

Athabasca State of the Watershed Report

Criteria and Indicators

What is the Athabasca watershed?

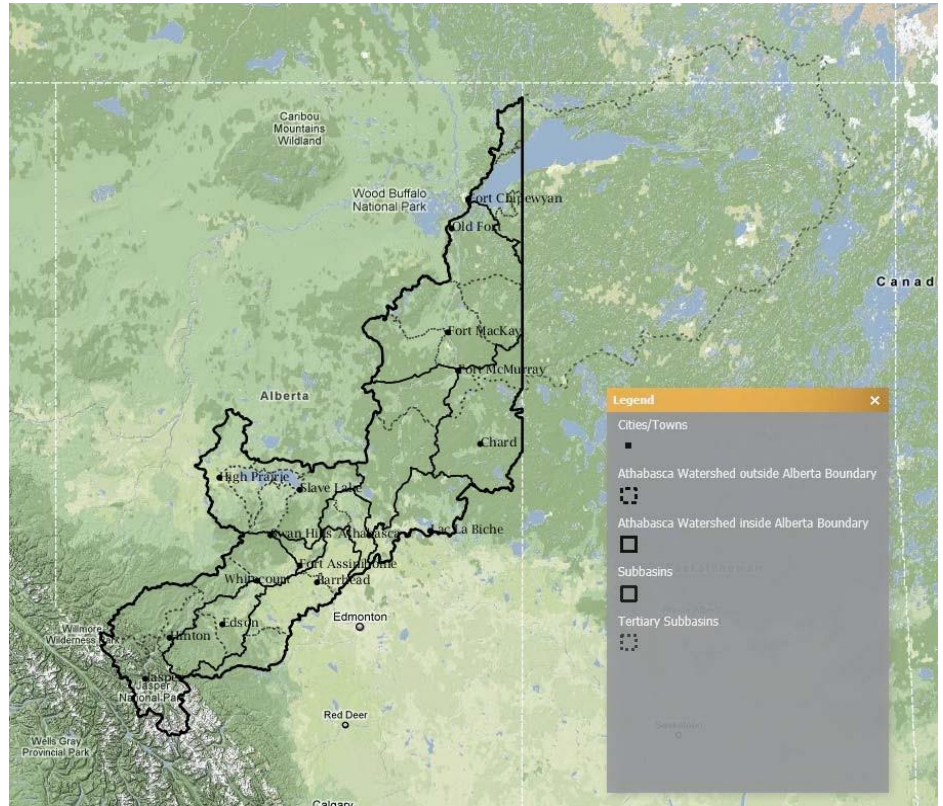
The Athabasca River watershed is the area of land that captures rain, hail and snow that eventually drain into the Athabasca River. Together with the area of land within Alberta that drains into Lake Athabasca, they form the Athabasca watershed within Alberta. Our activities on land and in water affect the health of rivers, streams, lakes and wetlands. Whatever we do upstream affects water and land downstream. Therefore, the **watershed** is the appropriate landscape unit for managing our activities so that land, water, and air are clean and people, fish and wildlife are healthy.

Why is the State of the Athabasca Watershed Report important to me?

It will help identify key issues throughout the Athabasca watershed that affect the health of water, land, air, fish and wildlife resources. We can then plan and work together to address these issues. A **healthy watershed** is essential for our health, and social and economic well-being.

How do I know that our watershed is healthy?

The health of a watershed can be determined by obtaining regular measurements of condition and pressure indicators. **Condition indicators** are directly measured characteristics of the environment (water, land, air, fish and wildlife). For example, the concentration of



The 10 sub-watersheds of the Athabasca watershed further subdivided into 31 tertiary watersheds. Tertiary watershed was the scale used for data mapping for the Athabasca State of the Watershed Report Phase 2 (see page 2).

contaminants in drinking water or area, quantity of water use for human lakes and rivers, or air; concentration needs, irrigation, and industry; human of dissolved oxygen in lakes and population; conversion of natural areas rivers; natural fish populations in a to agriculture, forestry, urban areas, river or grizzly bears in the boreal and recreational facilities; and resource extraction, etc.

Measurements are compared with provincial and national guideline values that should not be exceeded (for example, contaminants) or should not fall below (for example, dissolved oxygen) for the protection of the environment. There are ecological thresholds derived from scientific studies as well. **Pressure indicators** are measurements of human activities that pose risk to the environment. For example, total length of roads within an

Indicators can be grouped into different **criteria**, each criterion representing a watershed element that embodies the collective conservation values and goals for management of the watershed. The set of criteria and indicators for the Athabasca State of the Watershed Report (SoW) is on page 2.

Pressure and condition indicators selected for the Athabasca State of Watershed Report

| NAME OF INDICATOR | INDICATOR TYPE | INDICATORS MODELED IN REPORT |
|--|----------------|------------------------------|
| Criterion 1. Conservation of Biological Diversity | | |
| Road Density | Pressure | PR Δ |
| Seismic Line, Pipeline, Power Line & Railroad Density | Pressure | PR Δ |
| Large Patches of Natural Vegetation | Condition | PR Δ |
| Stream Connectivity | Pressure | PR Δ |
| Fish Community* | Condition | |
| Aquatic Bird Community* | Condition | |
| Amphibian Community* | Condition | |
| Macroinvertebrate Community* | Condition | |
| Mammal Community* | Condition | |
| Rare Species* | Condition | |
| Focal Habitat Condition* | Condition | |
| Wetland Condition and/or Rate of Loss* | Condition | |
| Criterion 2. Maintenance of Surface Water Quality | | |
| Stream Crossing Density | Pressure | DC Δ |
| Surface Water Quality | Condition | NR Δ |
| Point Source Contamination | Pressure | NR Δ |
| Non-point Source Contamination | Pressure | DC Δ |
| Lake Trophic Status* | Pressure | |
| Riparian Condition* | Pressure | |
| Sediment Quality* | Condition | |
| Water Clarity* | Condition | |
| Acid Sensitive Lakes* | Pressure | |

| NAME OF INDICATOR | INDICATOR TYPE | INDICATORS MODELED IN REPORT |
|--|------------------|------------------------------|
| Criterion 3. Maintenance of Ecologically Significant Water Levels & Flows | | |
| River Water Flow | Pressure | NR Δ |
| Potential Surface Water Use | Pressure | DC Δ |
| Lentic Water Availability* | Pressure | |
| Criterion 4. Maintenance of Groundwater Quality and Quantity | | |
| Potential Groundwater Use | Pressure | DC Δ |
| Groundwater Quality* | Condition | |
| Criterion 5. Maintenance of Watershed integrity | | |
| Human Population Growth | Pressure (Trend) | PR, DC Δ |
| Human Land Use | Pressure | Δ |
| Land Conversion | Pressure (Trend) | DC Δ |
| Changes in Climate Regime* | Pressure (Trend) | |
| Surface & Subsurface Mining* | Pressure | |
| Traditional Land Use* | Pressure | |

Indicators marked with an * are aspirational; PR, DC, and NR—see text below. Human Land Use-Agriculture & Built-up Areas

The Athabasca State of the Watershed Report Phase 2 (SoW P2) with an online Interactive Atlas was completed on April, 2012. The report compiled information on indicators that had data available for all the 10 sub-watersheds, further sub-divided into 31 tertiary watersheds of the Athabasca watershed (see map, page 1). Information for each indicator was summarized and presented in a map format. The indicators included in the report are indicated in the table above.

Six indicators had science-based thresholds and for each indicator,

tertiary watersheds Three indicators were **non-rated (NR)** were given **Pressure** and one of them was Surface Water **Ratings (PR):** Low, Quality based on the Alberta River Medium, and High Water Quality Index. It was only for the mainstem Athabasca River and

Six indicators had no science-based

thresholds and were grouped using Jenks analysis. This method is based on natural groupings that are inherent in the data and identifies break points (big jumps in data) that group similar values to maximize the differences between classes. This resulted in **Relative Disturbance Classification (DC)** with ratings: Minimal, Moderate, and Elevated for each tertiary watershed. These ratings allow comparison among tertiary watersheds within the Athabasca watershed but may have no association with adverse environmental impacts.

The planned SoW phase 3 will focus on Surface Water Quality and consider more parameters that have been collected on a regional or industry rather than watershed-wide basis.

Public Participation events at four locations in the watershed are being planned for 2012 to obtain stakeholder feedback on the SoW P2 report.

The SoW P2 report was prepared by Fiera Biological Consulting, Edmonton in consultation with the Athabasca Watershed Council Technical Committee and the Science Advisory Team. It can be accessed by early May 2012 at our website www.awc-wpac.ca.