



LESSER SLAVE INTEGRATED WATERSHED  
MANAGEMENT PLAN  
RISK ASSESSMENT RESULTS

Prepared for: Lesser Slave Watershed Council  
Submitted on: February 17, 2015



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## Background

With support from ESRD and participation from engaged stakeholders and individuals, the LSWC is leading the development of an Integrated Watershed Management Plan (IWMP) for the Lesser Slave Watershed. As part of the development of a communication and engagement strategy for the IWMP, a risk analysis was conducted with the IWMP Steering Committee to rank the importance of watershed management issues.

This project was accomplished through discussions that occurred during three working sessions with the IWMP Steering Committee.

### **Session 1: Creation of list of issues and risk statements**

Prior to the first session, a list of watershed management issues was created, based on review of the LSWC's State of the Watershed Report and Abells Henry (2013). During Session 1, this list of issues was presented and refined, and risk statements were drafted with the Steering Committee.

### **Session 2: Ranking of watershed risks**

At Session 2, a risk assessment process was conducted with the Steering Committee. Prior to Session 2, risk statements developed in Session 1 were individually scored, on a scale of 1 to 5, for level of impact (1="insignificant"; 5="Extreme") and likelihood (1="rare"; 5="almost certain"). Through a risk matrix, the product of the scores for level of impact and likelihood was calculated as a risk score for each risk statement. During Session 2, risk scores were presented to the Steering Committee. Risk scores were confirmed and, based on these, issues were prioritized.

### **Session 3: Review draft communication and engagement strategy**

Based on issues identified in Session 2, a list of stakeholders was created. This list was used to create the first draft of the communication and engagement strategy and accompanying information material. Comments were solicited through email and a second draft of all material was created. These draft documents were presented and refined during Session 3 and a final draft was subsequently produced.

## Results

Table 1 presents the risk statements, scoring, and list of stakeholders to be involved in collaborations to address identified issues within the IWMP process.

**Table 1: Risk Assessment and Initial Collaborating Stakeholders**

RISK STATEMENT	Average Likelihood	Average Impact Significance	Average Inherent Risk	Risk	Initial Collaborating Stakeholders
<b>Theme 1: SURFACE AND GROUND WATER QUALITY</b>					
Lack of natural buffers on settled land (White zone) may result in accelerated run-off, erosion of river banks and increased deposition of sedimentation.	5	4	20	EXTREME	<ul style="list-style-type: none"> <li>• Canadian Association of Petroleum Producers (CAPP)</li> <li>• ESRD</li> <li>• Individual First Nations</li> <li>• Lesser Slave Forest Education Society</li> <li>• Big Lakes County</li> <li>• MD of Greenview</li> <li>• MD of Lesser Slave River</li> <li>• MD of Smoky River</li> <li>• Northern Sunrise County</li> <li>• Town of High Prairie</li> <li>• Town of Slave Lake</li> <li>• PCBFA</li> <li>• Upstream Oil and Gas</li> </ul>
Lack of stream crossing inventory and enforcement may cause negative impacts to watershed quality.	5	4	20	EXTREME	
Increased access development will result in increased run-off and sedimentation (linear disturbance).	4	3	12	HIGH	
Increased agricultural production will result in more waste-related release to rivers and lakes. This will have implications to the continued health of the lakes and rivers and the overall watershed.	3	4	12	HIGH	
Fracking may cause fissures up to nearby aquifers allowing contaminants to enter the aquifer or water leaving the aquifer.	2	5	10	HIGH	
Significant population growth will result in more treated and untreated wastewater release to rivers and lakes. This will have implications to the continued health of the lakes and rivers and the overall watershed.	3	3	9	MODERATE	
Lack of crossing enforcement may result in livestock crossing directly through wetlands and water courses causing damage to the streams and increased waste deposited to streams/ivers.	3	3	9	MODERATE	
Increased forest removal (for other land uses) will increase open land base and may result in increased run-off and sedimentation.	3	3	9	MODERATE	
Due to inadequate regulations and enforcement regarding septic systems, unsafe levels of harmful bacteria may increase in the watershed.	3	2	6	MODERATE	
Due to inadequate regulations and enforcement regarding illegal dumping of wastewater (treated/untreated), unsafe levels of harmful bacteria may increase in the watershed.	3	2	6	MODERATE	
Increased recreation will result in more treated and untreated wastewater release to rivers and lakes. This will have implications to the continued health of the lakes and rivers and the overall watershed.	3	2	6	MODERATE	
As a result of the lack of data for the watershed, increased nutrient levels in the water may go undetected resulting in lower water quality for the watershed.	2	2	4	LOW	
Due to inadequate regulations and incentives to encourage the collaborative discharge of treated wastewater, unsafe levels of harmful bacteria may increase in the watershed.	1	3	3	LOW	

RISK STATEMENT	Average Likely-hood	Average Impact Significance	Average Inherent Risk	Risk	Initial Collaborating Stakeholders
The lack of enforcement for the timely reclamation of gravel pits may leave large parcels of the watershed barren expediting the flow of water and the sediment carried in the water.	3	1	3	LOW	
Lack of a Best Management Practices for water crossings for Agriculture may cause irreparable damage to the streams and increased waste deposited to streams/ivers.	1	2	2	LOW	
<b>Theme 2: SURFACE AND GROUND WATER QUANTITY</b>					
Lack of knowledge regarding up-to-date cumulative water withdrawal locations and volumes may result in over use.	4	4	16	HIGH	<ul style="list-style-type: none"> <li>• AER</li> <li>• Alberta Geological Survey</li> <li>• Big Lakes County</li> <li>• ESRD</li> <li>• MD of Greenview</li> <li>• MD of Lesser Slave River</li> <li>• MD of Smoky River</li> <li>• Northern Sunrise County</li> <li>• Town of High Prairie</li> <li>• Town of Slave Lake</li> </ul>
The use of fresh water for Industrial (fracking) may result in over use.	3	4	12	HIGH	
Lack of infrastructure to mitigate flooding during high flows.	3	3	9	MODERATE	
Lack of knowledge regarding ground water quantity and use may lead to over usage	2	2	4	LOW	
Lack of infrastructure in place may lead to water scarcity during droughts.	2	2	4	LOW	
<b>Theme 3: BIODIVERSITY AND WILDLIFE</b>					
Lack of stream crossing inventory and enforcement may cause negative impacts to fish movement and populations.	5	4	20	EXTREME	<ul style="list-style-type: none"> <li>• Alberta Trappers Association</li> <li>• Boreal Center for Bird Conservation</li> <li>• ESRD</li> <li>• Jr. Forest Wardens in Slave Lake</li> <li>• Big Lakes County</li> <li>• MD of Greenview</li> <li>• MD of Lesser Slave River</li> <li>• MD of Smoky River</li> <li>• Northern Sunrise County</li> <li>• Town of High Prairie</li> <li>• Town of Slave Lake</li> <li>• REAC</li> </ul>
Development through dry tributaries may diminish natural drainage and loss of wetlands resulting in habitat loss for many species at risk.	4	4	16	HIGH	
An unhealthy fish habitat may result in reduced fish diversity and negative impacts on the fishery.	4	4	13	HIGH	
Loss of riparian and wetland habitats may adversely affect biodiversity.	3	4	12	HIGH	
Loss of forested areas due to insect infestations may negatively impact the watershed.	3	3	9	MODERATE	
Lack of Adaptive Management Strategies to address climate change may result in the deterioration of the biodiversity of the watershed.	3	2	6	MODERATE	
<b>Theme 4: HUMAN AND ANIMAL HEALTH</b>					
An increase in blue green algae within lakes of the watershed will result in increased health risks to humans.	4	4	16	HIGH	<ul style="list-style-type: none"> <li>• AHS</li> <li>• Big Lakes County</li> <li>• ESRD</li> <li>• MD of Greenview</li> <li>• MD of Lesser Slave River</li> <li>• MD of Smoky River</li> <li>• Northern Sunrise County</li> <li>• Town of High Prairie</li> <li>• Town of Slave Lake</li> </ul>
An increase in blue green algae within lakes of the watershed will cause lower oxygen levels and cyano toxins in the water, resulting in increased health risks to wildlife and aquatic animals.	4	4	12	HIGH	
An increase in blue green algae within lakes of the watershed will cause lower oxygen levels and cyano toxins in the water, resulting in increased health risks to livestock.	4	4	12	HIGH	
A higher level of nutrients in the water may cause increased algal blooms resulting in increased health risks to humans.	4	2	8	MODERATE	

RISK STATEMENT	Average Likely-hood	Average Impact Significance	Average Inherent Risk	Risk	Initial Collaborating Stakeholders	
As a result of the lack of data for the watershed, trace concentrations of pharmaceuticals may go undetected in the watershed thus posing potential human health risks from exposure to very low levels of pharmaceuticals in drinking-water.	4	2	8	MODERATE		
A higher level of nutrients in the water may cause increased algal blooms resulting in increased health risks to wildlife and aquatic animals.	3	2	6	MODERATE		
A higher level of nutrients in the water may cause increased algal blooms resulting in increased health risks to livestock.	3	2	6	MODERATE		
As a result of the lack of data, an increased level of harmful bacteria may go undetected, resulting in impacts to recreational users (human health).	2	2	4	LOW		
<b>Theme 5: SOCIAL AND ECONOMIC</b>						
An increase in algae within lakes of the watershed will cause lower oxygen levels and higher nutrient levels in the water, resulting in increased costs associated with water treatment.	4	3	12	HIGH	<ul style="list-style-type: none"> <li>• LSLEA</li> <li>• Big Lakes County</li> <li>• ESRD</li> <li>• MD of Greenview</li> <li>• MD of Lesser Slave River</li> <li>• MD of Smoky River</li> <li>• Northern Sunrise County</li> <li>• Town of High Prairie</li> <li>• Town of Slave Lake</li> <li>• Tourism Operators</li> </ul>	
An increase in blue green algae within lakes of the watershed will cause lower oxygen levels and cyano toxins in the water, resulting in lower recreational opportunities.	4	3	12	HIGH		
A higher level of nutrients in the water may cause increased algal blooms and aquatic weeds resulting in lower recreational opportunities.	3	4	12	HIGH		
Lack of a proper stewardship program will cause the watershed to stay the same or decrease in all aspects.	3	4	12	HIGH		
Lack of programming to educate stakeholders about water quantity may result in adverse effects on future development approvals.	3	4	12	HIGH		
Increased sedimentation may result in lower recreational activities and higher costs associated with frequent dredging around water intakes.	3	3	9	MODERATE		
An unhealthy fish habitat may decrease the capability of sustaining the Traditional Use of fisheries	2	4	8	MODERATE		
An unhealthy fish habitat will negatively impact recreation and commercial tourism.	2	4	8	MODERATE		
<b>Theme 6: RIPARIAN LANDS</b>						
Lack of monitoring shoreline development may result in over-development and lower than optimal shoreline intactness.	5	4	20	EXTREME		<ul style="list-style-type: none"> <li>• Same as Theme one</li> </ul>
Alteration of shoreline aquatic vegetation removal and armoring for shoreline stabilization	5	4	18	HIGH		
Lack of Guidelines to manage shoreline development may result in over-development of surrounding shorelines.	4	4	16	HIGH		
Use of riparian areas and wetlands by livestock cause damage to riparian areas and aquatic systems.	4	4	16	HIGH		

RISK STATEMENT	Average Likelihood	Average Impact Significance	Average Inherent Risk	Risk	Initial Collaborating Stakeholders
Lack of enforceable standards around shoreline development	4	4	14	HIGH	
Elimination of riparian buffers along water courses	3	4	12	HIGH	