PEACE AND SLAVE WATERSHED MANAGEMENT DISCUSSION PAPER

Bridge on Highway 49 over the Little Smoky River

6/1/2016

Purpose

This discussion paper combines the recommendations of 2 working groups with input that the MPWA has received over the years to make recommendations for watershed management, planning and policy in the Peace and Slave Watersheds.

Acknowledgements

The Mighty Peace Watershed Alliance (MPWA) would like to thank the all the work, knowledge and input of the working group members. Likewise, MPWA acknowledges their sectors and agencies for supporting their participation on the Working Group. We thank all those who made sector presentations and provided additional information to inform our work. This discussion paper has been created based on the recommendations that the 2 working groups provided to the MPWA. Also, the MPWA would like to thank Petra Rowell for all her work in facilitating the 2 working groups and also helping the MPWA Board of Directors work through the recommendations received from the working groups.

Water Quality, Availability and Consumptive Use Working Group Members

Name	Job Title or Perspective	Affiliation
Dollie Anderson	Municipality with water availability issues	MD of Opportunity
Bill Berzins	Energy industry water user	K-Nowbe/CAPP
Rod Burr	Approvals Team Lead	Alberta Environment and Parks
Leland Jackson	Academic	University of Calgary
Rick Keillor	IWMP Steering Committee	Mighty Peace Watershed Alliance
Gregory Pippus	Environment Lead	Weyerhaeuser
Brent Schapansky	Municipal water management	NEW Water Ltd.
Darryl Smith	Conservation organization	Alberta Fish and Game Association
Natalia Thornton	Oil and Gas industry	Seven Generations Energy Ltd
Jim Webb	Aboriginal perspective on water policy	North Peace Tribal Council

Wetlands and Wetlands Loss Working Group Members

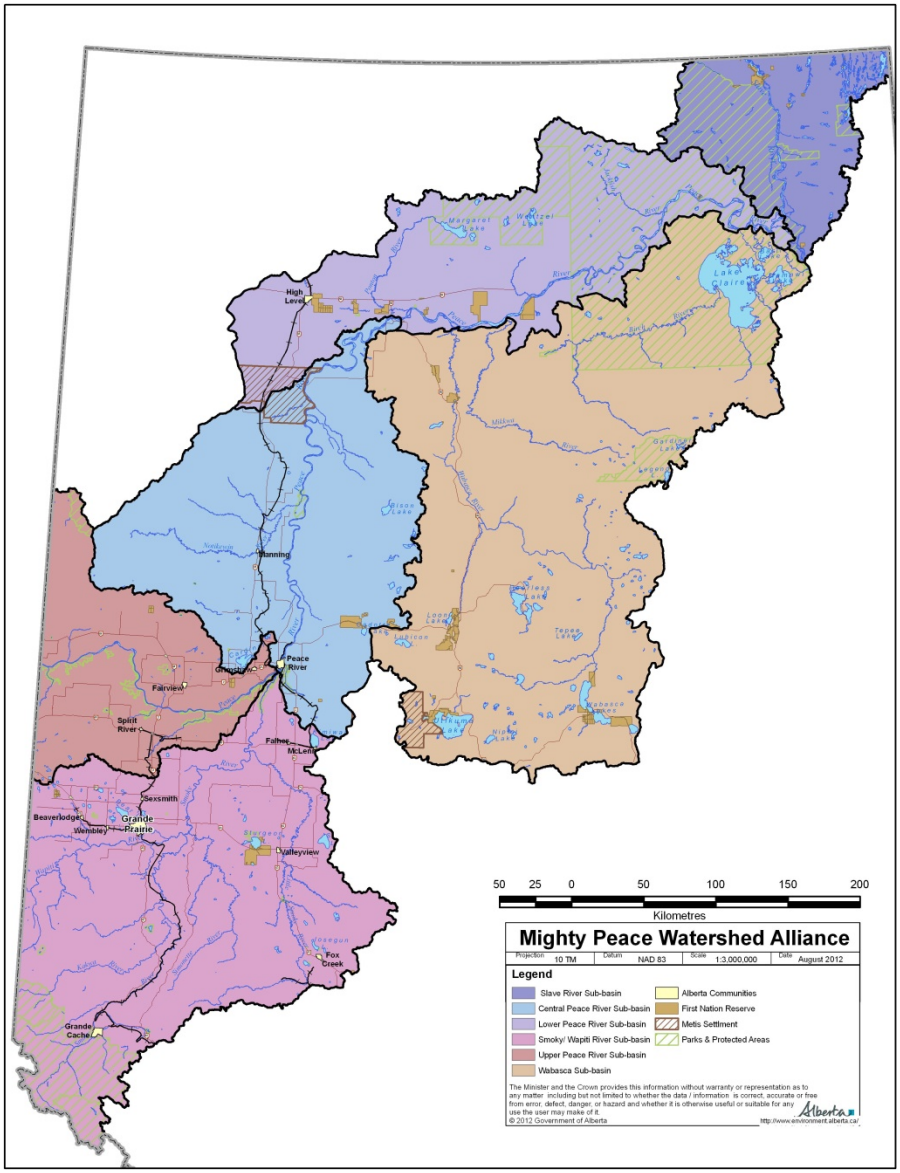
Name	Job Title or Perspective	Affiliation
Garth Davis	Energy industry	ConocoPhillips
Joe Hustler	Mining	Knelsen Sand and Gravel
Eric Jorgensen	Municipal Councillor	Mackenzie County
Stuart MacMillan	Resource Conservation Manager	Wood Buffalo National Park
David Matheson	Conservation Organizer	Ducks Unlimited Canada
Amber Moskalyk	Producer	Agriculture
Jason Straka	Ecologist	Parks Canada
Gilman Cardinal	Traditional Use	Bigstone Cree
Chris Thiessen	IWMP Steering Committee	City of Grande Prairie
Marsha Trites-Russell	Wetland Specialist	Alberta Environment and Parks
Jim Webb	Aboriginal perspective on wetlands	North Peace Tribal Council
Ian Whitby	Forest Planner	Tolko
Bix Xu	Research Chair	NAIT Boreal Research Institute

Mighty Peace Watershed Alliance Board Workshop in Peace River.

Peace and Slave Watershed management discussion paper

Purpose

With this discussion paper, the MPWA hopes to spark discussion, comments and receive input on the Integrated Watershed Management Plan. At the present, it is in a very draft format and we want to get feedback about the content. Our discussions always have a multi-stakeholder and consensus format and we continue to seek diverse and representative input. An Integrated Watershed Management Plan attempts to coordinate efforts to manage at the watershed scale so that we are better able to manage our uses and impacts on our shared water resources.



Integrated Watershed Management Plan

The Integrated Watershed Management Plan of the Peace and Slave Watersheds will address effective and sustainable management and use of the water resources. It will also address the maintenance of other benefits provided by the ecological functioning of the watershed. Ensuring that cumulative effects are understood and communicated among all users of the watershed is necessary to improve decision-making about human activity in the watershed. Creation and implementation of this plan will support the achievement of Water for Life's 3 main goals of: safe, secure drinking water; healthy aquatic ecosystems; and reliable, quality water supplies for a sustainable economy.

Integrated Watershed Management Plan Terms of Reference

This section is taken from the Integrated Watershed Management Plan's Terms of Reference. Public engagement, ongoing conversations throughout the watershed and technical knowledge guided the creation of the Terms of Reference. Please go to www.mightypeacewatershedalliance.org/projects/integrated-watershed-management-plan/

This plan will identify the areas with the greatest need for coordinated management and create a roadmap of how to lay the foundation for ongoing watershed management in the Peace and Slave Watersheds. This plan is not a one-time effort, but rather the beginning of a systematic and prioritized adaptive management process at the watershed scale. Please see map on page 4 for the geographic scope of this plan

The purpose of this process is to coordinate the watershed management efforts of governments, residents, stakeholders, and communities in the Peace and Slave Watersheds. It is the intention of the MPWA to get the support of as many governments, stakeholders, communities and residents for this plan as possible in order to make it successful. This process will be a marathon and not a sprint. The MPWA has prioritized the areas of greatest concern based on input from those in the watershed and is now considering how best to address those issues. Implementation is critical to the utility of this work and the challenge of having the plan implemented will take place once the plan is complete. The MPWA will ensure that recommendations are carried forward to decision-makers who then can implement the recommendations.

This discussion paper only provides a brief overview of the work that has been done, the information collected and the possibilities considered. For more information please visit our website www.mightypeacewatershedalliance.org or contact us at 780-324-3355 or mpwa.execdirector@telus.net.

Highlighted Watershed Issues of Concern

The Board of Directors used input that they had received from the public, technical studies and conversations throughout the watershed and the State of the Watershed Process (www.mightypeacesow.org) to identify Issues of Concerns. Five issues of concerns were identified and three of these were addressed by two different working groups. Sufficient water quality and

quantity are critical to the watershed and the people who use the water resource. It is recognized that water quality and quantity are two broad categories that provide us with a sense of how the watershed is functioning. Each of the highlighted issues of concern falls under the umbrella of either water quantity or water quality. This is by no means an exhaustive list but rather a prioritized list that will guide initial planning efforts (see Table 1). Subsequent rounds of planning may tackle other issues depending on the conditions at that time.

Non-saline ground water

Groundwater is a crucial source for many residents and communities throughout the watershed. More needs to be understood about the quantity and geographic boundaries of these reserves, how sustainable their current use is and an appropriate means of managing them into the future. This plan will lay out a strategy to fill the data gaps in this area.

One good example of very valuable groundwater is the Grimshaw Gravels Aquifers, which is a very high quality source of ground waters within the watershed. This aquifer is also at high risk due to its proximity to the surface so it is an issue of concern. This Integrated Watershed Management Plan will look at means of protecting and safeguarding this valuable resource.

Surface Water Quality and availability away from the mainstem

Although the water allocations on the Peace River and Slave River mainstems are less than 1% of annual flow at present, the need for water is often not on these large mainstems. Several tributaries, such as the Little Smoky River, where water is withdrawn for municipal and industrial uses face water restrictions. Generally, these involve a timing restriction to levels of flow when water can be drawn. This may result in the need to withdraw at high flows and store, both of which create an increase in costs for municipalities and residents. Similarly, some lakes used as source water for municipalities are facing similar issues.

This plan will explore options for ensuring a sustainable supply of water away from the Peace River mainstem.

Winter water quality sampling on Steeprock Creek

Wetlands and Wetland loss

Wetlands cover slightly more than 29% (52,898 km^2) of the Peace and Slave watershed (not including national parks, for which information was not readily available). The extent of wetland area is a reflection of the natural land cover and land use. The regions with high coverage of

wetlands correspond with extensive boreal forest areas and little human activity. These wetlands provide valuable ecosystem services (http://1.usa.gov/1YmpRig). In the lower watershed, First Nation's mode of life relies heavily on a wetland dominated ecosystem.

This plan will lay out a strategy for dealing with the lack of data around wetlands, look for solutions to address the loss of wetlands and explore the role of restoration in safeguarding wetlands in the watershed. Any strategies in the plan will incorporate the new Provincial Wetland Policy.

Treed fen south of High Level

Peace River flow regime

The Peace is considered a "regulated" river because it can be and is controlled by dams in British Columbia. The dams have altered the seasonal flow rate since 1967, significantly reducing flows in spring, summer and autumn and significantly increasing them in winter. The impact of the dam must be considered when management practices are being considered that adjust the flows. The specific effects of the dam on aquatic ecosystems of the Peace and Slave watershed have not been sufficiently characterized. Most of the water in the Peace River comes from British Columbia, so the timing, quality and quantity of this water has many ramifications for the Peace and Slave Watersheds. Similarly, the water passes through to other jurisdictions and this raises transboundary issues.

Relying heavily on the work being done by the Peace Athabasca Delta Ecological Monitoring Program, this plan will explore the impact of flow regime on the Peace Athabasca Delta and recommendations to restore and maintain its ecological functioning. Similarly, this plan will follow the work being done in the bilateral negotiations between Alberta and British Columbia. Flow regime will be reviewed in terms of the risk it poses to communities, farmland and infrastructure so that recommendations for their safeguarding can also be made.

Consumptive Use of fresh water (both ground and surface water)

As of 2011 water licenses and registrations issued to people and companies allow withdrawals of up to 148,728 cubic decametres (10x10x10 metres), which is the amount of water in 60,000 Olympic sized swimming pools, of surface water for use. Allocations of surface water account for about 0.3% of the average annual flow of the Peace River at Peace Point. Nearly two thirds of these allocations are for commercial purposes, including pulp mills, coal mines and thermal power projects. Another

19% of surface water allocations are for municipal purposes, with 7% for industrial purposes (oil and gas). Allocations for agricultural use account for 5% of total allocations.

This plan will develop a strategy to better understand the extent of the consumptive industrial use of water including the practice of deep disposal. The Oil and Gas, Mining and Power Generation, Agriculture and Forestry industries will be examined and options explored for reducing the consumptive use of fresh water.

Iosegun River Valley

Working Groups

The working groups were struck by the MPWA Board of Directors to broaden the input for these Issues of Concern and come up with creative and collaborative solutions. It is important to have the range of uses and interests represented throughout the discussions and solutions identification and innovation.

The working groups approved a Terms of Reference based upon a template given to them by the MPWA IWMP SC. It included the following objective:

> Working groups worked through the Issues of Concern as directed by the Integrated Watershed Management Plan Steering Committee (IWMP SC) in a consensus process. The end goal for each Issue of Concern is a set of concrete recommendations to the IWMP SC on how to improve water quality and quantity in pursuit of the 3 goals of the Water for Life strategy. This includes statements about the Issues of Concern and potential options for addressing them.

The Water Quality, Availability and Consumptive Use of Water working group considered three aspects of Watershed Management. First, this working group considered water quality for surface water for both lakes and rivers. Second, water availability was examined and speaks more to the distribution of water than the actual quantity of water. Although the Peace River has a large amount of water in it, many communities or users are not using water from the Peace River mainstem. Third, Consumptive Use refers to the use of water when it is not returned to the same hydrological unit where it was withdrawn from. Currently, the predominant consumptive use in the Peace and Slave watersheds is hydraulic fracturing and oilfield injection.

Wetlands and wetland loss were examined by the second working group. Their focus was on the presence, loss and function of wetlands and how to best manage human impact on them. Almost a third of the Peace and Slave Watersheds are covered in wetlands. The approach to managing human impacts on wetlands depends on the type of wetland and whether it is located in the white or green zone.

Water Quality, Availability and Consumptive Use of Water

SUMMARY OF THE WORKING GROUP'S FINDINGS

The Mighty Peace Watershed Alliance Integrated Watershed Management Plan Steering Committee struck a multi-sector *Water Quality, Availability and Consumptive Use Working Group* to investigate a number of watershed management topics and provide recommendations to the Committee for consideration in their planning process.

Overall, the Working Group concluded that ***water quality*** is generally good on the Peace River main stem, with its large volume and relatively few point and nonpoint source pollution inputs. There are issues on smaller tributaries and lakes. Processes are in place to address such issues to some degree. A more extensive and accessible monitoring, assessment and reporting system would benefit our understanding of water quality throughout the basin.

Water ***availability*** is not an issue for communities that draw source water from the Peace River main stem. However, due to their location throughout the watershed, many communities draw from smaller tributaries, lakes or from groundwater that may not provide optimal source quality or volume.

Partnerships, such as NEW Water Ltd, can see communities, including First Nations reserves and Métis Settlements, work together to find solutions to drinking water treatment and distribution challenges. Collaborations can also address a number of issues faced by communities throughout Alberta, including the cost of building and maintaining drinking water and wastewater treatment and distribution infrastructure, and recruiting, training and retaining drinking water and wastewater staff.


Duck weed and aquatic macrophytes

The most common form of consumptive use in the Peace and Slave Watersheds is currently hydraulic fracturing and oilfield injections. The discussion about consumptive use is made more complex by the source (surface water or groundwater; saline or non-saline); timing of flows and withdrawals (particularly for small, seasonal tributaries and lakes), and the need for timely monitoring of the cumulative effects of multiple withdrawals at multiple diversion points on downstream aquatic health. Topics such as the use of recycled water or treated effluent or of using storage versus continuous pumping, also add complexity to the tracking and management of available supply versus demand, both now and in the future under a changing climate scenario. Like other watersheds in the province, the Peace watershed would benefit from a more comprehensive, cumulative effects management approach to all water allocation and supply issues, including consumptive use.

Finally, in looking at its recommendations, the Working Group noted that many of its conclusions

are similar to what other groups have indicated is needed to manage water in this and other watersheds. That is, going forward, efforts should be directed to having a sound knowledge base specific to the Peace-Slave watershed; sharing this knowledge with others through education and collaboration such that a system of iterative and adaptive management planning and implementation becomes effective; resulting in a healthy watershed, now and in the future.

Recommendations

Upon receiving the recommendations produced by the working group, in a two day workshop the MPWA Board of Directors considered the two working groups' recommendations and chose those which they felt could be achieved in the short term. Table 1 below provides a full listing of the recommendations by the working group to the IWMP Steering Committee; however the 3 listed below will be the initial focus for the IWMP. Following public engagement and conversations with the different sectors and land users involved these priorities will be fleshed out into a more detailed plan.

The top priority for this Issue of Concern as identified by the Board of Directors is the following:

Identify and support communities with critical water supply and/or treatment issues.

And following this the next priorities are:

Develop an education and outreach strategy that identifies target audiences, key messages and appropriate communication tools.

Raise awareness and promote the use of source water protection plans for all sources in the Peace/Slave watershed.

Table 1. Outcomes, Strategies and Actions for Water Quality, Availability and Consumptive Use (Board priorities are highlighted in Green)

Vision: Water in the Peace-Slave watershed is adaptively managed for current and future generations such that the water resource is well understood, quality source and drinking waters are available where and when they are needed and aquatic ecosystems are healthy.		
Outcomes	STRATEGIES	POTENTIAL ACTIONS
1.0 Accessible, timely and accurate baseline information on water quality, availability and consumptive use supports knowledge-based decision-making and adaptive management such that aquatic ecosystem health and ecological integrity are sustained.	1.1. Develop an accessible water database(s) and/or portals. (Build on existing databases like the water use reporting system, AEP, etc.)	1.1.1 Identify a 3rd party neutral multi-stakeholder database host (e.g. MPWA, AEP, etc.)
		1.1.2 Develop a communications strategy to raise awareness of available data.
	1.2 Find funds for database support and for research to fill data gaps.	1.2.1 Create a database of available funding sources.
		1.2.2 Investigate and leverage existing Water for Life and other provincial initiatives (e.g. AB Innovates, WRRP program) for funds.
		1.2.3 Explore the use of a levy or donation from water users to fund a shared publicly available database.
		1.2.4 Collaborate with University researchers
	1.3 Decide what parameters, indices will be monitored and assessed for water quality, quantity/use and aquatic ecosystem health (including ecological goods and services).	1.3.1Survey current indices and parameters and select best fit.
		1.3.2 Standardize collection and assessment methods and timelines.
		1.3.3 Establish baseline and begin collecting data for these indices and/or parameters and make findings publicly accessible.
		1.3.4 Identify triggers, responses.
	1.4 Promote mandatory water use reporting by all.	1.4.1 Link water use reporting data to the publicly available database.
	1.5 Improve our understanding of historical and future flows and demands.	1.5.1 Encourage First Nations and community elders to share traditional and historical knowledge.
		1.5.2 Back cast the past 100 years of flow data; forecast the next 100 years to gain a better understanding of seasonal flows on smaller tributaries and compare to projected instream and industry needs, in the face of climate change.
2.0 Land use and water managers and the public are knowledgeable about the water balance	2.1 Develop an education and outreach strategy that identifies target audiences, key messages and appropriate communication tools (e.g. tradeshows, Sister City, school curriculum, etc.).	2.1.1 Develop a mainstream media education campaign for a public audience.
		2.1.2 Develop a more industry-focused campaign promoting compliance, stewardship, best practices, etc. for water haulers, road builders, construction, grader operators, etc. Work through certification and training programs to improve water awareness.
		2.1.3 Develop, or tap into existing, municipally focused campaigns.

(inputs and outputs) and share accountability for managing current and future water use demands sustainably in the Peace-Slave watershed.	2.2 Ensure accountabilities by building processes into the Water Act allocation and licensing system that assure cumulative effects are known and impacts are lessened.	2.2.1. Make it a condition of a license that the water hauler, or other user, has to prove training/ certification, etc. (Many TDL applicants note that they have their haulers complete online training at www.surfacewaterdiversion.com.)
		2.2.2 Ensure and report on compliance with water use reporting, conditions on licenses such as monitoring, etc.
		2.2.3 Put a more formal system in place with resources to monitor / model license withdrawals and timing of flows on any small tributary with multiple term or temporary diversion licenses on it.
3.0 Source water yield is recognized as a value to be managed by the crown ensuring source waters are protected.	3.1 Raise awareness and promote the use of source water protection plans for all source waters (existing and new) in the Peace/Slave watershed.	3.1.1 Define, locate and map source waters (surface and groundwater) in the watershed.
		3.1.2 Promote existing tools and programs that are currently available to municipalities and private system owners to develop plans (technical advice, templates, etc.)
	3.2 Mitigate anthropogenic point and non-point source pollution (sediments, nutrients, etc.).	3.2.1 Identify current and potential pollutants and sources (both natural and anthropogenic).
		3.2.2. Create and implement an education plan about NPSP and how to mitigate its impacts.
		3.2.3 Promote the use of agricultural BMPS (e.g. off-site watering systems) particularly in the Upper Peace and Smoky-Wapiti sub- basins.
		3.2.4 Investigate trade-able credits / offsets / cap and trade systems for their ability to affect cumulative effects. (See provincial policy on conservation off-sets)
	3.3 Promote passive ecosystem management with buffers, setbacks, conservation easements, municipal and environmental reserves, etc. around waterbodies, wetlands, riparian lands, floodplains and	3.3.1 Investigate the ALUS or a similar incentive program (ecological goods and service payments) for the Peace.
		3.3.2 Identify (delineate) crown lands (bed and shore) on title before land sales. (or at the referrals stage) (see the new guide on establishing permanence)
		3.3.3 Map floodplains and limit development on and restore; see WRRP program

Vision: Water in the Peace-Slave watershed is adaptively managed for current and future generations such that the water resource is well understood, quality source and drinking waters are available where and when they are needed and aquatic ecosystems are healthy.		
Outcomes	STRATEGIES	ACTIONS
4.0 The water allocation system is comprehensive, transparent, efficient and effective and protects aquatic ecosystem health and ecological integrity in the Peace-Slave watershed.	4.1 Determine the IFN (using the desktop method) for any priority (e.g. over a particular volume) tributary with an allocation license on it with available data and/or a surrogate.	4.1.1 Determine what needs to be protected for instream flow needs, including wetland / ecosystems how much water is allocated in each basin; what remains for allocation, seasonal issues, etc.
	4.2 Promote the water use reporting system and ensure compliance such that all TDLs and term license-holders (e.g. ag users, irrigation, larger licenses e t c .) are tracking and reporting water use.	4.2.1 Look at current monitoring and compliance systems to ensure water allocations are appropriate through sensitive periods, compliance is 100%, including cumulative effects monitoring (to be defined) and reporting.
	4.3 Understand limits (carrying capacity) for tributaries and manage the cumulative effects of Water Act approvals.	4.3.1 Start a pilot project with smart meter real time monitoring in critical areas (to be defined).
5.0 Source water availability is a key consideration of current and future population growth and development.	5.1 Integrate land and watershed planning.	5.1.1 Ensure a MPWA board member sits on the Upper and Lower Peace planning processes.
		5.12 Investigate designating the watershed plan as a sub-regional plan.
	5.2 Forecast future growth and development of the watershed (all future needs) to inform decision-making on all source waterbodies particularly priority source tributaries under demand.	5.2.1 Engage consultant to model watershed (e.g. ALCES) or those tributaries believed to be under pressure.
	5.3 Identify and support communities with critical water supply and or treatment issues.	5.3.1. Create a list of communities and issues (including First Nations communities with boil water advisories).
		5.3.2. Prioritize communities for action.
		5.3.3. Outline possible actions to improve supply and/or treatment options, in particular, looking at regional collaborations.
		5.3.4. Conduct feasibility studies.

		5.3.5. Select on option.
		5.3.6. Fund and implement through existing federal and provincial municipal infrastructure programs.
6.0 Consumptive use of fresh water is managed sustainably and economically.	6.1 Empower water use managers and planners to achieve shared objectives from an agreed to watershed management plan.	6.1.1 Use incentives and compliance, in the right balance.
		6.1.2 Monitor and assess (using performance measures) the achievement of objectives.
		6.1.3 Ensure instream flow needs are set on all waterbodies with allocations to guide decision-making.
		6.1.4 Set and educate on a common terminology (e.g. waste, unrefined product, etc.).
		6.1.5 Create a forum for transparent discussions about trade-offs.
		6.1.6 Promote best available technology, CEP planning, water reuse and recycling of source and wastewaters (to be defined).
		6.1.7 Understand demand and timing of demand (instantaneous and annual, and long term) as well as long-term supply cycles and trends.

Wetlands and Wetlands Loss

SUMMARY OF WORKING GROUP FINDINGS

The Mighty Peace Watershed Alliance (MPWA) Integrated Watershed Management Plan (IWMP) Steering Committee struck a multi-sector *Wetlands and Wetland Loss Working Group* to investigate a number of wetland-related topics and provide recommendations to the Steering Committee for consideration in their planning process.

Wetlands provide important ecological goods and services including but not limited to flood reduction, biodiversity, water storage and water filtration. Furthermore, wetlands support and provide the means for First Nations people to exercise their Treaty protected right to their mode of life. This is particularly important in the Wabasca and Lower Peace sub-watersheds, where the majority of the population is First Nation people.

All five wetland types (fens, bogs, swamps, marshes and shallow open water) occur across the Peace-Slave watershed. Some types, such as swamps, are more prevalent (put in percentage of) in certain areas, like the Wabasca sub-basin. However, it is difficult to assess the current state and trajectory of these wetlands without an adequate historical baseline. In addition, there are gaps in the data for types (Shallow Open Water wetlands), areas (Wood Buffalo and Jasper National Park) and historical loss. Awareness of regulations related to wetlands, including the new Wetland Policy, is poorly understood. The value of wetlands to ecosystem function is not well documented and few incentives exist to ensure their preservation and restoration.

"We need to acknowledge the need to more pro-actively manage wetlands as an integrated part of the landscape, with a view to a healthy watershed, both now and in the future."
Working Group Member

Until we have a better understanding of the current state of wetlands, as well as an understanding of how the new Wetland Policy and its implementation will affect sector operations in the watershed, it is challenging to set wetland management priorities. Hence the majority of recommendations made by the Working Group focus on building better baseline information, and communicating this information to everyone in the Peace-Slave watershed.

Wooded fen photo courtesy of Marsha Trites-Russell.

Recommendations

Upon receiving the recommendations produced by the working group, the MPWA Board of Director held a 2 day facilitated workshop to review and prioritize the recommendations. The table below provides a full listing of the recommendations by the working group to the IWMP Steering Committee; however the 3 listed below will be the initial focus for the IWMP

The top priority for this Issue of Concern as identified by the Board of Directors is the following:

Promote stewardship with people active in and around wetlands.

And following this the next priorities are:

Strike an education committee to develop and implement a general wetland education and outreach plan.

Communicate the state of wetlands and wetland trends as information becomes available.

Table 2. Outcomes, Strategies and Actions for Wetlands and Wetland Loss (Board priorities are highlighted in Green)

Wetland Vision: In the Peace-Slave watershed, the state and functions of wetlands is well understood and human activities affecting wetlands are mitigated (avoid, minimize or replace) such that wetlands and their associated benefits are healthy (ecological integrity is maintained), resilient and sustained on the landscape for current and future generations.		
OUTCOMES	**STRATEGIES**	**POTENTIAL ACTIONS**
1.0 Baseline information supports knowledge- based decision- making and adaptive management.	1.1 Develop good baseline information including an accessible GIS wetland inventory with both surface water delineation and sub-surface flows (i.e. groundwater connection).	1.1.1 Build on existing MPWA, GOA and GOC (WBNP) wetland inventories to develop complete baseline data for the Peace- Slave watershed (and possibly the Hay and Liard watersheds) including information on WBNP, Shallow Open Water, current and historical distribution, type, areas of loss, and areas for restoration. Use AVI, Lidar, TEK, ground truthing, industry data, etc. to improve maps.
	1.2Define and monitor wetland health and periodically assess the state of wetlands.	1.2.1 Work with the GOA-AEP, GOC-PC and AEMERA-ABMI to determine criteria, protocols, etc. and incorporate into MPWA state of reporting.
	1.3 Set benchmarks and determine management objectives to guide future work in an iterative and adaptive process via the IWMP process.	1.3.1 Determine appropriate time period(s) for benchmarks (e.g. current, pre-settlement, etc.) depending on the questions that need answering. Start in higher impacted sub- basins including the Upper Peace and Smoky-Wapiti.
		1.3.2 Continue to explore wetland management options meaningful to stakeholders going forward perhaps by modelling future disturbance footprint (temporary and permanent loss), climate change, etc.
	1.4 Improve our understanding of the ecology of wetlands in the watershed including the goods and services they provide recognizing these might be affected by cumulative effects and climate change.	1.4.1 Determine research priorities (e.g. impact of wetland loss on aquifer recharge or species at risk; carrying capacity, etc.), partners, etc. in a research strategy. Glean learnings from White Area wetland research but encourage new research to focus on the Green Area (boreal) wetlands.
		1.4.2 Develop a TEK study of wetland uses and importance and historical distribution.
2.0 Everyone in the watershed is knowledgeable about wetlands and their	2.1 Strike an education committee to develop and implement a general wetland education and outreach plan.	2.1.1 Model this education and outreach plan on the University of Saskatchewan Delta Dialogue Network: an example of knowledge building and sharing and knowledge mobilization. Target municipal councils, ag service boards, industry, the public, etc. (take a triage approach to determining sector priorities.)

social, economic and environmental value.		2.1.2 Provide input to AEP as they review and renew the Alberta Education wetland curriculum (Webbed Feet Not Required) to focus more on wetland management in a northern context. Assist AEP with curriculum delivery and promotion throughout the Peace.
		2.1.3 Engage post-secondary and professional organizations in the Peace-Slave watershed in wetland education and outreach.
	2.2 Communicate the state of wetlands and wetland trends.	2.2.1 Integrate wetland state of reporting into the MPWA state of reporting process.
	2.3 Ensure wetland education and outreach products are available.	2.3.1 Use multiple platforms for information sharing (see www.wetlandsalberta.ca)
3.0 Everyone in the basin is aware of the provisions of the *Water Act, Public Lands Act* and the *Wetland Policy* and all other legislation (e.g. SARA) related to managing human activities around wetlands.	3.1 Develop a more specific awareness campaign around the new Wetland Policy and policy implementation tools targeted specifically at sectors operating in the Peace- Slave watershed.	3.1.1 Identify priority target audiences (e.g. municipalities, peat mining, road building, agriculture and industry associations, etc.), key messages and appropriate communication tools (e.g. field extension, social media, etc.). Resource campaign implementation with wetland offset dollars.
	3.2 Ensure land owners / land users operating in the watershed are knowledgeable about and comply with legislation.	3.2.1 Develop an education, compliance and enforcement program.
		3.2.2 Work with agriculture and industry to set shared wetland objectives in an IWMP that they can achieve (carrot rather than the stick) above the regulatory backstop. Ensure there is awareness of existing and new incentive programs.

Wetland Vision: In the Peace-Slave watershed, the state and functions of wetlands is well understood and human activities affecting wetlands are mitigated (avoid, minimize or replace) such that wetlands and their associated benefits are healthy (ecological integrity is maintained), resilient and sustained on the landscape for current and future generations.		
OUTCOMES	**STRATEGIES**	**POTENTIAL ACTIONS**
4.0 Landowners and land users are incented to be good stewards and conserve wetlands.	4.1 Promote stewardship with various user groups.	4.1.1 Work with off-roading /all-terrain vehicle users to promote stewardship. See *Tread Lightly on the Tundra* model.
		4.1.2 Work with Agriculture to improve understanding of the economic benefits of wetlands and the ecological goods and services they provide and to implement BMPs.
		4.1.3 Work with industry to promote stewardship tools such as BMPs, Codes of Practice, biodiversity and conservation offsets, etc.
5.0 In areas of high wetland loss or degradation, wetlands are restored.	5.1 Understand the relationship between the Peace main stem flow regime, the health of wetlands in the PAD, and the quality of life of local inhabitants and promote the operation of flows to preserve this relationship.	5.1.1 Create a multi-stakeholder committee to provide their perspective and advice to the AB-BC Transboundary Negotiation teams.
		5.1.2 Examine pre- (natural), post-dam and current desired flow and develop potential options/scenarios to manage the flow of the Peace for the health of people and wetlands in the PAD.
	5.2 Define what is meant by "areas of high wetland loss" in the Peace-Slave basin context and map the occurrence of any such high loss areas.	5.2.1 From the baseline maps developed in outcome #1, look at historical loss. Using a triage approach, define and map areas of high loss. The definition could be number of wetlands, areal cover, loss of functions, etc. It could also be different in different sub-basins, depending on the regional context. Work should be started in the sub-basins with the highest footprint (Upper Peace, Smoky Wapiti).
	5.3 Partner with land trusts and other land stewards (DUC, TNC, ACA, Parks Canada, First Nations, forest industry, etc.) to conserve wetlands.	5.3.1 Strengthen communication between forestry and FN (re operational planning).
		5.3.2 Promote and support land trusts by encouraging them to operate in the Peace-Slave watershed and linking them to potential donors.

	5.5 Conduct a regional strategic environmental assessment as a tool to model scenarios/ management options to achieve outcomes.	5.5.1 Modelling scenarios will likely be a part of the LUF regional planning processes, and hopefully will include stakeholder input into what are culturally and environmental significant areas and features in the Peace-Slave watershed.
	5.6 Explore a conservation offset strategy (tie carbon sequestration, biodiversity, etc.)	5.6.1 Explore FN collaborative involvement as stewards of offsets (i.e. examine the option of managing lands complementary to existing tenures for conservation values where we could fund First Nations to manage lands for biodiversity and other conservation values).
	5.7 Develop a runoff /non-point source strategy to mitigate the impacts on receiving waterbodies including wetlands.	5.7.1 Encourage the use of tools like riparian setbacks, environmental reserves and incentives as a means of managing erosion and surface water run-off (NPSP) for the protection of source water quality and to protect high value wetlands.
6.0 Exceptional wetlands that are socially, economically and/or environmentally significant are protected.	6.1 Define what is an exceptional wetland (develop criteria) and inventory where they are including delineation and ownership.	6.1.1 With a group of stakeholders, research other jurisdictions to see if criteria already exist before setting Peace-Slave specific criteria.
		6.1.2 Apply criteria to base line data developed in outcome #1 to identify and map exceptional wetlands. Alternatively, explore a nomination process approach similar to Alberta's Special Places 2000 program.
	6.2 Work with governments, land trusts, landowners, etc. to protect exceptional wetlands.	6.2.1 Provide incentives to landowners to protect private lands around designated exceptional wetlands possibly through programs such as ALUS, tax relief, conservation easements, Growing Forward II, etc.
		6.2.2 During environmental impact assessments of project proposals that have potential impacts on exceptional wetlands, assess project specific and cumulative impacts against pre-development baseline conditions.

Summary

Great learning has been had through the Working Group process both due to the products received but also because of the process. The process confirmed what the recommendations said: ongoing communication and awareness are critical to watershed management. Here, watershed management is meant in the broadest terms, that is, how do we as those living, playing and working in this watershed do things in order to maintain our water resources that are so critical to all of us. Hard conversations were had, as were great moments of reaching out.

We heard statements such as, "I understand what you need now, what we could do differently is…"

This ongoing collaboration and awareness of the issues, of the current state of the watershed and of the needs of the different users on the landscape is central to the work being done by the MPWA.. Our hope is to continue this and use this Integrated Watershed Management Plan process to support and encourage practices that we can all agree upon.