

## North Saskatchewan River Watershed in Alberta

The North Saskatchewan River (NSR) watershed in Alberta is made up of 12 sub-watersheds. The river elevation is 1,390 m above sea level at Saskatchewan Crossing, near the Banff National Park boundary, and 500 m above sea level by the time it reaches the Saskatchewan border. It joins with the South Saskatchewan River just east of Prince Albert, flows into Lake Winnipeg and from there empties into the Hudson Bay by way of the Nelson River.

The NSR is subject to the 1969 Master Agreement on Apportionment between the governments of Canada, Alberta, Saskatchewan and Manitoba, which states that Alberta must pass 50% of the natural flow of east-flowing rivers into Saskatchewan.

Water quality in the NSR is affected by input from natural and human, non-point and point sources. Nutrients, bacteria and chemicals accumulate as water flows downstream. Dissolved oxygen decreases downstream of major urban areas. Flow in the NSR is affected by two headwaters dams: the Brazeau on the Brazeau River, and the Big Horn on the main stem of the river west of Rocky Mountain House. The effect of these impoundments is to redistribute flow to a higher than natural flow in the winter time and lower than natural flow in the summer.

Land use in the NSR Watershed includes: agriculture; resource exploration and extraction; forestry; tourism and recreation; and municipal use. The upper region of the watershed is sparsely populated; the greatest population base is found in and around Edmonton.

For more information about the North Saskatchewan River watershed visit our website: [www.nswa.ab.ca](http://www.nswa.ab.ca)

## NSWA Information Bulletin

### The Integrated Watershed Management Plan (IWMP)

The North Saskatchewan River watershed is a large and complex area with many diverse land uses, hydrological systems and ecological regions. The watershed is a source of water for domestic and municipal users, agriculture, forestry, petroleum and other industries, fishing, recreation and tourism.

In order to maintain and restore a healthy watershed that balances environmental, social and economic needs of watershed stakeholders, the NSWA has embarked upon an Integrated Watershed Management planning process.

#### IWMP OBJECTIVES

- \* To develop strategies (including the establishment of Water Conservation Objectives) that will support sustainable use, management and economical value of land and water resources of the watershed;
- \* To identify land uses that could affect the future sustainability of the watershed and propose strategies to address these land use issues;
- \* To prepare the IWMP in collaboration with watershed stakeholders and the public so that the IWMP meets local and regional needs.

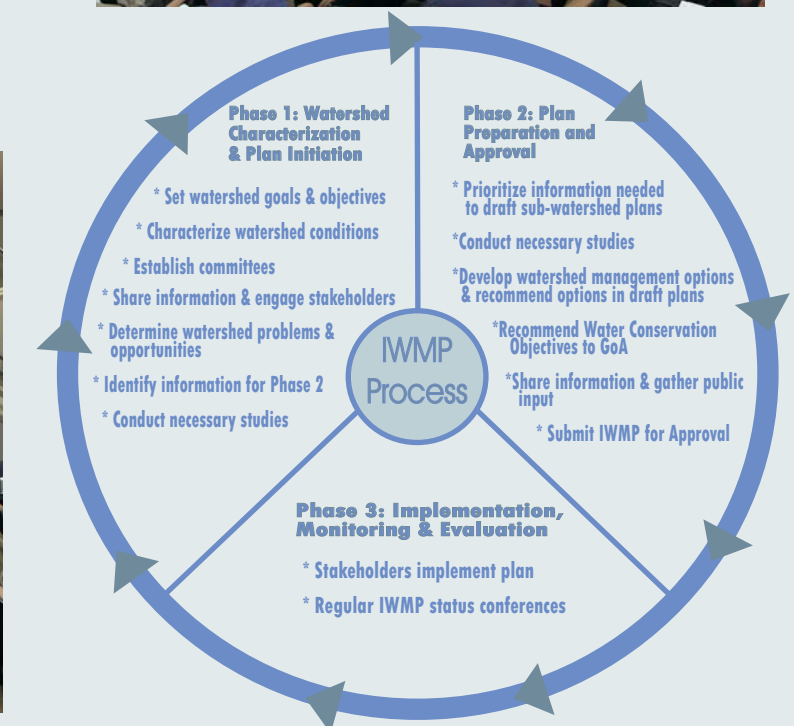
The IWMP process has progressed into Phase Two, with completion planned for 2010.



#### STAKEHOLDER ENGAGEMENT

NSWA understands that continual stakeholder engagement is essential to a successful planning process. Those affected by proposed management strategies must have the opportunity:

- \* to understand the current state of the watershed
  - \* to provide input
  - \* to become effective stewards of watershed health
  - \* to participate in integrated watershed planning
- NSWA will engage all key sectors during the IWMP development process.





## NSR Instream Needs Scoping Study (2007)

This study outlines the scope of work needed for determining *Instream Flow Needs* for the North Saskatchewan River. *Instream Flow Needs* describe the rate of flow and water quality requirements needed in order to protect aquatic ecosystems and other river functions. Information from this report is essential to the discussion that will lead to proposing Water Conservation Objectives for river flow and water quality.

### Information included in this report:

- A *geographic segmentation analysis* of the North Saskatchewan River main stem. This analysis was based on flow regimes, channel geomorphology and confluences with major tributaries.
- A *comprehensive literature review* of over 200 government and scientific publications relating to the hydrology, geomorphology, biodiversity, water quality and other attributes of the North Saskatchewan River watershed.
- A *summary of available water quality data* in Alberta Environment's Water Quality Data System for 15 key variables in the main river and four contributing watersheds (Brazeau, Clearwater, Sturgeon and Vermilion rivers).
- A *collection of a wide variety of GIS data sources* used for watershed assessment, including land use/land cover, soil and drainage and topography.
- A *detailed review of approaches for modeling Instream Flow Needs*

This report is on our website: [www.nswa.ab.ca](http://www.nswa.ab.ca)

## The State of the North Saskatchewan Watershed Report: a Foundation for Collaborative Watershed Management (2005)

This report captures a "*snapshot in time*"; it describes a baseline from which the Integrated Watershed Management Plan will be developed. It comments on land uses, water quality and environmental integrity in the North Saskatchewan River watershed in Alberta. **The full report is on our website: [www.nswa.ab.ca](http://www.nswa.ab.ca)**

## Current and Future Water Use in the North Saskatchewan River Basin (2007)

This report is a comprehensive analysis of water allocations and water use in the North Saskatchewan River watershed in Alberta. An accurate understanding of current and projected water use patterns in the North Saskatchewan River watershed is fundamentally important to Integrated Watershed Management Planning.

### This Study explains:

- **Allocation** - the licensed maximum volume, as well as the rate and timing, of a water diversion.
- **Actual Water Use** - the amount of water consumed and not returned to the source.
- The sometimes **vast difference** between allocation and water use (many licensees' actual water use volumes are much less than their allocations)

### What We Learned:

- **Current Annual Surface Water Allocations** - about 2 billion cubic metres (approximately 27% of the NSR's average annual discharge)  
**Current Actual Use** - about 0.19 billion cubic metres per year (approximately 2.6% of the NSR's average annual discharge)
- **Groundwater Allocations** - about 25 million cubic metres (a little more than 1% of the surface water allocations). Limited data are available on actual groundwater use. The report estimates that current actual use is about 60% of total allocation.

This report is on our website: [www.nswa.ab.ca](http://www.nswa.ab.ca)

## Water Supply Assessment for the North Saskatchewan River Basin (2008)

This study quantifies the *natural* water supply to the North Saskatchewan River and its spatial, seasonal and annual variability.

### What We Learned:

- Nearly 90% of the flow comes from the upper third of the basin (Brazeau, Cline, Ram and Clearwater rivers).
- Before the dams, under natural conditions, 16% of annual flow occurred during the winter (Oct to March).
- The mean annual natural discharge of the river at the Alberta/Saskatchewan border is about 7.5 billion m<sup>3</sup>.
- 10% of the time the annual flow would exceed 10.4 billion m<sup>3</sup> and 10% of the time the annual flow would be less than 5.1 billion m<sup>3</sup>.

This report is on our website: [www.nswa.ab.ca](http://www.nswa.ab.ca)

## Assessment of Climate Change Effects on Water Yield from the North Saskatchewan River Basin (2008)

Building on the Water Supply Assessment, this study provides an initial assessment of climate change effects on water supply to the NSR. The study predicts temperature and rainfall patterns for the period 2021 to 2050.

### What We Learned:

All models and scenario combinations predicted an increase in temperature. Ten out of 12 predicted an increase in precipitation. Water yield predictions varied from an increase of 15% to a decrease of 23%.

This report is on our website: [www.nswa.ab.ca](http://www.nswa.ab.ca)



## Basin Water Quality Model (to be completed March 2009)

This project will provide a calibrated, one-dimensional model of water quality for the North Saskatchewan River main stem, from Abraham Lake to the Saskatchewan provincial boundary. It will help to understand the relative inputs of various natural and man-made contaminant sources in order to predict the future impacts of development in the basin and to evaluate the benefits of water quality management options.

## Basin Overview of Ground Water Resources (to be completed March 2009)

This report will provide an overview of ground water issues, conditions, and knowledge, including:

- Existing geological and hydrological information
- Identifying major aquifers and vulnerabilities
- Potential major sources of GW contamination

## Water Quality Issues, Indicators and Objectives (to be completed March 2009)

This project will:

- Develop site-specific water quality objectives for key reaches of the NSR mainstem and for key tributaries.
- Develop site-specific objectives to protect multiple river system uses.
- Identify significant human pressures.
- Identify probable impacts on water quality.