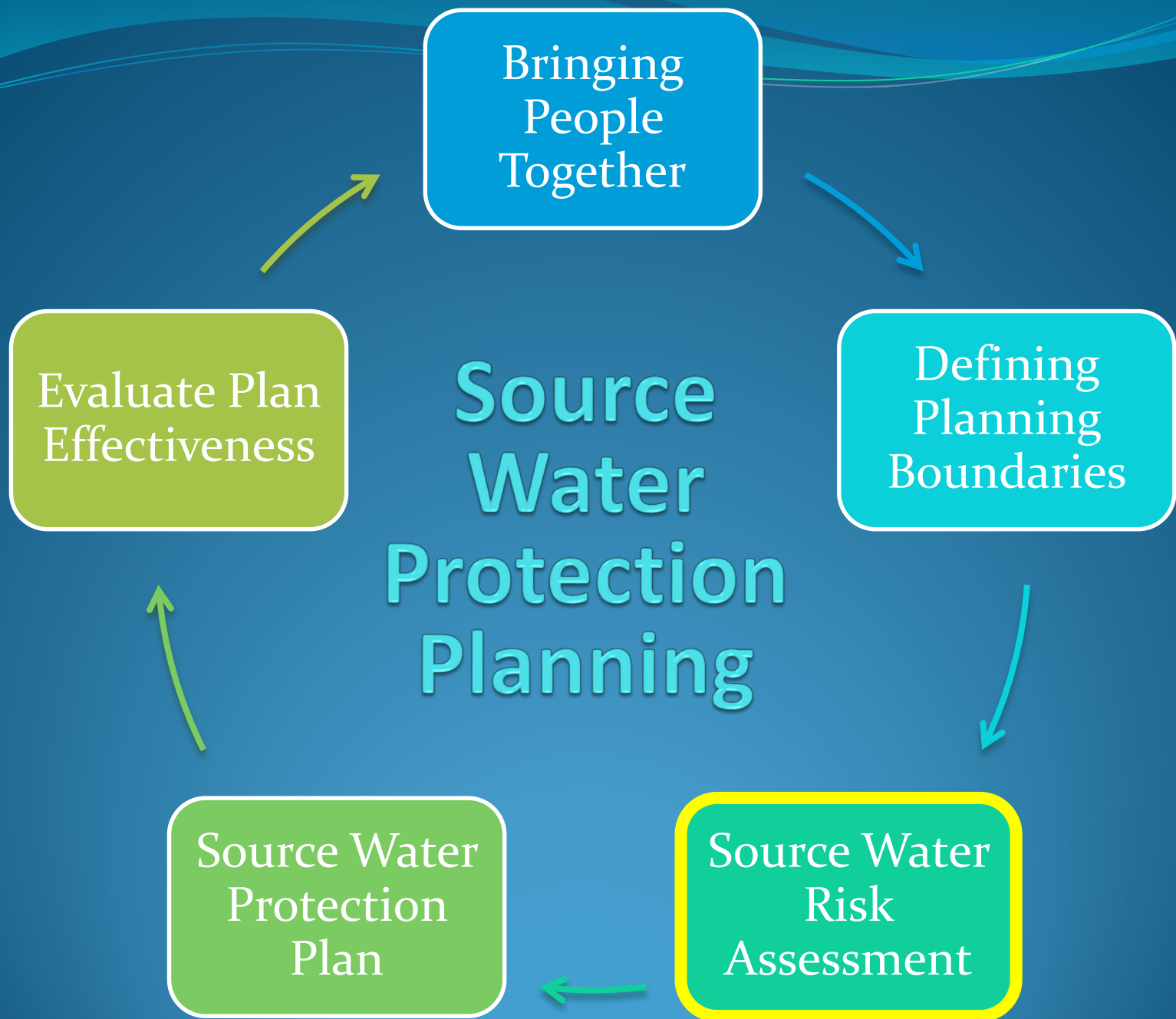
Camrose Source Water Protection Initiative



Defining Planning Boundaries

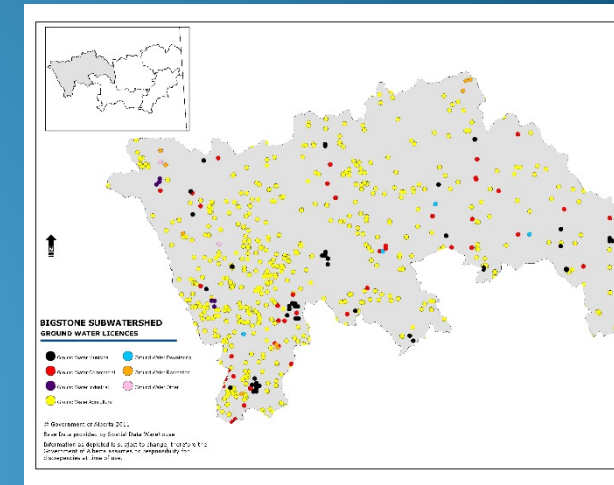
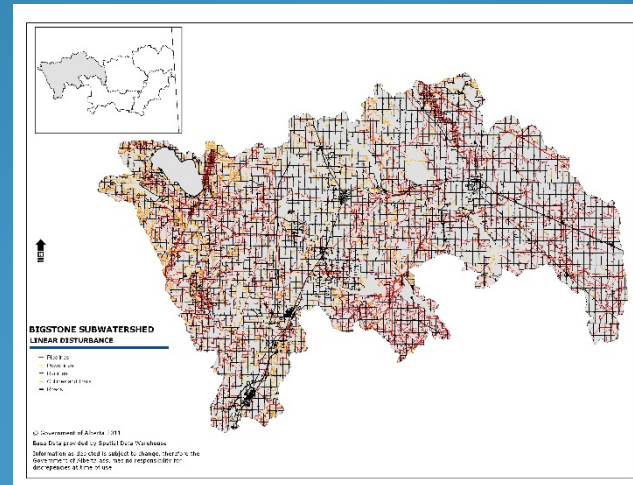
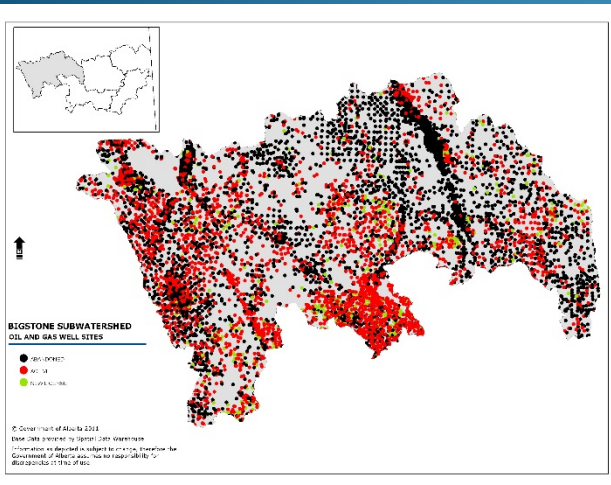
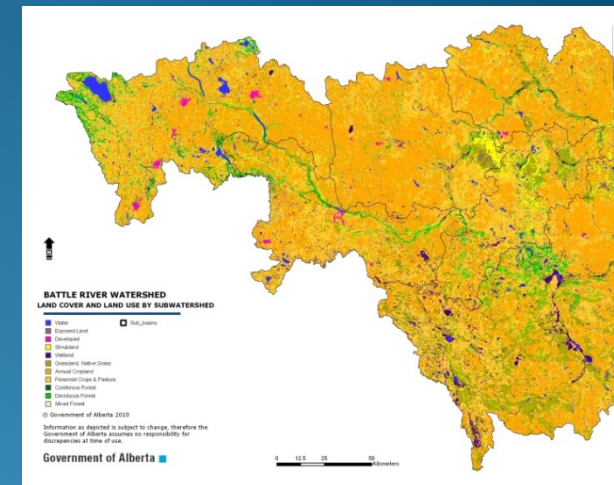
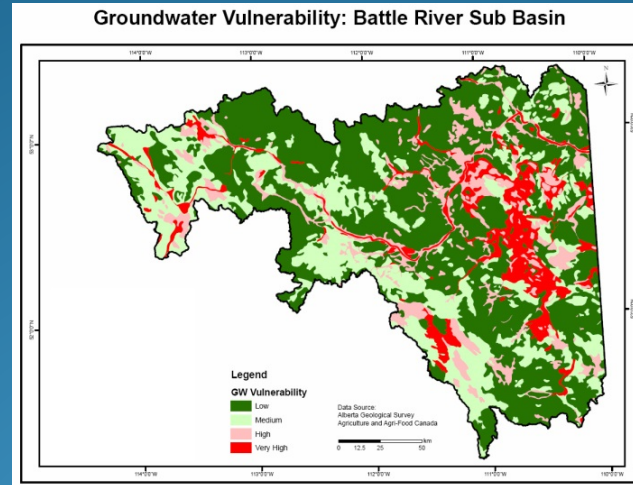
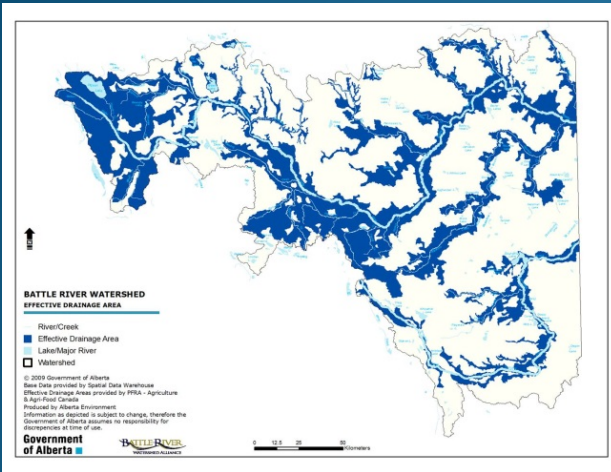
Camrose Source Water Protection Initiative





Source Water Risk Assessment

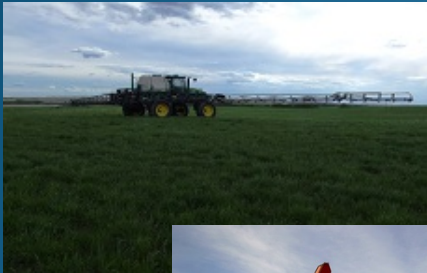
Characterizing the Watershed



Source Water Risk Assessment

Identifying Potential Risks to Source Water

- ❖ agricultural land uses
- ❖ erosion, drought, flooding and other natural factors
- ❖ industrial and commercial land uses
- ❖ urban development and associated stormwater runoff, waste water treatment, and landfills
- ❖ resource extraction: gravel and coal mining, oil and gas extraction, etc.



Source Water Risk Assessment

Assess Risks Using Risk Matrix

		Impact of Occurrence				
	Score	Insignificant	Minor	Moderate	Severe	Catastrophic
Likelihood of Occurrence	Most Unlikely	1	2	4	8	16
	Unlikely	2	4	8	16	32
	Possible	4	8	16	32	64
	Probable	8	16	32	64	128
	Almost Certain	16	32	64	128	256

- ✓ Synergies with community Drinking Water Safety Plans in AB and federal “First Nations On-Reserve Source Water Protection Plan: Guide and Template”

Source Water Risk Assessment

Camrose Source Water Protection Initiative



- ❑ Characterized SWP planning area
- ❑ Identified risks to source water and used the risk matrix to assign risk scores
- ❑ used modified version of Alberta Drinking Water Safety Plans Template

REFORMATALL		INS	Note: Shallow wells from river gravels should be regarded as surface water as much of the recharge may be coming from the adjacent watercourse			
	Risk Description	Risk I.D.	Hazard	Cause of Potential Failure	Comments	
General Risks	Deterioration of raw water quality caused by shallow water body and wind effects	DWSP-S-020	Turbidity Colour Manganese	Resulting from shallow water body and wind induced turbulence.	Storm conditions may stir up sediment and make treatment more difficult.	
General Risks	Contamination of raw water resulting from algal blooms	DWSP-S-021	Algae	Due to algal blooms due to increased nutrient levels or changing weather patterns.	Algal cells may clog filters causing poor quality or lower throughput. Blue green algae produce toxins.	
General Risks	Insufficient raw water quantity	DWSP-S-022	Loss of supply	Resulting from restriction in diversion licence due to changing legislation or growth in demand.	Changes in environmental legislation may lead to tighter diversion limits.	

Content and Layout of the Workbook "2017/2018 Tables of Drinking Water Threats for Pathogens and Chemicals"

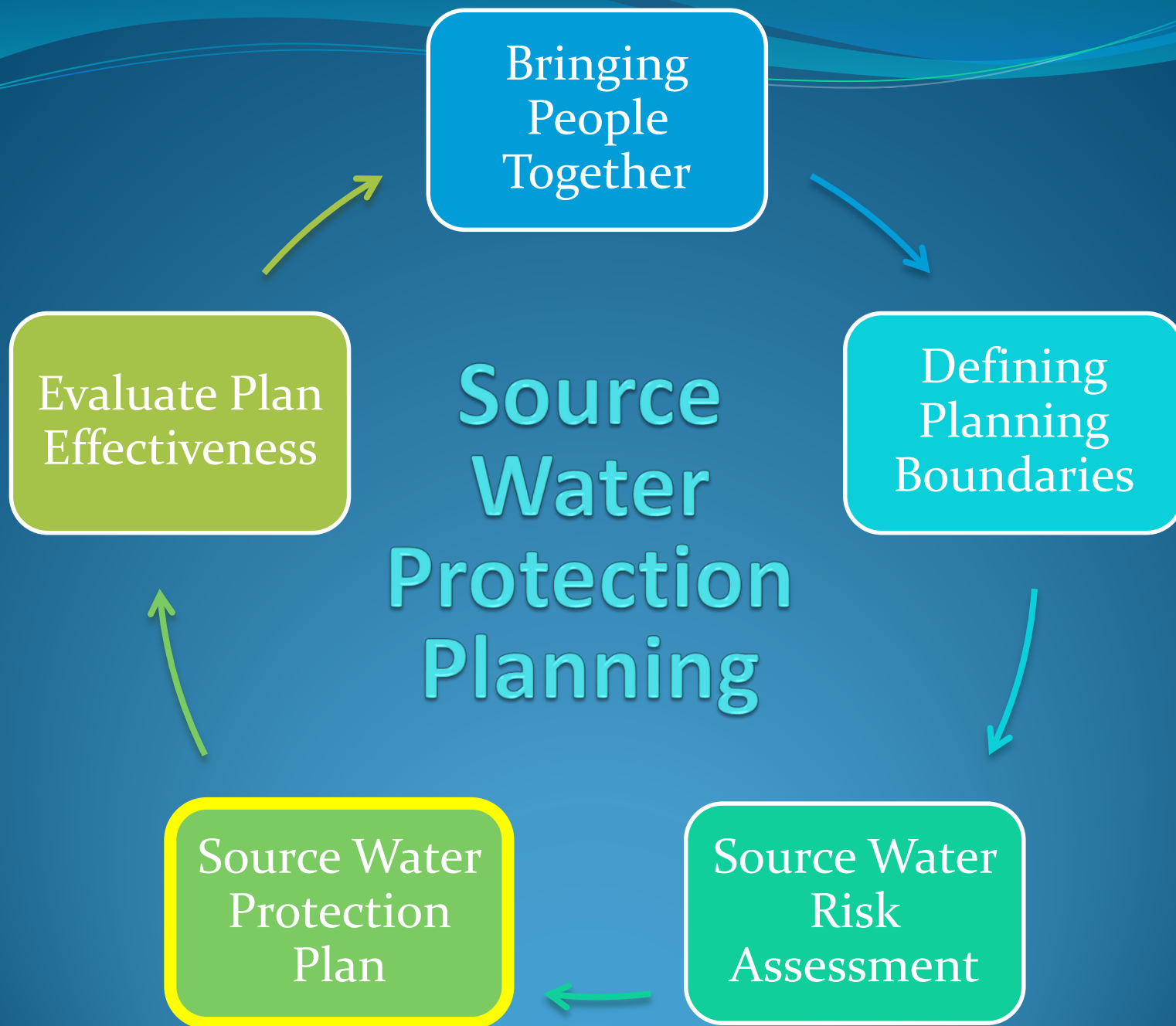
The following Tables of Drinking Water Threats for Pathogens and Chemicals workbook contains 2 worksheets (sheets). They are described below and additional detailed information is provided in the individual sheets.

Sheet 1, Table 1: 2017/2018 Table of Drinking Water Threats for Chemicals. This table lists the circumstances for which each drinking water threat and related subcategories are Significant, Moderate or Low drinking water threats for chemicals according to the Director's Technical Rules

Sheet 2, Table 2: 2017/2018 Table of Drinking Water Threats for Pathogens. This table lists the circumstances for which each drinking water threat and related subcategories are Significant, Moderate or Low drinking water threats for pathogens according to the Director's Technical Rules

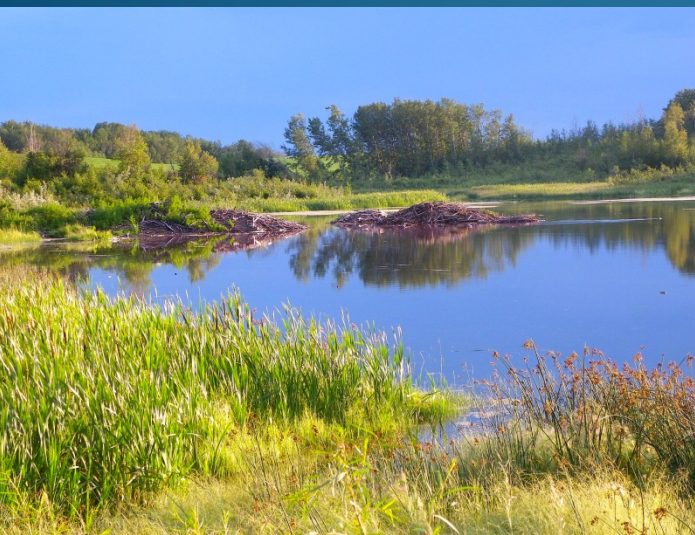
		Impact of Occurrence				
		Score	Insignificant	Minor	Moderate	Severe
Likelihood of Occurrence	Most Unlikely	1	2	4	8	16
	Unlikely	2	4	8	16	32
	Possible	4	8	16	32	64
	Probable	8	16	32	64	128
	Almost Certain	16	32	64	128	256

Source		Description of Risk	Level of Risk
URBAN RISKS	Transportation	Roadway activities; sand/salt application and storage	High
		Snow storage and spring runoff	Moderate
	Stormwater	Runoff from urban environment	High
	Lawn Care Products	Use of lawn care products (fertilizers, pesticides, herbicides)	High
	Development and Construction	Development/construction activities	Moderate
	Green Spaces, Wetlands	Removal of upland vegetation and wetlands	High
		Removal or degradation of riparian vegetation	Moderate
	Recreation, Wildlife	Wildlife and pet activity	Low
	Wastewater	Pharmaceutical products, microbeads, etc.	Moderate



Source Water Protection Plan

Identify and Implement Management Actions to Minimize Risk



**WORKING
WELL**
Clean water.
Well protected.



Source Water Protection Plan

Camrose Source Water Protection Initiative

- ❑ Key management areas:
 - ❑ Land management
 - ❑ Oil and gas development
 - ❑ Transportation
 - ❑ Recreation
 - ❑ Development and Construction
 - ❑ Green spaces
 - ❑ Wetlands
 - ❑ Water wells and springs
 - ❑ Stormwater management
 - ❑ Lawn care products
 - ❑ Dust, ice and snow control measures
 - ❑ Waste water
 - ❑ Waste disposal



Source Water Protection Plan

Camrose Source Water Protection Initiative



- ❑ Plan Development: developing management actions for risks identified through the risk assessment
- ❑ Implementation: identifying timelines and responsible parties for each management action
- ❑ Public Engagement: getting resident/stakeholder feedback on potential risks and management actions

Source Water Protection Plan

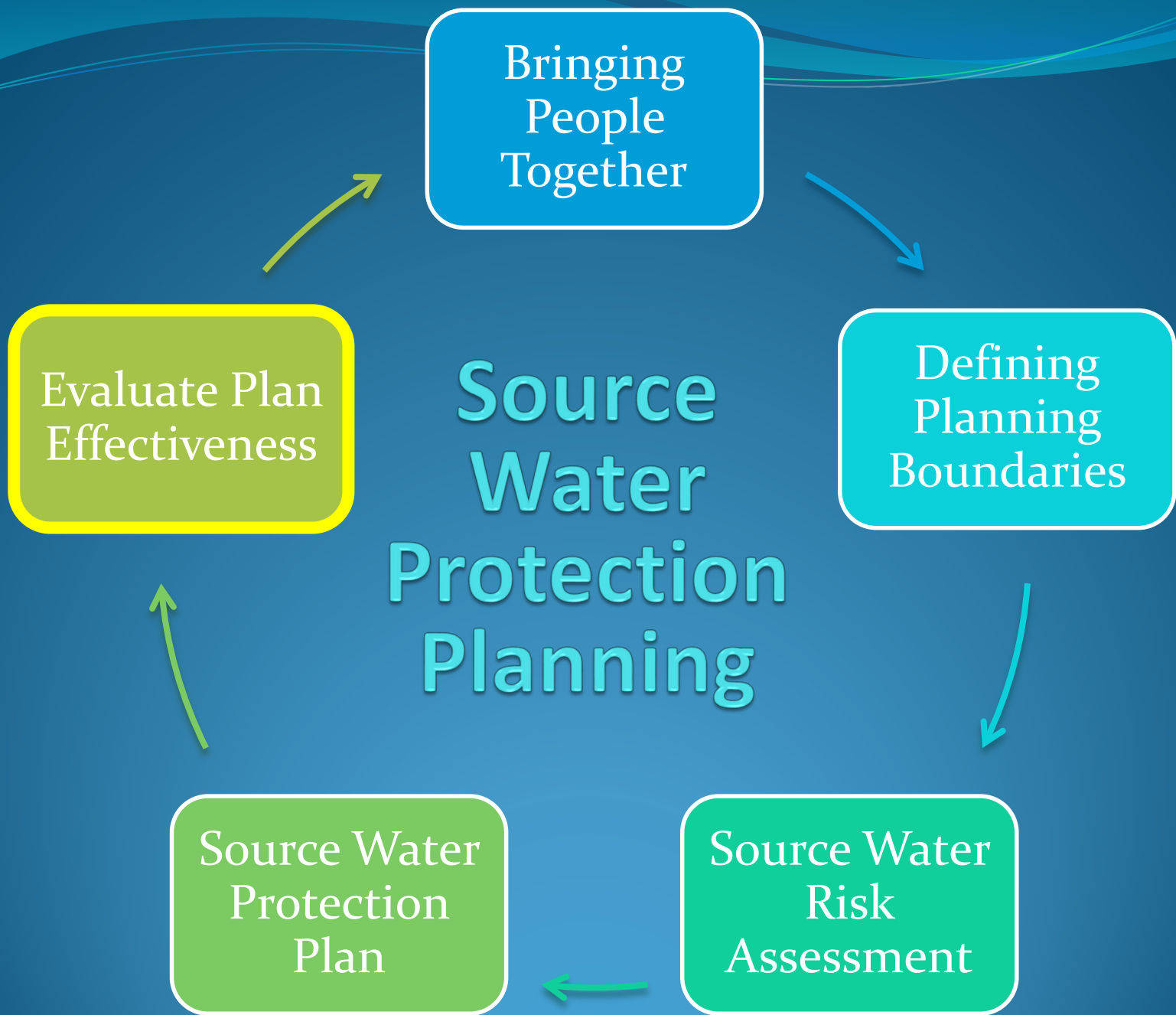
September 2016

Camrose Source Water Protection Plan

Management Action	Responsibility	Timeline
<p>1: It is recommended that Camrose County and partners work with landowners and agricultural producers to implement beneficial management practices (BMPs) that maintain or improve upland, wetland and riparian area health and water quality in the planning area.</p> <p><i>This may include encouraging producers to participate in existing incentive programs to support BMP implementation.</i></p>	<ul style="list-style-type: none">• Camrose County• Agricultural Producers• Landowners• Battle River Watershed Alliance• Cows and Fish• Ducks Unlimited Canada• Government of Alberta	<ul style="list-style-type: none">• Short-term

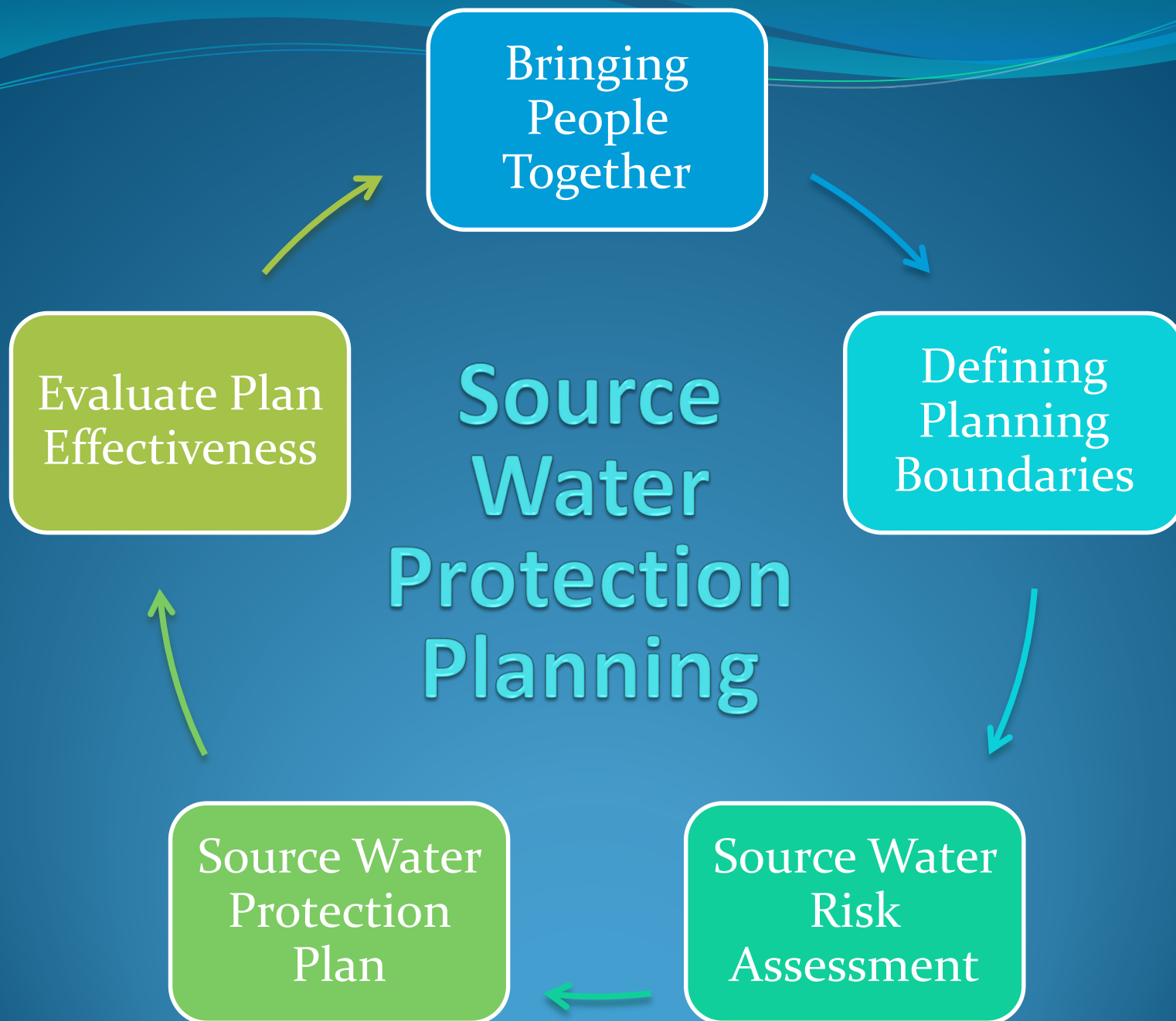
Source Water Protection Plan

“While this Plan is non-binding and voluntary, the intent is for it to be used as a guidance document to direct resources towards projects that meet the short, medium, and long-term goals for source water protection (whether that be through education, volunteer support, staff time, or direct funding). Stakeholders are encouraged to use this Plan as a tool in deciding how to utilize the resources available to work towards the common goals outlined in this Plan for the benefit of the whole community.”



Evaluate Plan Effectiveness

- ✓ Keep track of progress in implementing management actions
- ✓ Evaluate effectiveness of management actions in minimizing risks to source water: baseline data and ongoing monitoring of key water quantity, water quality and land use indicators
- ✓ Review Source Water Protection Plan on a regular basis and update as required



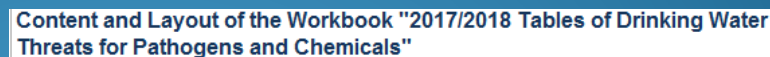
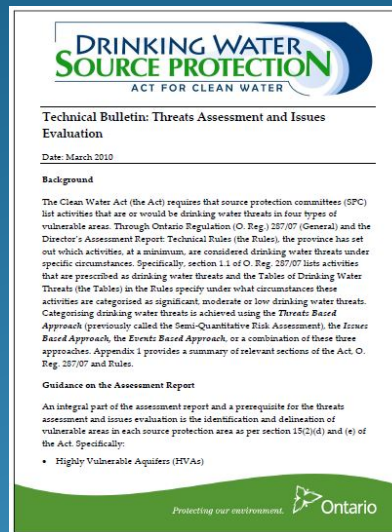


Questions?

BATTLE RIVER
WATERSHED ALLIANCE

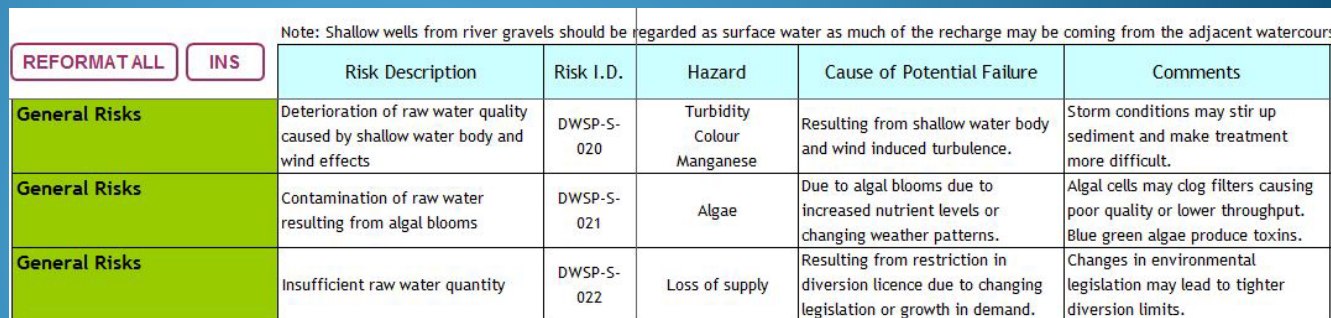
Cactus at Big Knife Provincial Park,
in the Battle River watershed

Resources



Sheet 1, Table 1: 2017/2018 Table of Drinking Water Threats for Chemicals. This table lists the circumstances for which each drinking water threat and related subcategories are Significant, Moderate or Low drinking water threats for chemicals according to the Director's Technical Rules

Sheet 2, Table 2: 2017/2018 Table of Drinking Water Threats for Pathogens. This table lists the circumstances for which each drinking water threat and related subcategories are Significant, Moderate or Low drinking water threats for pathogens according to the Director's Technical Rules



Source Water Protection Plan

Resources

Consider the Source: A Pocket Guide to Protecting Your Drinking Water

Drinking Water Pocket Guide #3



United States
Environmental Protection
Agency

Office of Water
4606

EPA 816-R-97-009
August, 1997



STATE SOURCE WATER ASSESSMENT AND PROTECTION PROGRAMS

FINAL GUIDANCE

Protect Water

Home About Us What We Do Step Into Nature Media Resources Members Contact

Find Information about your local Drinking Water Source Protection Region or Area

To access your local **Assessment Report**, choose the **ProposedAR** or **ApprovedAR** link in the first column of the table below.

If the link in the first column says **ProposedAR**, this report has been through an initial 35 day consultation period. If the link in the first column says **ApprovedAR**, the Assessment Report has been approved.

A link to the Environmental Bill of Rights Information Notice (**EBRNotice**) is also included for Approved Assessment reports

Your local Source Protection Plan (SPP) can be accessed by selecting **DraftSPPlan** or **ProposedSPPlan** in the fourth column in the Table below. If the link in the fourth column says **DraftSPPlan** the SPP is in, or has completed, an initial 35 day public consultation period. If the link says **ProposedSPPlan** the SPP is in, or has completed a secondary 30 day public consultation period. In general, Proposed Source Protection Plans will be submitted to the Minister of the Environment for approval in August 2012. When a SPP has been approved by the Minister, the fourth column will be updated to read **ApprovedSPPlan**.

Source Water Protection

Operational Guide to AWWA Standard G300

G300

Chi Ho Shum, Ph.D., Richard W. Gellick, Ph.D., Sharon C. Long, Ph.D., and Pamela P. Kneel, P.E.

American Water Works Association

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Consultations
Education and Training
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Environment

Developing a Municipal Source Water Protection Plan: A Guide for Water Utilities and Municipalities

WATER WELLS

...that last

Alberta Government

Canada Agriculture and Agri-Food Canada