North Saskatchewan Watershed Alliance

A WORKBOOK

To Share Your Views on Developing an Integrated Watershed Management Plan (IWMP) for the North Saskatchewan River Watershed

January 2011

North Saskatchewan Watershed Alliance

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The North Saskatchewan Watershed Alliance (NSWA) is a non-profit society whose purpose is to protect and improve water quality and ecosystem functioning in the North Saskatchewan River watershed in Alberta. The organization is guided by a Board of Directors comprised of member organizations from within the watershed. It is the designated Watershed Planning and Advisory Council (WPAC) for the North Saskatchewan River under the Government of Alberta's *Water for Life Strategy*.

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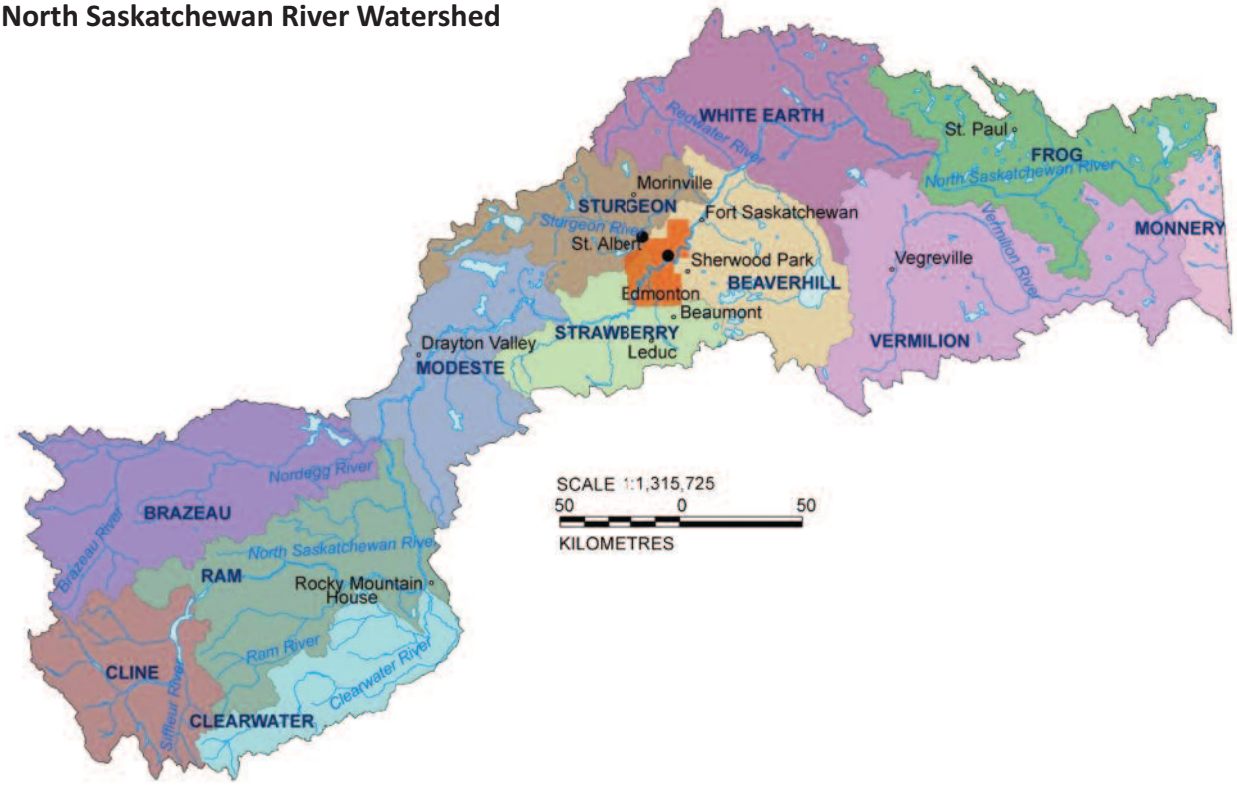
The North Saskatchewan River watershed is one of the major drainage basins located in Alberta, Canada. The river originates in the Rocky Mountains in the ice fields of Banff National Park and flows in an easterly direction across the Alberta plains. It reaches the Saskatchewan border north of Lloydminster. See S**ection 1.1** of the *IWMP Discussion Paper*.

North Saskatchewan River Watershed



- A watershed (also known as a basin) is the area of land that catches precipitation and drains into a larger body of water, such as a river. It is often made up of a number of sub-watersheds that contribute to its overall drainage. Total drainage area of the watershed in Alberta: 57,000 square kilometres.
- 12 sub-watersheds: Clearwater River, Ram River, Cline River, Brazeau River, Modeste Creek, Strawberry Creek, Sturgeon River, Vermilion River, Beaverhill Creek, Monnery Creek, Frog Lake and White Earth Creek.
- 1.2 million people live in the watershed, with 1.1 million living in the Alberta Capital Region.
- 20 rural municipalities and 66 urban municipalities.
- 2 hydro-electric reservoirs: the Brazeau Dam (creating the Brazeau Reservoir) and the Big Horn Dam (creating Abraham Lake).
- 3 coal-fired electricity generating plants.
- Large forestry, agricultural and petrochemical sectors, including oil and gas exploration.

Developing an Integrated Watershed Management Plan

In 2005, the North Saskatchewan Watershed Alliance (NSWA) was appointed by the Government of Alberta as the Watershed Planning and Advisory Council (WPAC) for this river basin. As one of the partnerships under *Water for Life: Alberta's Strategy for Sustainability*, the NSWA was given a mandate by the government to prepare an Integrated Watershed Management Plan (IWMP).

The IWMP will provide watershed information and advice to the Government of Alberta and all stakeholders in order to protect, maintain and restore the North Saskatchewan watershed; and to balance environmental, social and economic needs in order to achieve the three goals of the *Water for Life* Strategy.

The purpose of the IWMP is to meet the goals of the *Water for Life* strategy:

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

To develop the IWMP, the NSWA:

- Took a watershed approach that considers both surface and groundwater issues, and the interaction of water, plants, animals and human activities within the watershed.
- Prepared a *State of the North Saskatchewan Watershed Report* (2005) and many other scientific and technical reports to provide an improved scientific basis for decision-making.
- Prepared an *IWMP Discussion Paper* (January 2011) that identifies Draft IWMP Recommendations for managing the watershed and a collaborative planning and management framework that identifies the roles and responsibilities of working groups of stakeholders to implement each action.
- Developed a stakeholder engagement process to identify issues in the watershed, review the Draft Recommendations proposed in the *IWMP Discussion Paper*, and build support for the implementation of the IWMP.

Draft IWMP Recommendations are in the form of:

- Goals
- Watershed Management Directions
- Actions

An Opportunity to Share your Views

This *IWMP Workbook* is intended as a companion to the *IWMP Discussion Paper*. The information contained in this workbook briefly describes why the proposed Draft Recommendations in the *IWMP Discussion Paper* are important, and directs you to the section of the Discussion Paper where you can find more information.

Your views on these Draft Recommendations are important. Implementation of the IWMP depends on the willingness of watershed stakeholders to voluntarily implement these actions. **To help shape the final IWMP recommendations, please respond to the survey questions in this workbook**.

The survey questions have been divided into two parts. PART ONE focuses on Draft Recommendations that describe the goals and watershed management directions, which form the foundation of the IWMP. PART TWO focuses on Draft Recommendations that describe specific actions and stakeholder sectors required to voluntarily implement each action.

We encourage you to read all of the Draft Recommendations and to respond to questions in both Parts One and Two of the survey. The actions described in Part Two, however, may require some knowledge in the fields of planning and natural resource science and management to fully appreciate their implications. If you have limited time or do not feel you have sufficient background, please complete Part One of this survey. A third and final part of this workbook requests some basic demographic information about yourself, and asks you to provide the NSWA with your contact information so that you can keep informed of progress made developing and implementing the IWMP.

PART ONE – Time commitment: 15 to 30 minutes. Do you support the proposed goals and watershed management directions? Are there any that you do not support or that are missing?

PART TWO – Time commitment: 1.5 to 2 hours. Do you support the proposed actions? Are there actions you do not support? Are there other actions that need to be identified?

PART THREE – Time commitment – 3 to 5 minutes. Demographic questions and contact information.

How to Complete the Workbook

Online:

The *IWMP Discussion Paper* and this workbook can be found and completed online at **www.nswa.ab.ca/IWMPworkbook**.

Printed copies:

1. Can be found at your local library. The *IWMP Discussion Paper* and *IWMP Workbook* are available at all public libraries in the watershed. If you do not have access to the Internet, or if your access is dial-up, we encourage you to visit your local library to review the discussion paper and to use the library's computers and high-speed internet connection to complete the workbook online.
2. By mail: please contact the NSWA office at 780-496-3474 and return the completed workbook to: **North Saskatchewan Watershed Alliance, 9504 - 49 St. Edmonton, AB T6B 2M9**.

Deadline for receiving your response: **April 30, 2011**.

All responses received will be aggregated to produce a summary report. Individual responses remain confidential. Only NSWA staff and board members assigned to the analysis will have access to raw data. Only aggregated data and summary reports will be made publicly available.

IWMP Discussion Paper

The NSWA has been working towards the development of the IWMP since 2005. The IWMP Discussion Paper presents information about:

- The NSWA and the North Saskatchewan River watershed (**Section 1**).
- The IWMP planning process (**Section 2**).
- An analysis of the current legislative, policy and planning context (**Section 3**).
- A review and summary of major technical studies undertaken in the watershed (**Section 4**).
- A summary of watershed issues identified by stakeholders (**Section 5**).
- Draft Recommendations: goals, watershed management directions and actions (**Section 6**).
- Implementation of the IWMP with roles and responsibilities for each stakeholder sector (**Section 7**).
- Challenges of aligning the IWMP with other regional-scale planning initiatives (**Section 7.4**).

Implementing the IWMP: Dependency on Voluntary Action

Collaborative planning has been adopted by the Government of Alberta as the desired approach to managing water and land in an integrated way. Currently, IWMPs are not referred to directly in Alberta's legislation. There is no specific statutory framework in place to require the adoption and implementation of IWMPs. Implementation of IWMP recommendations therefore relies on the **voluntary choices and actions** of governments, industries, organizations and individuals. However, there are legislative tools, such as Water Management Plans and Water Conservation Objectives, which are currently available to approve, adopt and implement specific recommendations. (See **Section 2** of the *IWMP Discussion Paper* for more information.)

Example:
The Draft IWMP Recommendations identify the need to develop objectives (numerical thresholds) for water quality, water quantity (instream flow) and aquatic ecosystem health. The Government of Alberta's *Framework for Water Management Planning* and *Strategy for the Protection of the Aquatic Environment* (enabled by the *Water Act* in 2001), identify Water Management Plans, Approved Water Management Plans and Water Conservation Objectives as tools that can be used to implement objectives identified in IWMP Recommendations.

Creating a Collaborative Planning and Management Framework: IWMP Working Groups

The dependency on voluntary action underscores the importance of building a lasting collaborative planning and management framework to support continued stakeholder engagement in the implementation of the IWMP. The Draft Recommendations identify working groups of stakeholders responsible for addressing each proposed action. These stakeholders must have both the capacity and the interest to participate in the implementation of the actions.

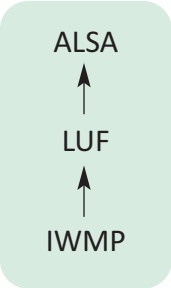
Example: Establishing Water Quality Objectives

An IWMP Working Group of stakeholders will:

- Review current research and policy context.
- Identify and address gaps in the research.
- Propose numerical thresholds.
- Consult widely on the implications of these objectives; how they reflect societal values and how they may impact economic development.
- Provide the objectives as advice to the Government of Alberta, requesting the Director under the *Water Act* to include them as Water Conservation Objectives under a Water Management Plan or an Approved Water Management Plan.

Aligning Regional Planning Initiatives

The *Alberta Land Stewardship Act* (ALSA) enables sustainable development by responding to the cumulative effects of human activity and other impacts. It makes the *Land-use Framework* (LUF) Regional Plans binding, and requires the management of cumulative effects at the regional scale. Currently, most watershed stakeholders agree that the IWMP will "feed into" the Regional Plans, but the North Saskatchewan Regional Plan is in the very early stages of development, and it is still unclear how this alignment will occur.
(See **Section 3.2** of the *IWMP Discussion Paper*)



The Role of the NSWA and Watershed Stakeholders

Choosing to take action requires the voluntary commitment of all sectors. The NSWA will continue to engage its members, watershed stakeholders and the public as an integral part of both the development and implementation of the IWMP. Over the next few months, the NSWA will:

- Conduct a broad program of stakeholder engagement and public consultation, using the *IWMP Discussion Paper*, this *IWMP Workbook*, the NSWA website, discussion forums, meetings, and presentations.
- Prepare a draft IWMP, which will include a work plan and timetable, that considers all information received during the consultation and engagement process.
- Consult with stakeholders on the draft IWMP.
- Prepare the final IWMP for approval by the NSWA Board of Directors, which will be submitted to the Government of Alberta and other stakeholders for endorsement and implementation.

- Initiate IWMP Working Groups to begin implementation on priority actions.

While the NSWA has taken the lead role to develop the IWMP, it will not be directly involved in all IWMP Working Groups. However, the NSWA is committed to monitoring and reporting on progress made to implement all IWMP actions. As the diagram illustrates, the NSWA is one of many participants. It is expected that full implementation of the IWMP will take several years. A work plan with short, medium and long-term targets will form part of the final IWMP.

Key Findings from the Research

The NSWA produced the *State of the North Saskatchewan Watershed Report* in 2005. Since then, the NSWA has commissioned many reports concerning the assessment of water quality, water quantity (supply and instream flow needs methodology), groundwater, cumulative effects, climate change, and current and future water use (water allocation). Following are key findings from the research:

- The overall health of the entire North Saskatchewan Watershed (in 2005) was generally fair. (See **Section 4.1** of the *IWMP Discussion Paper*)
- The most pressing issues in the mainstem of the North Saskatchewan River are those related to water quality. (**Section 4.2**)
- Quantity of water flowing in the North Saskatchewan River is an important component of an IWMP. This includes understanding natural supply and variability, withdrawals and consumptive use (water used and not returned to the river), and instream flow needs (the amount of water flowing in a river or stream needed to sustain a healthy aquatic ecosystem). (**Section 4.3.1**)
- Alberta must allow at least 50% of the annual, naturalized flow of eastward-flowing rivers to enter Saskatchewan. (**Section 4.3.1**)
- Nearly 90% of the water supply in the river comes from the upper four sub-watersheds (the Cline, Clearwater, Ram and Brazeau). The watershed area downstream of Edmonton to the Saskatchewan border contributes less than 5%. (**Section 4.3.3**)
- Most of the water needed in the North Saskatchewan River watershed in Alberta is taken from surface sources; only about 1% of water is taken from groundwater. However, much more research is needed to map the aquifers and to fully understand the impact of human uses on groundwater. (**Section 4.3.2**)
- 27% of the average annual flow from the watershed is allocated. However, many allocations are not fully utilized. Thermal power plants and municipalities, for example, return most of the water they use to the river. As a result, only 2.6% of the average annual flow is presently being consumed (withdrawn and not returned to the river). (**Section 4.3.2**)
- The most likely future trend in water supply, as a consequence of climate change effects, is an increase in annual yield (water volume) of 5% to 15%. However, reductions in annual yield are still a possibility. Potential variations in monthly yields may be larger than the annual yield variations (with the largest increases projected in spring and largest decreases projected in summer and fall months). (**Section 4.3.4**)
- The main footprints affecting watershed values are urban and residential development and agricultural use. (**Section 4.5**)
- The NSWA consulted widely with stakeholders to identify issues of concern in the watershed. Information received was categorized into five types of issues: water quality; water quantity (supply); habitat and aquatic species; governance (how people organize themselves to accomplish their goals); and knowledge (information and education). (**Section 5**)

Draft IWMP Recommendations

The NSWA recognizes that stakeholders have done, and are in the process of doing, much to improve conditions in the watershed, and considerable scientific work has been initiated in the past few years. However, much work and research remains to be done, including the development of effective assessment and modelling tools that can be used to support ongoing watershed planning activities.

The Draft Recommendations take the form of goals, watershed management directions and actions:

- **Goal**: overall, long-term result the plan is intended to achieve.
- **Watershed Management Direction**: A specific, measurable condition that quantifies efforts to achieve a desired goal.
- **Action**: A specific management activity undertaken to achieve the watershed management direction. The actions identified are not exhaustive, but instead serve as examples that reflect the NSWA's current understanding of the balance among environmental, social and economic needs and interests. These actions are expected to be refined and adapted by stakeholders as this understanding evolves.

See **Section 6** of the *IWMP Discussion Paper* to find definitions of other key terms as well as references and indicators that can be used to determine whether each Watershed Management Direction is being achieved.

PART ONE:
Survey Questions on Draft IWMP Recommendations

Note: Sections referred to in the survey can be found in the *IWMP Discussion Paper*. If more space is required for hand-written comments, please use the extra sheets supplied at the back of this workbook (pages 40-42).

Draft IWMP Goals

Five goals have been identified. Thinking about the entire watershed, please indicate how supportive you are of these goals.

Key Definitions (Section 6.1): **Maintain**: keep in a condition suitable for all uses including ecosystem health, but not necessarily in the current or natural condition. **Improve**: where a condition is impaired, move toward a condition suitable for all uses, including ecosystem health, but not necessarily to a natural condition. **Protect**: where near-natural conditions exist, control and limit further human impacts on all uses, including ecosystem health.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Goal #1: Maintain or improve water quality in the North Saskatchewan River watershed.					
Goal #2: Maintain or improve water quantity (flow) conditions in the North Saskatchewan River.					
Goal #3: Maintain or improve aquatic ecosystem health in the North Saskatchewan River watershed.					
Goal #4: Protect groundwater quality and quantity in the North Saskatchewan River watershed.					
Goal #5: Water and land-use planning are aligned at the regional scale.					

Comments: Do these goals accurately capture your "big picture" concerns in the watershed? Please describe any goals that you do not support or which are missing.

Draft IWMP Watershed Management Directions

Watershed Management Directions have been identified for each goal. How supportive are you of each of these management directions in relation to achieving the goal?

Goal #1: Maintain or improve water quality in the North Saskatchewan River watershed. **Point source**: effluents entering the river from the end of a pipe and other constructed channels including industrial and municipal wastewater discharges, storm sewers and combined sewer outfalls. **Non-point source**: runoff from natural landscapes, farm fields, logging areas, mines, urbanized areas and roads. **Source water**: the waterbody from which a utility draws its supply of water. (**Section 4.2**)	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Watershed Management Directions: 1.1. Site-specific Water Quality Objectives are developed and implemented for the mainstem of the North Saskatchewan River.					
1.2. Total contaminant loads entering the mainstem of the North Saskatchewan River, from all point and non-point sources, are managed so that the Water Quality Objectives at long-term river network monitoring sites are met.					
1.3. Water Quality Objectives are developed and implemented for all major tributaries to protect tributary uses and support the achievement of water quality management goals in the North Saskatchewan River.					
1.4. Drinking water source protection plans are developed and implemented by waterworks utilities within the North Saskatchewan River watershed.					

Comments: Do these Watershed Management Directions contribute to attaining Goal #1? Please describe any management directions you do not support or which are missing.

Goal #2: Maintain or improve water quantity (flow) conditions in the North Saskatchewan River. **Instream Flow Needs (IFN)**: the amount of water flowing in a river or stream needed to sustain a healthy aquatic ecosystem. This is achieved by maintaining a natural cycle of high, medium and low flows to address the needs of multiple components of an aquatic ecosystem. (**Section 4.3.1**)	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Watershed Management Directions: 2.1. Future risks to surface water supply in the North Saskatchewan River watershed are evaluated.					
2.2. Instream Flow Needs are assessed and Instream Flow Objectives are developed and implemented for the mainstem of the North Saskatchewan River.					
2.3. Water quantity in the mainstem of the North Saskatchewan River is managed to meet Instream Flow Objectives.					

Comments: Do these Watershed Management Directions contribute to attaining Goal #2? Please describe any management directions you do not support or which are missing.

Goal #3: Maintain or improve aquatic ecosystem health in the North Saskatchewan River watershed. **Healthy aquatic ecosystem**: an aquatic environment that sustains its ecological structure, processes, functions and resilience within its range of natural variability. (**Section 4.4**)	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Watershed Management Directions: 3.1. Aquatic Ecosystem Health Objectives are developed for all major waterbodies and riparian areas.					
3.2. Numbers and areal coverage of wetlands are maintained or increased.					
3.3. Riparian area health and function are maintained or improved.					
3.4. Environmental impacts from the activities of resource and utilities industries are minimized or reduced.					
3.5. Environmental impacts from municipal and industrial expansion are minimized or reduced.					
3.6. Net loss of the permanent forested land base to other uses is minimized or reduced.					
3.7. Fish Management Objectives are established and achieved for the North Saskatchewan River mainstem, tributaries and lakes.					
3.8. Environmental impacts from random camping and all other recreational activities on public land are minimized or reduced.					
3.9. Knowledge and understanding of the importance of a healthy aquatic ecosystem are improved.					

Comments: : Do these Watershed Management Directions contribute to attaining Goal #3? Please describe any management directions that you do not support or which are missing.

Goal #4: Protect groundwater quality and quantity in the North Saskatchewan River watershed.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Watershed Management Directions: 4.1. Knowledge and understanding of groundwater quality and quantity are improved.					
4.2. Impacts on groundwater from resource, industrial, municipal and agricultural developments are minimized or reduced.					
4.3. Management strategies and plans to protect groundwater quality and quantity are developed.					

Comments: Do these Watershed Management Directions contribute to attaining Goal #4? Please describe any management directions that you do not support or which are missing.

Goal #5: Water and land-use planning are aligned at the regional scale.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Watershed Management Directions: 5.1. Cooperation and communication among planning initiatives are improved.					

Comments: Does this Watershed Management Direction contribute to attaining Goal #5? Please describe any management directions that are missing.

Thank you for your time and consideration of PART ONE of this survey. We encourage you to continue to PART TWO to read and consider proposed actions to implement these management directions and achieve the goals of the IWMP.

If you have completed your participation in this survey please go to PART THREE to provide the NSWA with some basic demographic information about yourself as a responder to this survey and to provide your contact information.

PART TWO:
Survey Questions on Draft IWMP Recommendations

Draft IWMP Actions

Actions have been proposed to implement each Watershed Management Direction. Please indicate how supportive you are of each of these actions.

Goal #1:
Maintain or improve water quality in the North Saskatchewan River watershed.

Watershed Management Direction 1.1: Site-specific Water Quality Objectives are developed and implemented for the mainstem of the North Saskatchewan River.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Upstream of Edmonton: All water quality indicators are generally much better than the published guidelines, although occasional peak runoff conditions can affect drinking water treatment due to the presence of high suspended solids, organic material and pathogens (total and fecal coliforms, *E.coli* and *Giardia*). Downstream of Edmonton: Despite continuous population growth and development certain aspects of water quality have been improving, due in large part to improvements made to the City of Edmonton and Capital Region wastewater treatment systems. Other urban, industrial and agricultural impacts, however, are still evident. Most of the selected indicators are better than the published guidelines, but a few exceed them (total suspended solids, turbidity, fluoride and pathogens). (**Section 4.2.1**)					
Actions: 1.1.1 NSWA to work with Government of Alberta and watershed stakeholders to finalize Water Quality Objectives for the mainstem of the North Saskatchewan River. The NSWA undertook a comprehensive assessment of water quality conditions for the mainstem of the North Saskatchewan River and proposed Water Quality Objectives based on that assessment. These proposed objectives are to act as a starting point of discussion for the working group identified in this Action. The group is expected to examine options to the current policy of 'no further degradation', including managing water quality to other targeted limits. (**Section 4.2.1**)					

Actions cont'd:	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
1.1.2 NSWA to recommend these Water Quality Objectives to the Government of Alberta for inclusion as part of a Water Management Plan or an Approved Water Management Plan for the North Saskatchewan River watershed.					

Comments: Do the above Actions (1.1.1 and 1.1.2) contribute to achieving Watershed Management Direction 1.1? Please describe any actions that you do not support or which are missing.

Watershed Management Direction 1.2: Total contaminant loads entering the mainstem of the North Saskatchewan River, from all point and non-point-sources, are managed so that the Water Quality Objectives at long-term river network monitoring sites are met. **Point source**: effluents entering the river from the end of a pipe and other constructed channels including industrial and municipal wastewater discharges, storm sewers and combined sewer outfalls. **Non-point source**: runoff from natural landscapes, farm fields, logging areas, mines, urbanized areas and roads.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Actions: 1.2.1 All point-source approval holders (municipalities and industries) to quantify point-source loads for all pollutants for which Water Quality Objectives have been established (e.g. for phosphorous, nitrogen and total suspended solids). (See **Section 6.2**, **Action 1.2.1** for more details.)					
1.2.2 Government of Alberta and point-source approval holders within each river reach (length of the river between two specific points) of the North Saskatchewan River to work together to set load targets and negotiate load allocations for each pollutant to meet site-specific Water Quality Objectives in the mainstem of the North Saskatchewan River. (See **Section 6.2**, **Action 1.2.2** for more details.)					
1.2.3 Government of Alberta and participating stakeholders to complete and implement the Water Management Framework for the Industrial Heartland and Capital Region.					
1.2.4 Government of Alberta, in collaboration with NSWA, municipalities and industry, to evaluate current water quality monitoring and future needs in the mainstem of the North Saskatchewan River.					
1.2.5 Government of Alberta to develop a plan to fund and implement a comprehensive long-term water quality monitoring system for the mainstem of the North Saskatchewan River that includes the creation of a more accessible database for all point-source load data.					

Comments: Do the Actions (1.2.1 to 1.2.5) contribute to achieving Watershed Management Direction 1.2? Please describe any actions that you do not support or which are missing.

Watershed Management Direction 1.3: **Water Quality Objectives are developed and implemented for all major tributaries to protect tributary uses and support the achievement of water quality management goals in the North Saskatchewan River.**	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Actions:					
1.3.1 NSWA to work with local stakeholders to initiate sub-basin watershed plans to address local issues, in response to their requests. (See **Section 6.2**, **Action 1.3.1** for more detail.)					
1.3.2 Government of Alberta, in collaboration with NSWA and watershed stakeholders, to evaluate current water quality monitoring in the major tributaries of the North Saskatchewan River watershed.					
1.3.3 Government of Alberta to develop a plan to fund and implement a comprehensive long-term water quality monitoring system established at the confluence of major tributaries entering the North Saskatchewan River mainstem.					
1.3.4 Government of Alberta to continue to work with agriculture and other sectors to minimize impacts and reduce non-point-source pollution by: analyzing current practices and plans; developing, monitoring and enforcing the implementation of updated plans; and utilizing best practices. (See **Section 6.2**, **Action 1.3.4** for more details.)					
1.3.5 Government of Alberta to work with the oil & gas sector to review, update and report on current response plans for pipeline breaks in order to manage risks to drinking water supplies.					

Comments: Do these Actions (1.3.1 to 1.3.5) contribute to achieving Watershed Management Direction 1.3? Please describe any actions you do not support or which are missing.

Watershed Management Direction 1.4: **Drinking water source protection plans are developed and implemented by waterworks utilities within the North Saskatchewan River watershed.** **Source water**: the waterbody from which a utility draws its supply of water.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Action: 1.4.1 All waterworks utilities in the watershed, in collaboration with Government of Alberta and other stakeholders, to develop drinking water source protection plans.					

Comments: Does this Action (1.4.1) contribute to achieving Watershed Management Direction 1.4? Please describe any actions you do not support or which are missing.

Goal #2:
Maintain or improve water quantity (flow) conditions in the North Saskatchewan River.

Watershed Management Direction 2.1: Future risks to surface water supply in the North Saskatchewan River watershed are evaluated.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Seasonal flow in the middle and lower reaches of the North Saskatchewan River is affected by two hydro-electric dams in the headwaters: the Brazeau Dam and the Big Horn Dam. These dams change the annual pattern of the river flow. Compared to the natural regime, flows are now lower in the summer and higher during winter. Stored water is released during the winter to generate power, to improve the reliability of the drinking water supply and to support the dilution of effluents. (**Section 4.3.1**)					
Actions:					
2.1.1 Government of Alberta to work with NSWA and other stakeholders to develop and implement a water resource management model (a tool to manage flow and licensing data) for the North Saskatchewan River watershed.					
2.1.2 Government of Alberta and other stakeholders to evaluate and report risks to the water supply of the North Saskatchewan River and its tributaries resulting from climate change, landscape-scale disturbances and the interactions between surface and groundwater diversions.					
2.1.3 Government of Alberta, in collaboration with other stakeholders, to evaluate and report on the need for future constructed water storage.					
2.1.4 Government of Alberta, in collaboration with other stakeholders, to evaluate and report on the need to establish a cap on water allocations for the North Saskatchewan River watershed.					

Comments: Do these Actions (2.1.1 to 2.1.4) contribute to achieving the Watershed Management Direction 2.1? Please describe any actions that you do not support or which are missing.

Watershed Management Direction 2.2: Instream Flow Needs are assessed and Instream Flow Objectives are developed and implemented for the mainstem of the North Saskatchewan River. **Instream Flow Needs** (IFN): the amount of water flowing in a river or stream needed to sustain a healthy aquatic ecosystem. This is achieved by maintaining a natural cycle of high, medium and low flows to address the needs of multiple components of an aquatic ecosystem.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Actions: 2.2.1 NSWA to work with Alberta Water Council and stakeholders to identify methodologies to assess instream flow needs.					
2.2.2 NSWA to work with Government of Alberta and stakeholders to evaluate instream flow needs for the protection of water quality, fish habitat, riparian zones, channel maintenance and intake structure requirements.					
2.2.3 NSWA to recommend Instream Flow Objectives to the Government of Alberta for inclusion as part of a Water Management Plan or an Approved Water Management Plan for the North Saskatchewan River watershed.					

Comments: Do these Actions (2.2.1 to 2.2.3) contribute to achieving Watershed Management Direction 2.2? Please describe any actions that you do not support or which are missing.

Watershed Management Direction 2.3: **Water quantity in the mainstem of the North Saskatchewan River is managed to meet Instream Flow Objectives.** **Consumptive use**: water used and not returned to the river.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Actions: 2.3.1. Government of Alberta to manage the water allocation licencing and approval process to meet Instream Flow Objectives, as part of a Water Management Plan, and to meet commitments to the Prairie Provinces Water Board. (See **Section 6.2**, **Action 2.3.1** for more details.)					
2.3.2 Government of Alberta to monitor, evaluate and report on the achievement of Instream Flow Objectives as part of a Water Management Plan or an Approved Water Management Plan.					

Comments: Do these Actions (2.3.1 and 2.3.2) contribute to achieving Watershed Management Direction 2.3? Please describe any actions that you do not support or which are missing.

Goal #3:
Maintain or improve aquatic ecosystem health in the North Saskatchewan River watershed.

The NSWA recognizes that different types of watershed management issues are found at different scales (mainstem of the river, tributaries, lakes and streams).

- Protection and restoration of the aquatic ecosystem, including lakes, wetlands and riparian areas can increase resilience and mitigate potential effects of climate change on these systems. (**Section 4.5**)
- The watershed was most healthy in the four headwater sub-watersheds, which include the Cline, Brazeau, Clearwater and Ram. East of the headwaters, where livestock density, human activity and populations are greatest, watershed health tended to decline. Generally, sub-watershed health was poorer where land use was more intensive and where riparian health scores and wetland cover were lowest. (**Section 4.1**)
- The impacts of high agricultural intensity in the Vermilion, Frog, Beaverhill, Modeste and Strawberry sub-watersheds was reflected in higher phosphorus levels, lower riparian health scores and lower wetland densities.(**Section 4.1.**)
- Disturbances to forest ecosystems can reduce water quality, and recovery will only occur with re-vegetation. Resource roads and stream crossings can have significant impacts on water quality in terms of erosion of surface soils and increased sediment deposition in streams. (**Section 4.2**)
- Controlling urban and rural residential sprawl appears to be one of the most powerful means of limiting further degradation of the watershed. (**Section 4.5**)
- The overall well-being of residents of the North Saskatchewan River watershed, as measured in economic terms, is on the order of $96.8 billion. This represents the value of economic activity ($79.1 billion) plus the value of ecosystem services generated by the landscape ($17.7 billion). For the five sub-basins upstream of Edmonton, the value of ecosystem services ($10.2 billion) was double the value of economic activity ($5.0 billion). Downstream of Edmonton, the value of ecosystem services ($4.9 billion) was 80% of the value of economic activity ($6.0 billion). (**Section 4.6**)

Watershed Management Direction 3.1: **Aquatic Ecosystem Health Objectives are developed for all major waterbodies and riparian areas.** **Healthy aquatic ecosystem**: an aquatic environment that sustains its ecological structure, processes, functions and resilience within its range of natural variability. **Riparian areas**: the bank and shore lands adjacent to and between streams, rivers, lakes and wetlands and their surrounding uplands, where the vegetation and soils are influenced strongly by the presence of water.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Actions: 3.1.1 Government of Alberta, in collaboration with North Saskatchewan River watershed stakeholders, to develop Aquatic Ecosystem Health Objectives for key waterbodies in the North Saskatchewan River watershed, including the mainstem, tributaries, lakes, wetlands and riparian areas.					
3.1.2 Government of Alberta, in collaboration with North Saskatchewan River watershed stakeholders, to assess the current state of aquatic ecosystem health of key waterbodies.					
3.1.3 Government of Alberta, in collaboration with North Saskatchewan River watershed stakeholders, to develop, fund and implement long-term monitoring of aquatic ecosystem health on priority waterbodies for inclusion as part of a Water Management Plan or an Approved Water Management Plan.					
3.1.4 NSWA, working with counties, summer villages, recreational councils and sport fishing groups, to develop a priority list of lakes requiring water quality management plans.					

Comments: Do these Actions (3.1.1 to 3.1.4) contribute to achieving Watershed Management Direction 3.1? Please describe any actions that you do not support or which are missing.

Watershed Management Direction 3.2: Numbers and areal coverage of wetlands are maintained or increased. **Areal coverage**: area of land (km^2) covered by wetlands.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Actions: 3.2.1 Government of Alberta, in collaboration with NSWA and other stakeholders, to develop wetland protection and restoration plans, practices and policies. (See **Section 6.2**, **Action 3.2.1** for more details.)					
3.2.2 Government of Alberta and municipalities to incorporate wetland conservation and restoration guidelines into regulations and by-laws.					
3.2.3 Government of Alberta, in collaboration with NSWA and other stakeholders, to complete wetland inventories.					
3.2.4 Ducks Unlimited Canada, municipalities and other stakeholders to restore drained and altered wetlands (or create new wetlands where restoration is not feasible) in areas of the watershed where significant wetland loss has occurred, as defined in Alberta's Interim Wetlands Policy and as determined by *Water for Life's* provincial comprehensive wetland inventory. (See **Section 6.2**, **Action 2.3.4** for more details.)					
3.2.5 Urban municipalities to increase retention and restoration of wetlands and create new wetlands to mitigate storm water runoff and non-point-source contamination to help meet Water Quality Objectives in receiving waterbodies; naturally-occurring wetlands to be retained with their function and processes intact.					

Comments: Do these Actions (3.2.1 to 3.2.5) contribute to achieving Watershed Management Direction 3.2? Please describe any actions that you do not support or which are missing.

Watershed Management Direction 3.3: **Riparian area health and function are maintained or improved.**	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Actions: 3.3.1 Government of Alberta, in collaboration with NSWA, Ducks Unlimited Canada, Alberta Conservation Association, Alberta Riparian Habitat Management Society (Cows and Fish), and other stakeholders to conduct an assessment of riparian area conditions throughout the North Saskatchewan River watershed.					
3.3.2 Government of Alberta and municipalities to develop and incorporate riparian set-back guidelines into regulations and by-laws. 3.3.3 Municipalities to work with other stakeholders to explore the availability of support (financial and expertise) to enable landowners to restore damaged riparian areas.					

Comments: Do these Actions (3.3.1 to 3.3.3) contribute to achieving Watershed Management Direction 3.3? Please describe any actions that you do not support or which are missing.

Watershed Management Direction 3.4: Environmental impacts from the activities of resource and utilities industries are minimized or reduced. **Green Area**: Public forested land owned by the Province of Alberta that is removed from settlement and managed for various uses including: timber production; oil & gas; mining; recreation; watershed, wildlife and fisheries. Agricultural use is limited to grazing, where it is compatible with other uses.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Actions: 3.4.1 Government of Alberta to work with the municipalities and industries to minimize their impacts in the Green Area by reducing the density (km/km2) of linear developments (roads, seismic, power lines, underground lines, etc.). (See **Section 6.2**, **Action 3.4.1** for more details.)					
3.4.2 Government of Alberta to work with the oil & gas sector to complete the process of improving regulations to reduce the footprint of active well sites and to reclaim and restore well sites defined as no longer in use. (See **Section 6.2**, **Action 3.4.2** for more details.)					
3.4.3 Government of Alberta to work with resource industries to develop integrated planning, best management and reclamation practices, such as developing road maintenance plans, eliminating hanging culverts and minimizing construction of stream crossings.					
3.4.4 Government of Alberta to work with stakeholders to complete and implement its gravel extraction policies.					

Comments: Do these Actions (3.4.1 to 3.4.4) contribute to achieving Watershed Management Direction 3.4? Please describe any that you do not support or which are missing.

Watershed Management Direction 3.5: Environmental impacts from municipal and industrial expansion are minimized or reduced.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Actions: 3.5.1 Municipalities, business, industry and Government of Alberta to work together to identify and implement best land-use planning practices to guide future development. (See **Section 6.2**, **Action 3.5.1** for more details.)					

Comments: Does this Action (3.5.1) contribute to achieving Watershed Management Direction 3.5? Please describe any part of this action you do not support and/or other actions that are missing.

Watershed Management Direction 3.6: **Net loss of the permanent forested land base to other uses is minimized or reduced.** **White Area**: Settled area, where public land is part of the agricultural landscape and is managed for various uses including: agriculture; fish and wildlife habitat; recreation; soil and water conservation.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Actions: 3.6.1 Government of Alberta to work with industrial, municipal and agricultural stakeholders to develop policies to guide and minimize conversion of forest land to other uses in the Green Area.					
3.6.2 Government of Alberta to work with municipal and agricultural stakeholders to develop market-based incentives and policies to maintain forest cover and function in the White Area. (See **Section 6.2**, **Action 3.6.2** for more details.)					
3.6.3 Municipal and agricultural stakeholders to work with Government of Alberta to develop policies and best practices to encourage re-forestation in order to maintain and improve forested riparian zones.					

Comments: Do these Actions (3.6.1 to 3.6.3) contribute to achieving Watershed Management Direction 3.6? Please describe any actions that you do not support or which are missing.

Watershed Management Direction 3.7: **Fish Management Objectives are established and achieved for the North Saskatchewan River mainstem, tributaries and lakes.**	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Actions: 3.7.1 Government of Alberta, in collaboration with stakeholders, to review, update and implement Fish Management Objectives for the North Saskatchewan River mainstem and develop and implement Fish Management Objectives for the North Saskatchewan River watershed tributaries and lakes.					
3.7.2 Government of Alberta and the federal Department of Fisheries and Oceans to assess, prioritize and protect significant fish habitat and populations in the North Saskatchewan River watershed.					
3.7.3 Government of Alberta, Department of Fisheries and Oceans and other stakeholders to fund the restoration of significant fish habitat that has been lost or damaged.					
3.7.4 Government of Alberta, in collaboration with other stakeholders, to develop and implement long-term monitoring of fisheries resources and aquatic habitat throughout the North Saskatchewan River watershed.					

Comments: Do these Actions (3.7.1 to 3.7.4) contribute to achieving Watershed Management Direction 3.7? Please describe any actions that you do not support or which are missing.

Watershed Management Direction 3.8: Environmental Impacts from random camping and all other recreational activities on public land are minimized or reduced. **Random camping**: camping in unapproved sites with no provisions for proper sanitation and waste removal.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Actions: 3.8.1 Government of Alberta and municipalities to work with the recreation sector to develop access management plans that focus on managing recreational activities on public land.					
3.8.2 Government of Alberta and municipalities to work with the recreation sector to implement and enforce recreation-access management plans.					
3.8.3 Government of Alberta and municipalities to work with the recreation sector to develop education and awareness programs that promote responsible recreation use, activities and practices on public lands.					

Comments: Do these Actions (3.8.1 to 3.8.3) contribute to achieving Watershed Management Direction 3.8? Please describe any actions that you do not support or which are missing.

Watershed Management Direction 3.9: Knowledge and understanding of the importance of a healthy aquatic ecosystem are improved.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Actions: 3.9.1 NSWA, in collaboration with the Government of Alberta, municipalities, industries and non-government organizations to develop active, wide-spread commitment to, and support for, watershed stewardship through improved education, communications and access to information.					

Comments: Does this action (3.9.1) contribute to achieving Watershed Management Direction 3.9? Please describe any part of this action you do not support and/or other actions that are missing.

Goal #4:
Protect groundwater quality and quantity in the North Saskatchewan River Watershed.

Watershed Management Direction 4.1: Knowledge and understanding of groundwater quality and quantity are improved.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Actions: 4.1.1 Government of Alberta to work with stakeholders to address gaps in knowledge about groundwater as identified in the NSWA's groundwater report. (See **Section 6.2**, **Action 4.1.1** for more details.)					
4.1.2 Government of Alberta and stakeholders to advance public understanding of groundwater by increasing and sustaining extension and education activities for municipalities, landowners and other stakeholders who use or impact groundwater (e.g. Working Well Program).					

Comments: Do these Actions (4.1.1 and 4.1.2) contribute to achieving Watershed Management Direction 4.1? Please describe any actions that you do not support and any which are missing.

Watershed Management Direction 4.2: **Impacts on groundwater from resource, industrial, municipal and agricultural developments are minimized.**	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Actions: 4.2.1 Government of Alberta, in collaboration with forestry and oil & gas stakeholders, to assess impacts of resource exploration and development on groundwater recharge in the headwaters region.					
4.2.2 Municipalities, in collaboration with Government of Alberta, industry and landowners to assess municipal/industrial/ agricultural impacts on groundwater quality, quantity and recharge in central and downstream regions.					
4.2.3 Government of Alberta and municipalities to work with the oil & gas sector to monitor, report, and share information on groundwater well data.					

Comments: Do these Actions (4.2.1 to 4.2.3) contribute to achieving Watershed Management Direction 4.2? Please describe any actions that you do not support or which are missing.

Watershed Management Direction 4.3: Management strategies and plans to protect groundwater quality and quantity are developed.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Actions:					
4.3.1 Municipalities, in cooperation with the Government of Alberta, to develop aquifer management plans for areas where population density and competing uses impact, or are a risk to, groundwater.					
4.3.2 Government of Alberta, municipalities and other stakeholders to develop strategies to address cumulative effects of all water wells on groundwater aquifers.					
4.3.3 Government of Alberta to identify and define sustainable pumping rates for priority aquifers.					
4.3.4 Government of Alberta to require groundwater users to monitor and report water use from both licensed and non-licensed wells.					

Comments: Do these Actions (4.3.1 to 4.3.4) contribute to achieving Watershed Management Direction 4.3? Please describe any actions that you do not support or which are missing.

Goal #5:
Water and land-use planning are aligned at the regional scale.

Watershed Management Direction 5.1: Cooperation and communication among planning initiatives are improved.	Strongly Support	Support	Do Not Support	Strongly Do Not Support	Do Not Know/No Opinion
Actions:					
5.1.1 Government of Alberta, Capital Region Board, municipalities and the NSWA to establish a working group to assess issues of planning integration and alignment within the North Saskatchewan River watershed in order to identify areas of overlap and inconsistency.					
5.1.2 Government of Alberta, Capital Region Board, municipalities and NSWA to report on the integration, alignment and implementation of all regional scale planning and management initiatives through their respective reporting mechanisms.					

Comments: Do these actions (5.1.1 and 5.1.2) contribute to achieving Watershed Management Direction 5.1? Please describe any actions that you do not support or which are missing.

Thank you for your time and consideration of PART TWO of this survey. Please go to PART THREE to provide the NSWA with some basic demographic information as a responder to this survey and to leave your contact information.

PART THREE: Please tell us about yourself

1. If you are responding on behalf of an organization, please answer the following questions. If you are responding as an individual, please go to the next set of questions.

Name of the organization:

Is the organization a member of NSWA? ◯ Yes ◯ No

What sector does your organization belong to? (choose only one)

- ◯ **Industry**: chemical and petrochemical; oil and gas; mining; power generation; forestry; agriculture (livestock, irrigated and other crops); utility.
- ◯ **Environmental Non-profit**: environmental; fish habitat conservation; lake environment conservation; wetland conservation.
- ◯ **Government of Alberta**: Agriculture and Rural Development; Energy; Environment; Health and Wellness; Sustainable Resource Development; Alberta Economic Development Authority; Alberta Science and Research Authority; Alberta Water Research Institute.
- ◯ **Other Government**: Federal; First Nations; Métis Settlements; large urban, small urban and rural municipalities.
- ◯ **Other** (Please Describe):

2. If you are responding as an individual:

Are you a member of NSWA:

◯ Yes ◯ No

Age:

◯ Under 24 ◯ 25 to 44 ◯ 45 to 64 ◯ 65 and above

Gender:

◯ Female ◯ Male

Education:
Which is the highest level of education that you have completed? (Please choose only one)

- ◯ High school diploma or certificate
- ◯ Apprenticeship or trades diploma or certificate
- ◯ Non-university diploma (e.g. college, CEGEP)
- ◯ Some university, not completed
- ◯ University degree (Bachelor's)
- ◯ Graduate university degree

Occupation:
Which category currently best describes your primary area of work? (Please choose only one)

- ◯ Management
- ◯ Business, Finance, Administration
- ◯ Natural and Applied Sciences and related occupations
- ◯ Health
- ◯ Social Science, Education, Government Service, Religion
- ◯ Art, Culture, Recreation and Sport
- ◯ Sales and Service
- ◯ Trades, Transport, Equipment Operators and related occupations
- ◯ Occupations unique to Primary Industries (Agriculture)
- ◯ Occupations unique to Processing, Manufacturing and Utilities
- ◯ Homemaker, Caregiver for someone at home

What sector do you consider yourself belonging to?

- ◯ **Industry**: chemical and petrochemical; oil and gas; mining; power generation; forestry; agriculture (livestock, irrigated and other crops); utility.
- ◯ **Environmental Non-profit**: environmental; fish habitat conservation; lake environment conservation; wetland conservation.
- ◯ **Government of Alberta**: Agriculture and Rural Development; Energy; Environment; Health and Wellness; Sustainable Resource Development; Alberta Economic Development Authority; Alberta Science and Research Authority; Alberta Water Research Institute.
- ◯ **Other Government**: Federal; First Nations; Métis Settlements; large urban, small urban and rural municipalities.
- ◯ **Other** (Please Describe):
- ◯ **None**

Commitment going forward

The NSWA is committed to meeting with stakeholders to review the *IWMP Discussion Paper* and to widely distributing and encouraging response to this *IWMP Workbook*. The NSWA will continue consultation and engagement until the IWMP recommendations have been reviewed, revised and adopted by the NSWA Board of Directors and submitted to the Government of Alberta and stakeholders for endorsement and implementation.

Please share your name and contact information with us so that we can communicate with you regarding the development and implementation of the IWMP for the North Saskatchewan River watershed. Your personal information will be kept confidential and separate from responses given in the workbook.

Name: _____

Phone Number: _____

Email address: _____

Postal Code: _____

Thank you for participating and helping to develop the Integrated Watershed Management Plan for the North Saskatchewan River watershed!

These additional sheets are provided for those submitting handwritten responses to the survey questions. Please ensure you indicate the number of the goal, watershed management direction and action to which your comments refer. (Example: 1.1.1: The first number (1) identifies the goal; the first two numbers (1.1) identify the watershed management direction; three numbers (1.1.1) identify the action.)

Draft Recommendation number	**Comment**

Draft Recommendation number	Comment

Draft Recommendation number	Comment