Parks Canada Parcs Canada

State of the Park Report 2009

Wood Buffalo National Park of Canada

Canada

Wood Buffalo National Park is part of Canada's system of national parks. Together with national historic sites and national marine conservation areas, national parks are part of a larger network of national protected heritage areas.

Parks Canada Agency Mandate:

"On behalf of the people of Canada, we protect and present nationally significant examples of Canada's natural and cultural heritage, and foster public understanding, appreciation and enjoyment in ways that ensure their ecological and commemorative integrity for present and future generations."

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Cover page image: The Salt Plains, representation of UNESCO World Heritage Site

Wood Buffalo National Park

of Canada

State of the Park Report

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1 Executive Summary

Parks Canada requires each national park to prepare a five-year state of the park report before beginning the management planning process. The purpose of this report is to provide an analysis and assessment of state of key aspects in a national park. This is the first State of the Park Report for Wood Buffalo National Park (WBNP) and it addresses the state of the following:

→ Aboriginal perspectives
→ Ecological integrity
→ Cultural resources
→ Visitor experience
→ Public outreach and education
→ Aboriginal and stakeholder engagement

The report also assesses major management actions taken in recent years and it identifies key issues and challenges facing the park. The report provides an opportunity to communicate the state of the park to local communities, visitors and other interested parties.

Wood Buffalo National Park of Canada spans the Alberta/Northwest Territories boundary and at 44,807 square kilometres, it is the largest national park in North America. It was created in 1922 to protect the last free roaming herds of bison in northern Canada. Today it protects far more, including the last remaining natural nesting area for the endangered whooping crane; the Peace-Athabasca Delta, one of the largest inland freshwater deltas in the world; some of the finest examples of gypsum karst landforms in North America; unique salt plains and vast undisturbed expanses of boreal wilderness. It is because of these natural wonders that the park was designated a UNESCO World Heritage Site in 1983. The Peace-Athabasca Delta and the whooping crane nesting area were also designated as Ramsar sites, a designation by the Ramsar Convention which focuses on identification and protection of important habitat for migratory birds. Many cultural resources are also found within the boundaries of the park that date Aboriginal peoples' occupation back thousands of years. Traditional activities are supported and celebrated in the park today. Wood Buffalo National Park attracts Canadian and international visitors who wish to experience and learn about the unique cultures, landscapes and wildlife of the boreal north.

The following tables summarize the state of Wood Buffalo National Park and its key issues. The green/yellow/red/grey colour-coding symbolizes the good/fair/poor/data-deficient condition of an indicator based on an assessment of the available information. Arrows denote the trend in the condition of the indicator since its last assessment.

CONDITION				TREND			
●	▼	■	N/R	↑	↔	↓	N/R
Good	Fair	Poor	Not rated	Improving	Stable	Declining	Not rated

TABLE E1

State of the Park Summary

INDICATOR	STATE	RATIONALE
Ecological Integrity		
Forest	↔	The natural fire regime continues to operate across the park, maintaining a broad range of forest age and stand types. The wildlife communities monitored appear to be in good condition.
Delta	↓	The hydrology, flood frequency and plant community measures of the delta are rated as fair and declining. This reflects the association between hydrology, flood frequency and vegetation patterns in the delta. The wildlife communities monitored range from fair to good condition. Air quality is good.
Lakes	N/R	Water quality data are limited to Pine Lake, where water quality is good. Additional hydrologic, water quality and bird community data collected for other lakes will add to our understanding of the condition of this indicator.
Wetlands	N/R	Measures include whooping crane numbers, whooping crane nesting area hydrology and amphibian and invertebrate community composition. Whooping crane numbers are increasing and water levels in the nesting area are stable, but additional information is required about amphibians and invertebrates.
Grasslands	N/R	Grasslands represent an important component within the boreal forest as habitat for rare plant communities and grazing areas for bison. Limited information on the extent of grasslands (wet and dry types) hamper the ability to assess trends. Intial work will assess aerial extent of grasslands and determine community composition and reference conditions.
Streams and Rivers	↓	The hydrology of the Peace and Slave Rivers are rated as poor and stable and water quality measures for the Peace and Athabasca Rivers are rated as fair and declining.
Cultural Resources		
Resource Condition	N/R	The archaelogical sites, buildings and structures are threatened due to erosion and other natural processes such as fire and decay.
Selected Management Practices	▼	Inventory is incomplete but expanding with work with Aboriginal groups. No Cultural Resource Value Statement. Draft Cultural Resource Management Strategy in place. Workshops underway to identify sites, places, resources and development of human history themes. Engagement of Aboriginal groups. No formal monitoring in place.
Visitor Experience		
Personal Connection		Ninety-two percent of surey respondents were satisfied with their overall expereince. Local and regional residents have personal connections that extend for generations. The park currently lacks social science methodology for measuring park use trends and satisfaction by local and regional residents. This has resulted in a significant under-reporting of overall park use and visitor numbers.
Marketing and Promotion		Increasing awareness of the park as a unique and desirable tourism destination is a challenge. Marketing and promotion done by the park is limited by both budget restrictions and a low number of interested private sector partners. The parks lacks a marketing strategy.
Interpretation		Ninety-three percent of survey respondents were satisfied with their visit as an educational expereince. The main users or park interpretive programs are local school and community groups and groups associated with special events in the local communities. The park's local and regional residents have indicated they would like more interpretive events offered in the park. The park's non-personal interpretation has improved over the last five years with the addition of numerous new interpretive signs at key frontcountry locations. The park lacks an interpretation strategy.
Activities and Services		Quality personal service from staff continues to be a strength. Improvement is needed in the provision of before visit information about trails and campgrounds and park information. The park is below the national average rate of 92% for satisfaction of the overall visit as a recreational experience. Visitors would like to see significant improvements to infrastructure associated with reacreation. A shortfall in local and regional tourism operators is impeding the attraction of new segments of visitors.

INDICATOR	STATE	RATIONALE
Public Outreach Education		
Awareness		The park has no social science data to measure awareness of the park amongst Canadians. The park lacks broad public awareness as a potential destination. The lack of a coordinated public awareness strategy at the national level, along with limited staff resources and investment dollars at the park level places the park in a difficult situation of trying to reach out on its own to a vast country with multiple target audiences. As a result, park-specific efforts to reach Canadians have been opportunistic rather than strategic. The park has done better on a local and regional scale.
Understanding		The park has no social science data to measure understanding. The outreach programs target local and regional residents and school children in the region to promote understanding of Parks Canada and its mandate and the role Wood Buffalo National Park plays within the national system. Broader outreach efforts to increase understanding have been opportunistic rather than strategic. An investment in social science research is needed to ensure that this measure is addressed through outreach in a targeted and strategic manner.
Appreciation		There is no social science data to measure this indicator for targeted audiences. As the local and regional level, teacher evaluations for the annual school outreach program are consistently positive. An investment in social science research would allow the park to develop appropriate outreach products for targeted audiences and to monitor their effectiveness.
Learning		The park lacks access and investment captial for the social science research needed to indentify and understand what targeted Canadian audiences want to learn and how they want to learn it. Wood Buffalo National Park has targeted its school outreach to the local and regional communities. Informal feedback from teachers and students suggests a satisfactory level of learning in the short-term. The park has no social science methodology to measure learning retention.
Aboriginal Group Engagement		
Support		The protection of the park landscape is of great importance to surrounding Aboriginal groups. More needs to be done to embrace Aboriginal culture so that its historical relationship with the land and wildlife of the park is better understood and appreciated by visitors.
Influence		The influence of Aboriginal peoples on park policies is high; however, seeking a resoultion to the challenge of collaborative management for the park has been a priorty of senior management for the last 10 years and for various reasons past attempts to broker a park-wide solution have not been successful.
Active Involvement		Although Aboriginal groups are involved in a variety of processes at many levels of park management, a formal park-wide management board or committee could increase the level of active involvement and collaboration among Aboriginal groups on a number of park policy areas.
Stakeholder Engagement		
Stakeholder Engagement		There is no data to accurately evaluate the condition of engagement. However, it is clearly demonstrated that Wood Buffalo National Park works with a wide variety of stakeholders and at many different levels.

INDICATOR	STATE	RATIONALE
Key Issues		
Peace-Athabasca Delta		The Peace-Athabasca Delta, one of the world's largest freshwater deltas, is among the park's most significant ecosystems. It is also a significant cultural landscape and is one of the park's key visitor attractions. Peace River flow reguation is impacting delta hydrology and ecology and declining Athabasca River flows and increasing trends in nutrient levels are a concern. Ecological changes in turn impact the delta's cultural landscape and cultural heritage. The state of visitor infrastructure within the delta at Sweetgrass Landing and Sweetgrass Station has seriously deteriorated, affecting the potential for positive visitor experiences.
Aboriginal Governance		The park lacks an Aboriginal governance structure. Although there is engagement in some areas, more is needed to create a successful relationship that will allow the park to move fully into working with Aboriginal peoples.
Bison Management		The park bison population has been increasing since 1999 despite two cattle diseases: bovine tuberculosis and bovine brucellosis, that have been present in the herd since the 1920s. Research needs to be done to assess how disease and other factors such as predation affect bison production. The possibility of disease transmission from diseased bison to domestic cattle and bison herds and wild bison herds is a major issue. Management of the disease issue is complicated by a variety of stakeholder and partner interests and by the range of associated ecological soci-economic and pollitical issues.
Visitor Experience		The park's existing infrastructure is aging and deteriorating with limited funding. There is a lack of local and regional tourism operators offering services and visitor experiences in the park. The park's visitor opportunities for recreation and experiences are not diversified. Wood Buffalo National Park attracts few visitors because it is in a remote nothern location and due to Canada's current demographic and economic realitites and trends.
Public Outreach Education		Outreach education has been consistently under-resourced and focused on local and regional school and community outreach.

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1 Introduction

1.1 Description of Wood Buffalo National Park

Wood Buffalo National Park of Canada spans the Alberta/Northwest Territories boundary and at 44,807 square kilometres, it is the largest national park in North America. It was created in 1922 to protect the last free roaming herds of bison in northern Canada. Today it protects far more, including the last remaining natural nesting area for the endangered whooping crane; the Peace-Athabasca Delta, one of the largest inland freshwater deltas in the world; some of the finest examples of gypsum karst landforms in North America; unique salt plains and vast undisturbed expanses of boreal wilderness.

It is because of these natural wonders that the park was designated a UNESCO World Heritage Site in 1983. The Peace-Athabasca Delta and the whooping crane nesting area were also designated as Ramsar sites, a designation by the Ramsar Convention which focuses on identification and protection of important habitat for migratory birds. Many cultural resources are also found within the boundaries of the park that date Aboriginal peoples' occupation back thousands of years. Traditional activities are supported and celebrated in the park today. Wood Buffalo National Park attracts Canadian and international visitors who wish to experience and learn about the unique cultures, landscapes and wildlife of the boreal north.

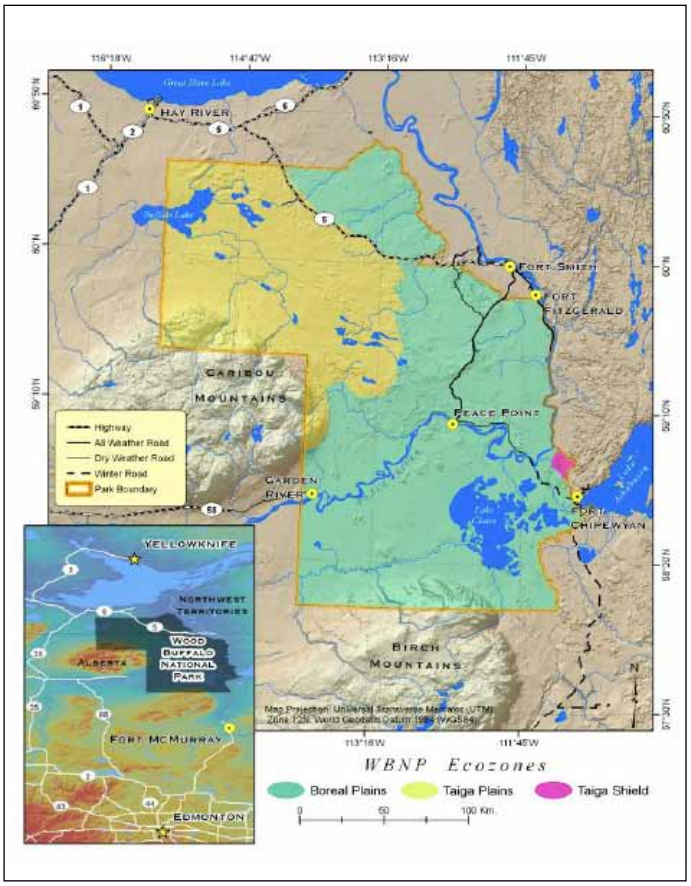


Figure 1. *Natural regions of Wood Buffalo National Park*

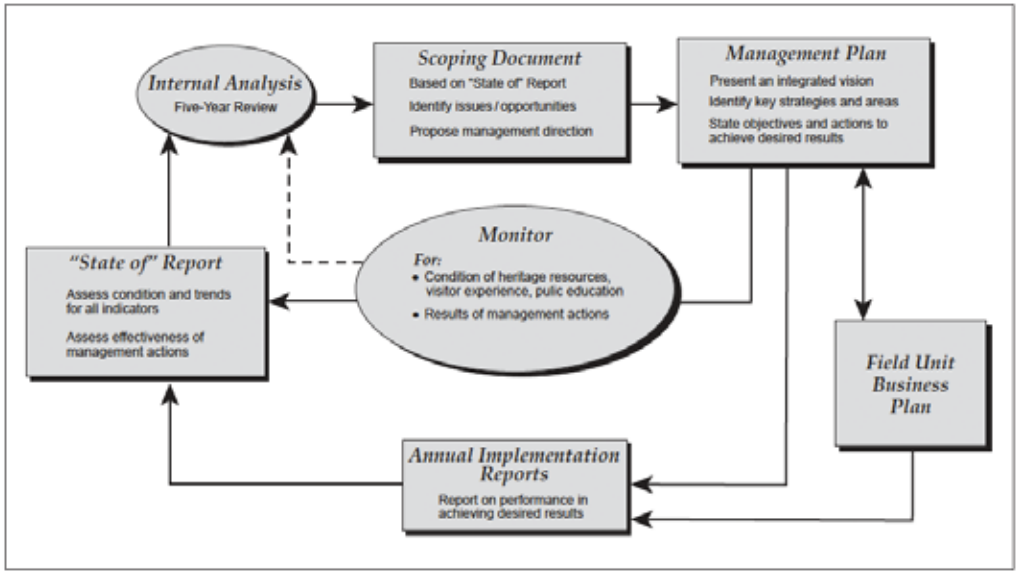


Figure 2. *Role of State of the Park Report in park planning, monitoring and reporting process*

1.2 Purpose of a State of the Park Report

This is Wood Buffalo National Park's first State of the Park Report. It provides an analysis of all components of the Parks Canada mandate. The report is intended to help raise awareness among key partners and visitors of the condition and status of park resources, activities and relationships. It also identifies key issues and challenges facing the park, which will lead to the next phase of planning - the Scoping Document and the Management Plan.

1.3 Methodology

Ecological Integrity

The ecological integrity of Wood Buffalo National Park was assessed by evaluating six ecosystem indicators that help to measure the state of ecological integrity in the park: 1) Forests; 2) Delta; 3) Lakes; 4) Wetlands; 5) Grasslands and 6) Streams and Rivers. Various approaches are used to measure ecological integrity, from remote sensing to large mammal surveys to snow tracking. Teams of biologists, resource management and public safety specialists, local community members and specialists from across the country, monitor and report on the ecological integrity of the park.

Cultural Resource Management

The evaluation of cultural resources is based on two indicators:

Resource Condition - this indicator is assessed using information gathered from the park's values at risk and asset databases and the artifact collection and archaeological database at the WNSC, which includes site visit histories and evaluations. Sites that have no current information were not included.

Selected Management Practices - This indicator is assessed using information regarding the status of the parks cultural resource inventory, evaluation and monitoring program. Not all areas of the park have been inventoried and a formal systematic evaluation has not been conducted on the park resources. Results were compiled from a review of the past and present cultural resource management projects that have been completed over the last decade, including the types of resources managed and what areas of the park they covered.

A multidisciplinary group of Parks Canada staff worked together using the rating guide to consider the data and other available information to determine the current ratings for the indicators.

Visitor Experience

Primary data sources for measuring the Visitor Experience indicators include park visitor statistics, the 2000 Visitor Information Program Survey and a 2006 Government of the Northwest Territories Exit Survey. Results from the 2008 Visitor Information Program Survey arrived too late to be incorporated into this report in their entirety; however, some of the key draft results have been noted where appropriate.

Public Outreach Education

There are currently no formal social science monitoring techniques in place to measure learning through outreach education. The results received are from informal teacher evaluations.

Aboriginal Relations

There is no process that monitors relations between Aboriginal groups and the park but a sense of the state of these relationships can be gathered through the park's partnerships with Aboriginal peoples in the area.

1.4 Indicators

A number of indicators are used in each section to evaluate the state of the park. A condition and trend is established for each indicator in the Ecological Integrity and Cultural Resources chapters.

CONDITION				TREND			
			N/R	↑	↔	↓	N/R
Good	Fair	Poor	Not rated	Improving	Stable	Declining	Not rated
The condition is satisfacory	There is concern about the condition	The condition is satifactory	There is insufficient information to determine the condition	The condition has improved since the last assessment	The conition has not changed since the last assessment	The condition has worsened since the last assessment	There is insufficient information to determine the trend

Fig. 3. Symbols used to evaluate indicators

1.5 Aboriginal Traditional Knowledge

In autumn 2008, Fort Chipewyan elder John James Antoine passed away at age 69. Antoine, a member of the Mikisew Cree First Nation, grew up in a remote part of Wood Buffalo National Park and spent much of his life working as a park firefighter. He also had a lifetime of experience traveling on the land as a park hunter and trapper. Although he was interviewed shortly before his death about the park's historic bison management station, he was never formally interviewed about his extensive knowledge of the land. Antoine's passing was a poignant reminder of the need to collaborate with Aboriginal governments to both record and engage Aboriginal Traditional Knowledge.

A useful definition of Aboriginal Traditional Knowledge is, "A cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations of cultural transmission, about the relationship of living beings (including humans) with one another and with their environment." (Berkes, 1999, p. 8). The park has conducted oral history interviews on the construction and operation of facilities such as Hay Camp, Sweetgrass, Jackfish Warden Station and various fire towers; however, there has not been a deliberate, systematic and ongoing process to engage Aboriginal Traditional Knowledge in park management.

Parks Canada (2003, 2004) recognizes that it is not sufficient for Aboriginal Traditional Knowledge to be an add-on to projects. The agency has developed basic principles for including Aboriginal Traditional Knowledge in ecological integrity research and management, but acknowledges that their application to specific parks will vary considerably. Three projects at Wood Buffalo National Park demonstrate how the park is shifting to new ways of working with Aboriginal traditional knowledge holders. In 1999-2000, study areas and a methodology for

assessing moose distribution and abundance in the park were established through a series of meetings with 11 Aboriginal groups. Input from hunters was critical and made survey results more credible to all parties. A process to develop collaboratively a set of game regulations for the park has been underway since 2006. Although not formally described as an Aboriginal Traditional Knowledge project, the process engages Aboriginal Traditional Knowledge holders in significant planning and decision-making, the results of which will have a lasting impact on the park. The game regulations process mobilizes, rather than simply documents, knowledge. The third project, the Peace-Athabasca Delta Ecological Monitoring program, is a collaborative attempt to assess the state of the delta ecosystem. Although at an early stage, this program will engage Aboriginal Traditional Knowledge in the monitoring and management of one of the park's most complex ecosystems.

Other initiatives to link to Aboriginal Traditional Knowledge are also underway. First Nations have been providing the park with direction on the Cultural Resource Management Strategy during day-long workshops and Wood Buffalo National Park staff were invited to participate in K´átł'odeeche First Nation's five-day documentation of cultural sites around Buffalo Lake in 2007. In 2009, Smith's Landing First Nation trained Parks Canada staff in their methodology for place name research so that collaborative place name research could be conducted in the park. While there is a role for the documentation of Aboriginal Traditional Knowledge, the park is moving away from simply collecting and incorporating information to a process of co-producing knowledge through collaborative research and monitoring. The goal is to have Aboriginal Traditional Knowledge holders collaborate from the beginning of a project with park researchers in identifying problems, goals, study design, implementation, assessment and communication.

2 Aboriginal Perspectives

2.1 Aboriginal Context

Wood Buffalo National Park is located in the southeast portion of the Northwest Territories and northeastern Alberta. For generations, the region encompassing the park has been the traditional landscape of a number of different Aboriginal peoples. The Beaver and Slavey at one time occupied a large area as far south as the Peace River, but following peace treaties made towards the end of the 18th Century, the Chipewyan and Cree became significant tribes and middlemen in the region, interacting with European traders. The traders were seeking additional trading links to the northwest of Hudson Bay between Great Slave Lake and Lake Athabasca, in an undiscovered region that became greatly significant to Canada's rapidly growing fur trade. Archaeological evidence indicates that Aboriginal peoples first lived in the park area more than 8,000 years ago, long before European fur traders first came to the area at the beginning of the 18th Century. Today the communities around the park are mostly made up of Cree, Chipewyan, Métis and non-Aboriginal people.

Wood Buffalo National Park is one of a number of northern parks with a tradition of hunting, trapping and other associated traditional uses. Although trapping is no longer a dominant economic activity for Aboriginal peoples it is still practiced by some community residents, although not on a full-time basis as was once the case. Hunting is however still popular, peaking in the fall moose hunting season when many families harvest food to supplement their needs for the winter season.

Wood Buffalo was first created as a national park in 1922 and in 1926 its boundary was extended to encompass the Peace-Athabasca Delta. Over the life of the park, the management and regulation of traditional use has been a contentious rights-based issue, which has only recently started to subside as a result of a court-determined decision. This has given recognition to the application of treaty rights. The settlement of land claims and the collaborative revision of the park game regulations with the park's Aboriginal harvesters have also contributed to the development of a more receptive environment for the resolution of Aboriginal issues in the park.

The park landscape, to which many Aboriginal people have a strong historical connection, comprises the traditional lands of a number of Aboriginal groups. The Mikisew Cree in Fort Chipewyan have legally recognized traditional lands in the southeast of the park, as well as a reserve at Peace Point. The Athabasca Chipewyan, a Fort Chipewyan First Nation, have traditional ties to the lands in and around the Birch River area at the west end of Lake Athabasca, as well as the adjoining Athabasca River. At the north end of the park, K´átł'odeeche First Nation has a long relationship with Buffalo Lake, where they lived until the 1950s. K´átł'odeeche First Nation is now located near the mouth of the Hay River beside Great Slave Lake.

By contrast, in the south of the park on the north side of the Peace River, the Little Red River Cree still follow a traditional lifestyle in the small community of Garden River. Garden River is a former seasonal trapping community that became permanent in the 1950s when

commercial park lumbering licences were permitted for a limited time.

With the economies of northern communities having undergone a number of profound changes over the past 30 years and treaty rights now recognized in Wood Buffalo National Park, a new type of relationship has started to evolve between Parks Canada and the park's Aboriginal constituency: a relationship based on a more explicit recognition of Aboriginal values in park management and policies.

2.2 Aboriginal Governance

In 2008, Wood Buffalo National Park had eight Indian Reserves within the park boundary and numerous others in close proximity to its borders in the Northwest Territories and Alberta. In addition, Canada is still negotiating three outstanding land claims processes with the Northwest Territories Métis Nation, the Akaitcho Dene and the Deh Cho Dene and Métis all of which will have some impact on the management of the park. Each of these negotiations, like those that have gone before it (Mikisew Cree, Salt River First Nation, Smith's Landing First Nation), are expected to produce new opportunities for collaboration on ecological, cultural and resource management issues in the park.

With regional land claim negotiations affecting existing and proposed national parks, the future cooperative management of Wood Buffalo National Park has become a focal point of discussion. To date, Parks Canada has only been able to establish a joint management agreement with one group, the Mikisew Cree, for the management of Mikisew's traditional lands in the southeast of the park. Discussions have taken place with other groups in recent years and joint management discussions will take place with all of the groups in due course. For the time being, and at the direction of the park's Aboriginal leaders, priority is being given to revising and updating park game regulations. The regulations, which were last revised in 1978, govern Aboriginal users hunting, fishing and trapping access to the park.

In addition to the collaborative discussions with Aboriginal users on the renewal of the park game regulations, Parks Canada and Aboriginal participants have established a Peace-Athabasca Delta Ecological Monitoring Program Steering Committee to monitor the habitat and ecological health of the delta in the southern end of the park. Given the current political attention by Aboriginal groups to the impact of industrial development on the supply and quality of water, this initiative is seen as a positive step.

Collaborative initiatives with Aboriginal governing bodies also include discussions about the development of a Cultural Resource Management Strategy for Wood Buffalo National Park. Parks Canada is working with each Aboriginal group to identify their unique park cultural history. Workshops started in fall 2007 with Dene and Métis groups in Fort Smith. Discussions have also taken place with K´átł'odeeche First Nation about their desire to have greater protection of the landscape between the northwest area of Wood Buffalo National Park and the Hay River.

In addition to the Cultural Resource Management strategy, Parks Canada has been working with Smith's Landing and Salt River First Nations to develop a joint land use plan for the area around Pine Lake, a popular destination in the middle of the park. Following the 2008 discussion on developing a joint management regime to protect the integrity of Pine Lake, the focus has been on establishing a firebreak and access trail.

Parks Canada and Little Red River Cree Nation are in the final stages of negotiating an agreement in principal for the excision of Garden River, a small Cree settlement in the south west of Wood Buffalo National Park. Once removed from the park, Indian and Northern Affairs Canada has agreed to establish the community as an Indian Reserve. The excision is provided for in the National Parks Act.

2.3 State of the Land

Aboriginal people living in and around the park have a longstanding and ongoing relationship with the land. While fewer people today make their living primarily from the land, they still remember and value how they or their families originally related to the land that eventually became Wood Buffalo National Park. For

Since July 2006, Parks Canada has been engaged in a collaborative review of the Wood Buffalo National Park Game Regulations with traditional users from all of the groups surrounding the park. The review, which is the most comprehensive review since the game regulations were last updated in 1978, has involved representatives from all of the Treaty 8 and Métis groups in the five communities surrounding the park. Group representatives have met six times to discuss the new game regulations. In addition, many of the groups have also held meetings with trapping members. The review will be completed in 2010 before being legally drafted by Justice Canada.

Aboriginal peoples, the land still represents a reservoir of knowledge, resources, strategies and ultimately meaning that goes back for generations. It is also a storied landscape in which the past and the future are connected and from which much traditional knowledge and legends are based and handed down.

Aboriginal Traditional Knowledge relies on Aboriginal ways of knowing based on a mixture of observation and empirical knowledge gained through experiential learning as well as through knowledge that has been received from relationships with elders and other knowledge-holders. Many Dene elders feel today that the health of future generations depends on the continuation of this knowledge process.

While Wood Buffalo National Park has to a certain extent excluded Aboriginal people in the past, in Aboriginal eyes the park still remains an inherently valuable landscape of well-being and identity, little changed from what it was a over a century ago at the signing of Treaty 8 in 1899. With much change currently taking place outside the park, especially to the south, Wood Buffalo National Park now represents a measure of protection for the land, water and wildlife, which might otherwise be lost or impaired.

The nature of what is observed and learned about the land and wildlife in and around the park whether through firefighting, moose surveys or the ongoing monitoring of the health of the Peace-Athabasca Delta requires a close working relationship between Wood Buffalo National Park and its Aboriginal constituency if the values of both are to be mutually respected, gain complete legitimacy and promote healthy relationships within healthy ecosystems. Steps have already been made in this direction as is evidenced by a number of recent park initiatives, a sample of which follow:

(i) Ecological Integrity

The Peace-Athabasca Delta Ecological Monitoring Program involves many stakeholders and is designed to integrate existing Parks Canada monitoring with monitoring done by government agencies and Aboriginal groups to better identify needs and collect and share information on the state of the delta.

(ii) Visitor Experience

Parks Canada regularly participates in Aboriginal events in the communities surrounding the park, as well as in tourism marketing events in Alberta and the Northwest Territories.

(iii) Cultural Resource Management

Since 2007, Parks Canada staff have been working with the K´átł'odeeche First Nation in the documentation of cultural sites around the Buffalo Lake area in the northwest corner of the park. The park has also been working with Smith's Landing First Nation on impact assessments and mitigation projects for two proposed cabin sites in 2006, 2007 and 2008. Work has also begun on identifying and documenting all the cultural resources associated with Sweetgrass Station. The park and archaeologist consult with Aboriginal communities/ partners prior to any archaeological work.

3 State of Ecological Integrity

3.1 Ecological Context

Wood Buffalo National Park is the largest area of boreal forest designated for maintaining ecological integrity in Canada. It is a vast, poorly-drained plain covered by boreal forest, grasslands, muskeg, meandering streams, lakes and bogs. As part of the Interior Plains, it is underlain by sedimentary rock. A few outliers of the granite hills of the Canadian Shield, which lies to the east of the plain, are also found within the park. The park contains two Ramsar (Convention on Wetlands) Wetlands of International Importance: The Peace-Athabasca Delta and the breeding habitat of the whooping crane. Elsewhere, the level of relief and slow percolating drainage has created fascinating landscapes, such as an extensive (250 $km^{2)}$ salt plain and the most extensive gypsum karstland known in the world.

Climate is a major controlling factor for all park ecosystems and is characterized by short, cool summers and long, cold winters with a mean annual temperature of –2° Celsius. Mean total precipitation is 392 millimetres

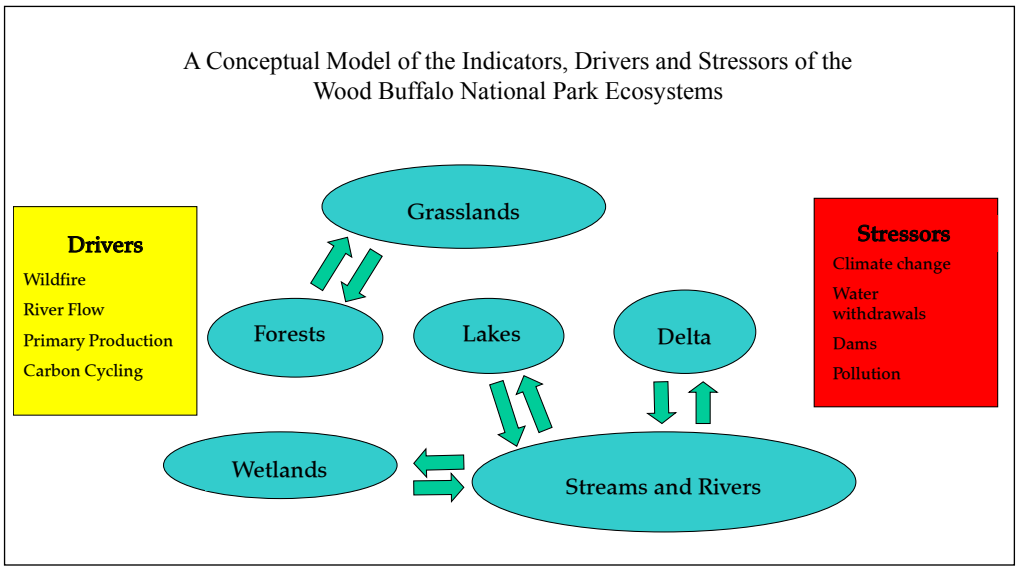


Figure. 4. *Conceptual Model of the Ecosystems in Wood Buffalo National Park*

at Fort Chipewyan compared to 362 millimetres at Fort Smith (1971-2000). Thunderstorms are common between April and October. Since the early 1900s, annual temperatures in Fort Chipewyan and Fort Smith have increased by 0.0186° Celsius, and 0.026° Celsius per year, respectively. Mean January temperatures are increasing at a greater rate than the annual mean temperatures.

With respect to maintaining the ecological integrity of Canada's National Parks and Heritage Sites, Parks Canada identified three areas of concern: biodiversity, ecosystem processes and stressors. The ecological integrity of Wood Buffalo National Park is summarized in six ecosystem indicators. Each indicator is rated based on several measures of the physical and biological character of the ecosystem. The ecosystem indicators identified for Wood Buffalo National Park correspond to the six dominant ecosystems comprising the park, which include: 1) Boreal Forest, 2) The Peace-Athabasca Delta, 3) Wetlands, 4) Lakes, 5) Grasslands and 6) Streams and Rivers. The indicators are consistent with those identified for the Interior Plains Bioregion, which includes four other national parks in Alberta, Saskatchewan and Manitoba, while recognizing the unique character of Wood Buffalo National Park (ie. the delta).

As a protected area, the park helps maintain biodiversity at the landscape, community, species and genetic levels. Park biodiversity is comprised of one of the largest herds of free-roaming bison in the world, breeding populations of whooping cranes and peregrine falcons, one of the largest freshwater inland deltas in the world, Aboriginal peoples pursuing their traditional activities, large riparian white spruce communities, gypsum karst topography, the salt plains and species at the edge of their ranges, such as the red-sided garter snake and Canadian toad.

The park's key ecosystem processes include: fire, flooding, herbivory, carnivory and traditional Aboriginal land use. Traditional use includes wildlife and plant harvesting and possibly prescribed burning. Bridging Aboriginal Traditional Knowledge with western science is fundamentally grounded to the refinement of our current and proposed monitoring activities.

Wood Buffalo National Park is by far the largest protected area in Alberta. However, size and legislative protection do not eliminate stress on park ecosystems. Resource extraction activities, such as deforestation, the increasing agricultural and oil and gas industries, have resulted in a highly fragmented regional landscape and reduction in the ecological integrity of areas just outside of the park. Economic and environmental trends are similar in the Northwest Territories.

The principle aim of Park Canada's ecological integrity monitoring program is to provide park managers with relevant and timely information on the state of the park's ecological integrity and the effects of management actions on it. Monitoring projects range from tracking the population dynamics of individual species with ranges spanning the park (bison, moose), those which occupy more specific habitat (whooping crane, muskrat), broad biodiversity measures (biodiversity indices of plants, bird point counts), communities (plant and fish community compositions), important processes (fire, weather, succession), as well as physical elements (water level and quality in lakes and rivers). For this State of the Park Report, data were available to report on some, but not all of these measures. Once the ecological integrity monitoring program is fully developed, future state of the park reports will assess the full suite of measures.

The condition and trend of ecological measures are evaluated against thresholds. Ideally thresholds are based on the natural range of variation expected in an undisturbed ecosystem. However, such thresholds may not be easy to identify. Wood bison and whooping cranes are both populations in some stage of recovery. Both have also been through some form of management intervention (introductions, supplemental feeding and predator control or egg removal programs). As a result, it is unlikely that the natural range of variation for these populations could be determined using existing data. Other data sets lack the longevity necessary to identify the natural ranges of variation. Because of these factors our approach was to set an interim threshold for the measures for the natural range of variation which is not captured by current data. In all cases, relevant literature and expert opinion was used to establish a threshold. Our thresholds will be reassessed and improved as additional information and data are gathered.

Species at Risk

Information available indicates that the park is home to four regularly occurring species at risk as identified by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the Canadian Species at Risk Act. An additional seven COSEWIC listed species may occur in the park, but data regarding those species are insufficient to assign a Managed Area Rank other than 'unrankable' or not applicable.

The park's wood bison herd represents the largest and most genetically-diverse population of wild wood bison in the world. Much of the species genetic diversity is present only in the WBNP population. Since the continued survival of a population is more likely when genetic diversity is broad within and among that population, the park's wood bison population is critical to the national recovery of this species.

SPECIES COMMON NAME	MANAGED RANK AREA	COSEWIC	SARA
Wood Bison	Vulnerable	Threatened	Schedule 1
Whooping Crane	Vulnerable	Endangered	Schedule 1
Peregrine Falcon (anatum subspecies*)	Vulnerable	Special Concern	No Schedule*
Woodland Caribou - Boreal Population	Imperiled	Threatened	Schedule 1
Northern Leopard Frog - Western Boreal/ Prairie Population	Historical	Special Concern	Schedule 1
Rusty Blackbird	Unrankable	Special Concern	Schedule 1
Short-eared Owl	Not applicable	Special Concern	Schedule 3
Western Toad	Not appicable	Special Concern	Schedule 1
Wolverine - Western Population	Unrankable	Special Concern	Schedule 3
Yellow Tail	Unrankable	Special Concern	Schedule 1
Olive-sided Flycatcher	Unrankable	Threatened	No Schedule*

Table 1. *Species at Risk in Wood Buffalo National Park*

Wood Buffalo National Park protects the nesting habitat of the only wild, self-sustaining population of whooping cranes in the world. While the whooping crane remains one of the world's most endangered birds, its road to recovery is a success story in the making. Conservation efforts have allowed this population to grow from a mere 15 birds in 1941, to a record 270 birds in 2008. Eggs collected within the park allowed establishment of a captive breeding program that now supports efforts to establish a second wild flock in the eastern United States. Nevertheless, the road to recovery remains a long one. The wild, self-sustaining population of whooping cranes must grow to 1,000 birds before the species can be down-listed to threatened status.

The peregrine falcon's position atop the food chain makes this species susceptible to environmental toxins. The DDT-induced continental collapse of the peregrine falcon is well documented. Parks Canada, the Canadian Wildlife Service and the Province of Alberta have worked together since 1971 toward recovery of the peregrine falcon in northeastern Alberta. Conservation efforts have included captive breeding and intensive brood management, contributing to a rise in the number of documented territories in and around the park: from three in 1974 to 31 in 2005. In 2007 the species was down-listed nationally from threatened status to species of special concern.

Information about woodland caribou in the park is limited. Aboriginal Traditional Knowledge of woodland caribou is improving our understanding of the species distribution and movement in and around the park. An ongoing study of genetic diversity of woodland caribou in the area will provide further information regarding population structure, the degree of genetic isolation, dispersal patterns and occupancy of late winter range.

INDICATOR	MEASURE	STATE
Forest	Annual area burned	↔
	Herbivore Community	N/R
	Index of primary productivity	↔
Delta	Lake hydrology	↔
	Historic flood frequency	↓
	Plant community	↓
	Fish community	↔
	Herbivore community	N/R
	Air quality	↔
Lakes	Bird community	N/R
	Hydrology	N/R
	Water quality	N/R
Wetlands	Whooping cranes	↑
	Amphibians	N/R
	Hydrology	↔
Grasslands	Plant community	N/R
Streams and Rivers	River hydrology	↔
	Water quality	↓

Table 2. *Conditions and trends for the six indicators and measures in Wood Buffalo National Park.*

3.2 State of Ecological Integrity

3.2.1 Indicator - Forests

Wood Buffalo National Park represents one of the largest tracts of protected boreal forest in Canada and is sufficiently large to maintain ecosystem processes. The forest includes extensive areas of jack pine, tamarack, spruce, poplar and mixed stands of varying degrees, interspersed with patches of grassland, muskeg, marshes and lakes. Fires are common and many species are very well adapted to and even depend on fire to maintain the health of the ecosystem. Population data collected on species with ranges spanning the park are reported in the forest indicator (wood bison, moose). Our measure of ecological integrity for the forest indicator is based on three measures for which there is enough information to make an assessment.

3.2.1.1 Measure: Annual Area Burned

Condition: Good
Trend: Stable

Fire is a critical element in the evaluation of the ecological integrity of the forest ecosystem. As the major disturbance agent in the boreal forest, fire influences the make-up of plant communities and forest age structure. The main measure for calculating fire frequency in Canadian forests is the fire cycle (Johnson and Van Wagner 1985), defined as the number of years required to burn over an area equal to the landscape of interest. The definition assumes that some locations will burn over more than once and others not at all. The fire cycle has major implications for vegetation in the boreal region. The differences between a 40-year fire cycle and an 80-year fire cycle, for example, may represent the distinction between a landscape dominated by grasslands and aspen parkland, versus one dominated by closed conifer forest.

The Area Burned Condition Class is used to assess fire condition: intact (0-33), moderately impaired (33-67) and severely impaired (67-100). It evaluates the degree to which annual area burned matches with hist fire cycles. The fire history of Wood Buffalo National Park (1860-1989) provides a target fire cycle of 63 years (Larsen 1997). To meet this target 65,000 hectares would have to burn annually. From 1959 to 2008, an average of 45,500 hectares per year have burned in the park. This provides an Area Burned Condition Class score of 30, an indication that the ecological integrity of fire occurrence at Wood Buffalo National Park is fairly intact. At a time when other protected areas are trying to achieve 20 per cent of their historic fire activity, Wood Buffalo National Park is in the enviable position of being within 70 per cent of its annual area burned target.

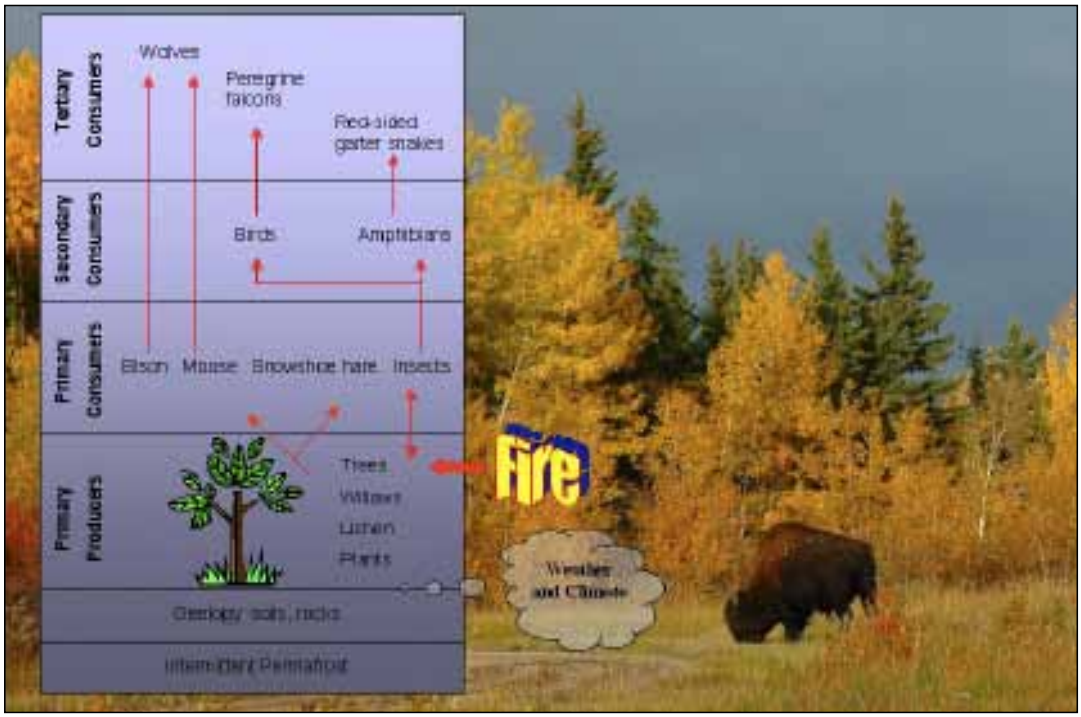


Figure 5. *Conceptual Model of the Forest Ecosystem in Wood Buffalo National Park*

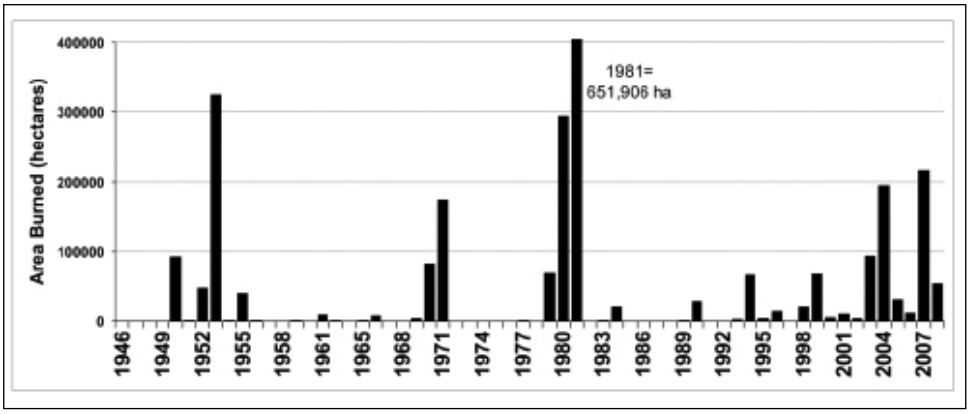


***Figure 6**. Fire occurence record 1946-2008 for Wood Buffalo National Park in hectares*

3.2.1.2 Measure: Herbivore Community

Condition: Good
Trend: Not rated

Herbivores form a vital link in the food chain between plants and upper trophic level species. Herbivory (where an animal eats a plant or plant-like organism) is a major agent of successional change within an ecosystem, capable of accelerating or decelerating the rate of succession and maintaining or altering the plant community structure. The herbivore community in the forest indicator ecosystem is monitored through population surveys of moose, wood bison and snowshoe hare.

Moose are a major herbivore, prey and subsistence species in Wood Buffalo National Park. They are surveyed in three separate study areas in the park. Thresholds were established by comparing moose densities against the range of expected densities for similar areas in the Northwest Territories and northern Alberta (good = 14 to 20 moose per 100 km^2, fair = seven to 13 moose per 100 km^2 and poor = two to six moose per 100 km^2). Results of the latest surveys indicate moose densities in the park range from six to eight moose per 100 km^2. The moose population was given a fair condition rating. A trend rating is not possible to establish at this time given that only two surveys have been conducted.

Bison are central to some important ecosystem functions: they help maintain open prairies through the process of herbivory and are an important link in the graminoid (grasses and grass-like plants)-bison-wolf food chain. Bovine tuberculosis and brucellosis are present in the Wood Buffalo National Park wood bison population, but the effect of the diseases on the population is not well understood. Teasing apart the impacts of disease, predation, and winter severity and range conditions on the population remains a challenge.

In 2009 it was estimated that there were 4,958 bison in the park. The fair-poor condition threshold of 1,000 animals was set based on the findings of Gross and Wang (2005) for retaining genetic and allelic diversity within a population and is consistent with recommendations of the draft Recovery Strategy for Wood Bison in Canada (2008). The fair-good condition threshold was established using 1.5 standard deviations from the mean of the baseline condition, derived using data collected from 1987-2007. The bison condition rating is good, with an increasing trend.

As hares are the main food source of lynx and great-horned owl and are important to other boreal predators, the abundance of hare can tell us something about conditions affecting the status of other species. The snowshoe hare monitoring program began in 2007. Condition and trend of the snowshoe hare population are not yet rated. The overall condition rating for this measure is

Wood Bison in Wood Buffalo National Park: The Challenge

For the past 80 years, wood bison management in Canada has been challenged by the diseases bovine tuberculosis and bovine brucellosis. The diseases were introduced into the park's wood bison population in the 1920s along with 6,600 plains bison transferred from Buffalo National Park in Wainwright, Alberta. Today, the presence of these diseases on the northern landscape is a concern mainly due to the potential for disease transmission to domestic cattle and to disease-free wood bison recovery herds. In 1990, an Environmental Assessment Review Panel appointed by the Minister of the Environment recommended that the best option for dealing with bison disease would be to remove all free-ranging bison in and around the park and replace them with healthy animals from Elk Island National Park and the Mackenzie Bison Sanctuary herd. This option was met with widespread public opposition based on concerns that the proposed option would result in a loss of genetic diversity and possible impairment of ecosystem integrity. To this day, the issue of how to manage bison disease cuts across a variety of stakeholder and partner interests and arises from a mix of ecological, socio-economic and political issues and associated values (Nishi et al. 2006).

Disease management is focused on preventing the transmission of tuberculosis and brucellosis to domestic cattle herds and disease-free wood bison recovery herds. In Alberta, a Bison Management Area has been established to reduce the risk of contact between diseased and disease-free herds. Surveillance in the area is passive. Free-ranging bison may be shot when observed but there are no structured searches of the area and there are no requirements that hunters submit samples for disease testing. As a result, it is impossible to assess the effectiveness of the Bison Management Area in reducing disease transmission. In the Northwest Territories, a Bison Control Area was established in 1987 as a joint program of Environment and Natural Resources, Government of the Northwest Territories and Parks Canada to reduce the risk of disease spreading to the disease-free Mackenzie Bison Sanctuary population. Surveillance activity in the control area is active and includes a schedule of fixed-wing air surveys between November and March to detect bison in the area. Northwest Territories residents can shoot bison in the control area and bison removed from the control area must be reported and tested for brucellosis and tuberculosis. In the 21 years since establishment of the Bison Control Area, 14 bison have been removed from the area and none have tested positive for disease.

While these diseases remain on the landscape, Parks Canada will continue to support the Bison Control Area and will work with other partners and stakeholders to develop additional measures to reduce the potential for disease transmission to disease-free wood bison recovery herds and domestic cattle herds.

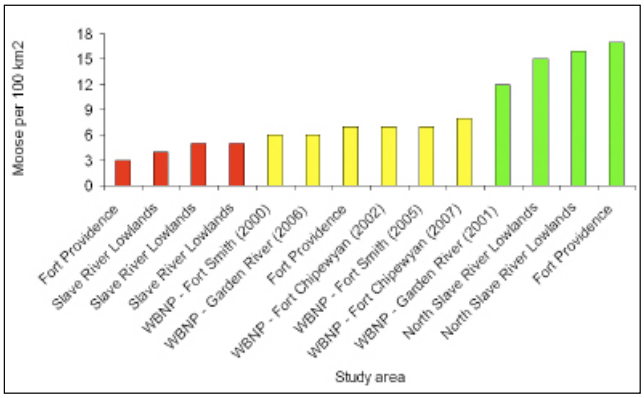


***Figure 7**. Population of moose in the regional study areas.*

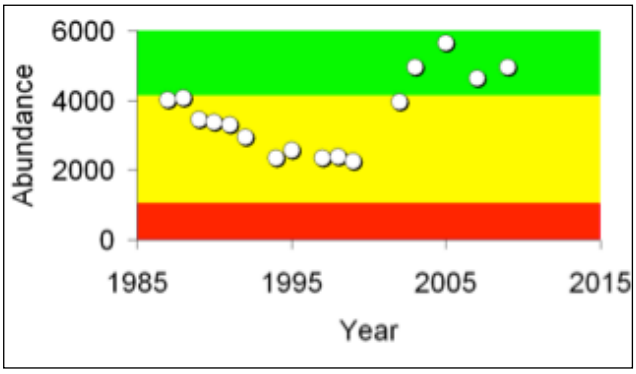


***Figure 8.** Wood bison abundance in Wood Buffalo National Park 1987 to 2007.*

determined to be good, based on the fair condition rating for moose and the good condition rating for bison. A trend rating for this measure will be possible in the future when more information for the moose and snowshoe hare populations is available.

PROJECT	CONDITION	TREND
Moose	Fair	N/R
Wood Bison	Good	Increasing
Snowshoe Hare	N/R	N/R
Overall	**Good**	**N/R**

3.2.1.3 Measure: Index of Primary Productivity (satellite imagery)

Condition: Good
Trend: Stable

Satellite technology is used to monitor the timing and intensity of plant growth across the park since 1985. A vegetation index, based on light reflectance values, provides a measure of both the timing of green-up in spring and the overall 'greenness' of vegetation during the growing season. Together this information provides a long-term and broad scale assessment of vegetation productivity.

Due to the number of ecological zones represented in Wood Buffalo National Park, there is considerable variation in productivity from place to place, with significantly higher values observed in the Peace River lowlands. Since 1985, differences in the index from year to year were associated most strongly with temperature differences, for example, cool years and warm years (He et al, 2008). The vegetation index provides strong baseline data supporting the condition rating as good with no significant change over time.

3.2.2 Indicator - Delta

The Peace-Athabasca Delta, one of the world's largest freshwater deltas, is located at the western end of Lake Athabasca where the Peace, Athabasca and Birch rivers converge. The delta is a very complex ecosystem, where conditions are naturally variable and sensitive to change. The rivers draining into the delta flow south to north, from regions of urban, agricultural and industrial development to remote areas with limited development. Water withdrawals, dams and pollution sources outside the park represent significant stressors to the park and greater park ecosystem.

Delta Background

Seasonal and annual variations in water levels are important factors in the low-lying delta and help to maintain highly-productive wetlands, lakes and marshes of various sizes. The resulting habitat provides some of the most significant waterfowl breeding and staging areas in North America, spawning sites for fish migrating between delta lakes and rivers, and sedge meadows for wood bison. The area also supports moose, muskrat and other species important to local people who have hunted, trapped and fished in the delta for centuries. For these reasons and more, the delta has been distinguished as a Ramsar Wetland of International Importance since 1982. To capture the unique character of the delta, only data collected from the delta on wood bison and moose are used to report on the herbivore measure for the the delta.

The plants and animals of the area are adapted to and thrive under the natural pulse of water that is a unique feature of delta flood plains, channels and basins. Along with an abundance of water, floods flush and scour the banks and deposit sediments and nutrients providing ideal growing conditions for plants. With ready access to water, nutrients and abundant sunlight, plants thrive in the delta wetlands making it one of the most productive landscapes in northern Canada.

How the Delta Works

Two of Alberta's largest rivers meet in the delta. The Athabasca River is one of the largest unregulated rivers in Canada with a mean annual flow of 650 cubic metres per second and flows into the delta from the south. The Peace River carries a much greater volume of water (mean annual flow of 2,100 cubic metres per second) and since 1968 has been regulated by hydro-electric production at the W.A.C. Bennett Dam in British Columbia. Although this river skirts the northern edge of the delta, it has a proportionately larger influence on the flood regime of the area.

The delta region is extremely flat. A slight increase in water depth results in a massive increase in wetted area. Delta water levels depend upon local climate influences (precipitation, evaporation) and contributions from river flows. Because local evaporation generally exceeds precipitation, the contribution of flood water from the rivers is important. Floods occur (1) in spring when river break-up creates ice-jam induced flood peaks or (2) in summer when the melt of mountain snow packs and regional rainfall events generate open water peak flows. During peak river stages brought about by these events, both rivers contribute flood waters to delta channels, lakes and surrounding wetlands. At high stages the Peace River can act as a hydraulic dam: literally a wall of water. This reverses drainage patterns and channels that normally drain north are suddenly carrying waters south. When Athabasca River levels are also high, more water is contributed to the system and extensive flooding occurs.

Perched basins are those portions of the delta landscape that are slightly elevated from the main channels, large lakes and adjacent wetlands. Summer peak water levels on the Peace and Athabasca rivers are not sufficient to flood the highest perched basins. These basins require higher flood levels and over-bank flows that are only generated by ice-jams during spring-breakup.

Since Peace River flow regulation, the long-term health of the delta ecosystem has been a concern. While average annual discharge on the Peace River remains similar to natural levels, peak summer flows are much reduced and ice-jam floods are infrequent. Both flow regulation and regional climate variability are implicated in this situation. Flow regulation has reduced river discharge in summer and has increased river discharge in winter. As a result, summer peak flows and flood events are smaller and shorter in duration, while higher winter freeze-up levels mean more spring flow is now required to generate ice-jam floods. At the same time, a regional climate trend toward warmer and drier conditions means that less run-off is -available to stimulate spring and summer flooding on both the Peace and Athabasca rivers. As a result of these flow regulation and climate influences, large scale flooding of the delta has happened only three times over the past 40 years (1974, 1996 and 1997).

Management interventions have been investigated to mitigate the impact of reduced flooding on the delta. Outflow weirs constructed on two channels that drain the delta (Riviere des Rochers and Revillon Coupe) help to maintain lake levels but prevent seasonal drawdown in winter. Experimental construction of artificial ice-jams at key locations in the delta, designed to help retain spring run-off, were attempted in the mid-1990s. And during the spring flood of 1996, BC Hydro increased releases from the Bennett Dam that supplemented flooding in the delta. A combination of management approaches, including strategic releases from the Bennett Dam to stimulate or augment ice-jam floods and strategically placed water management structures within the delta, may be required.

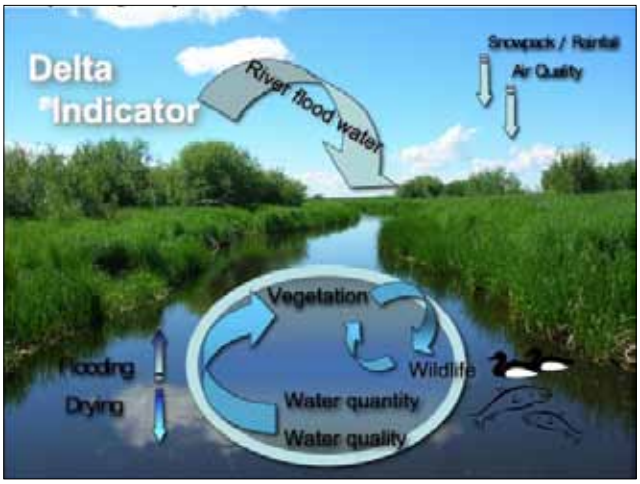


Figure 9. *Conceptual Model of Peace-Athabasca Delta Ecosystem*

In this relatively dry region where local rainfall is exceeded by evapo-transpiration (the combined water vapor put into the air through evaporation from water on earth's surface and plants giving off water to the atmosphere), delta wetlands depend on inputs of water coming from distant sources. This dependence puts the ecological integrity of this dynamic and vital region at risk to influences outside the park from the vast regions of northern British Columbia, Alberta and Saskatchewan.

Water levels in the lakes are tightly linked to water levels in the rivers, while water levels in the thousands of basins across the delta are dependent on recurrent flooding. The frequency and extent of floods in turn determine the habitat available to fish, waterfowl and other inhabitants. The delta ecosystem is ever-changing and complex and its interconnections reach up and down the Mackenzie Basin extending as far as the glaciers in Jasper National Park almost 1,000 kilometres away and to weather patterns over the Pacific Ocean.

3.2.2.1 Measure: Lake Hydrology

Condition: Fair
Trend: Stable

Water levels in Lake Athabasca have fluctuated across a range of about 3.4 metres between 1940 to the present. High levels in Lake Athabasca (above 210 m.a.s.l) were last recorded in 1997, after two years of ice-jam flooding and one summer season of high, sustained flows on the Peace River in 1996 due to an emergency release of water from the Bennett Dam. Since 2000, summer lake levels have been five to 95 centimetres below the long-term average. There has been a measurable downward shift in peak lake levels and alterations in other hydrological factors observed due to Peace River flow regulation and warmer and drier climate trends. Lake Athabasca was assessed as fair and stable.

Lake Claire water levels have been recorded since 1970 (post-regulation). Water levels varied by about 1.5 metres (208.6 – 210.1 m a.s.l.). Levels were high in 1974 and again in 1996 and 1997 (reflecting the influence of the spring and summer flood events noted above). These represent only brief conditions of high water during almost 40 years of record-keeping. Although rock weirs on the Rochers and Revillon Coupe rivers have maintained elevated lake levels, they do not allow for extreme seasonal rise and fall of the natural regime (Donald et al 2002). Currently water levels are higher in winter (September to May) and lower in summer as compared to an unregulated regime. Overall, Lake Claire was assessed as fair and stable.

Based on the overall assessment of these long-term datasets, the hydrological regime of the delta's large lakes was rated as fair and stable. The reduction in summer peaks levels on Lake Athabasca, and the reduced seasonal changes on Lake Claire contributed to this rating.

"Water is Boss"

Former Cree Chief Sal Marten lived on the delta for most of his life. He is one of the last of the Fort Chipewyan Elders to have worked at nothing but trapping and fishing for income and hunting, fishing and trapping for food. He is widely quoted as saying, "The water is boss." It summarizes the trapper's view that the water levels govern the muskrat populations and much of the other wildlife and fish on which the people of the delta have traditionally depended for their livelihood.

Excerpt taken from the Peace-Athabasca Delta Traditional Ecological Knowledge Report pg. 132

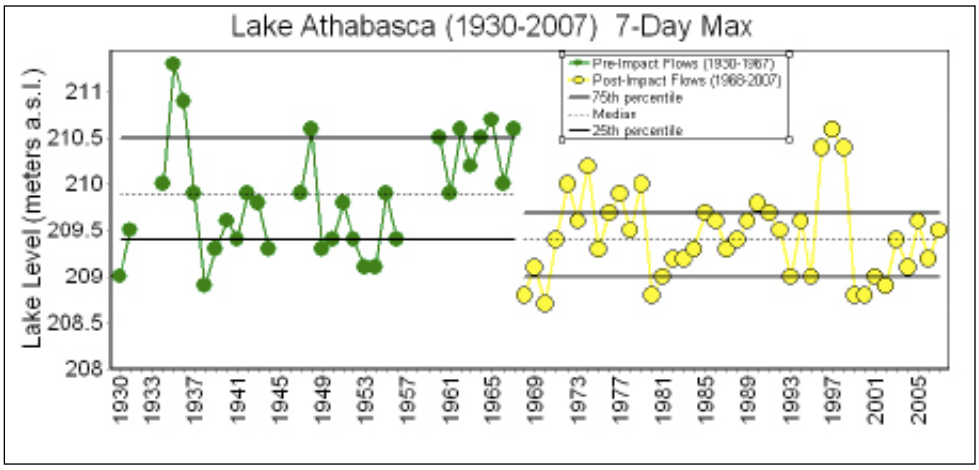


Figure 10. *Annual maximum water level for Lake Athabasca (seven day maximum) at Fort Chipewyan, Alberta. The period 1930 to 1967 indicates a baseline of natural levels before dam construction. Since 1968, a significant downward shift in the median lake levels is apparent (dotted line) and the range of variation (25th and 75th percentiles). NOTE: An emergency release from theBennett Dam throughout the summer of 1996 contributed to high flows.*

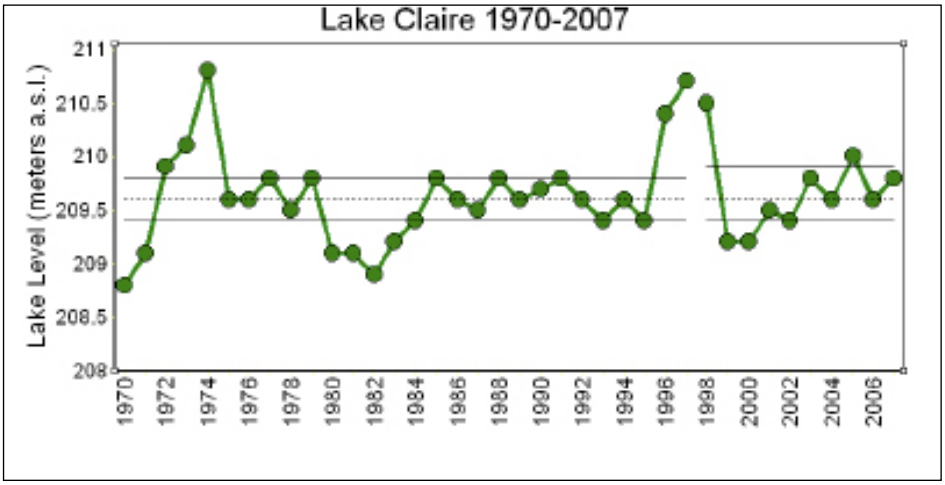


Figure 11*. Annual maximum water level for Lake Claire (seven-day max). The period of record 1970 to 2007 occur after the construction of the W.A.C. Bennett Dam in British Columbia. High lake levels occurred in 1974, 1996 and 1997 corresponding to the only major flooding in the past 40 years. NOTE: An emergency release from theBennett Dam throughout the summer of 1996 contributed to high flows.*

3.2.2.2 Measure: Flood Frequency

Condition: Fair
Trend: Declining

The frequency of floods originating from the Peace and Athabasca rivers is an important feature of the delta ecosystem (see How the Delta Works). The flood history of the area is available from written records as far back as the early 1800s (Timoney et al 1997) and from recent paleolimnological analysis of lake sediment cores. Recent floods identified from written records were assessed based on conditions near Fort Chipewyan and assigned a magnitude rating from 0 to 3 as follows: 0 – No mention of a flood; 1 - flood or high current, limited in duration or extent; 2 - unusually high water or flow, limited in duration and or area; 3 - unusually high water or flow, extended in duration and area flooded.

From 1850 to 2008, 14 large-scale floods impacted much of delta (magnitude3). Often, one flood year was followed by another. These floods were separated by an average of 10 years (+/- 7 statistical deviation.). Recent

"Spring floods bring back water to the small lakes and lower ponds and sloughs every year. But the higher ponds and sloughs only get water every five or seven years when ice jams on the Peace and Athabasca rivers cause major floods. When the high ponds and sloughs get water, muskrat come to them from the lower ones and start to have families. For the next three or four years, lots of muskrats are born. These are the years when trapping is good. Then the high ponds and sloughs start to dry out. The water goes stagnant and the plants that the muskrat eat start to die. In the winter the ponds and sloughs freeze right down to the bottom. For all these reasons, the number of muskrat goes down until the next major floods bring the water back. The scientists believe the cycle is 10 years long."

Reggie McKay in the Fort Chipewyan Way of Life Study Final Report talking about the muskrat cycle. Excerpt taken from the Peace-Athabasca Delta Traditional Ecological Knowledge Report pg. 132

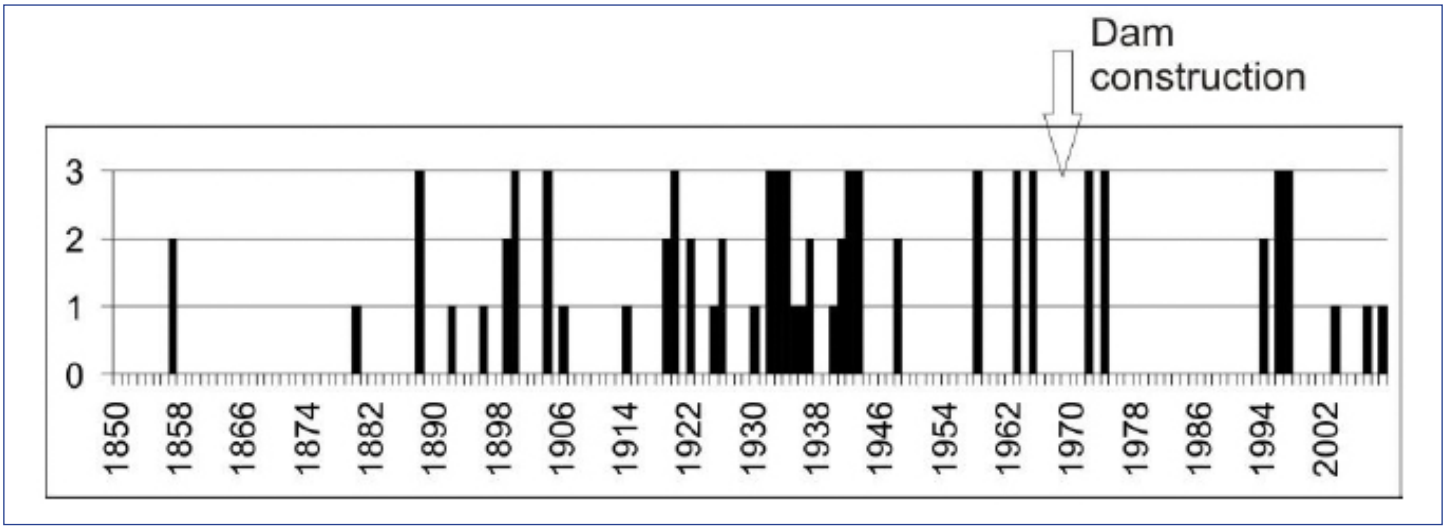


Figure 12. *Historic Flood Events (magnitude zero to three) from 1850 to 2008 for the Peace-Athabasca based on written records from Fort Chipewyan. Arrow indicates the start of water regulation on the Peace River following the construction of the Bennett dam.*

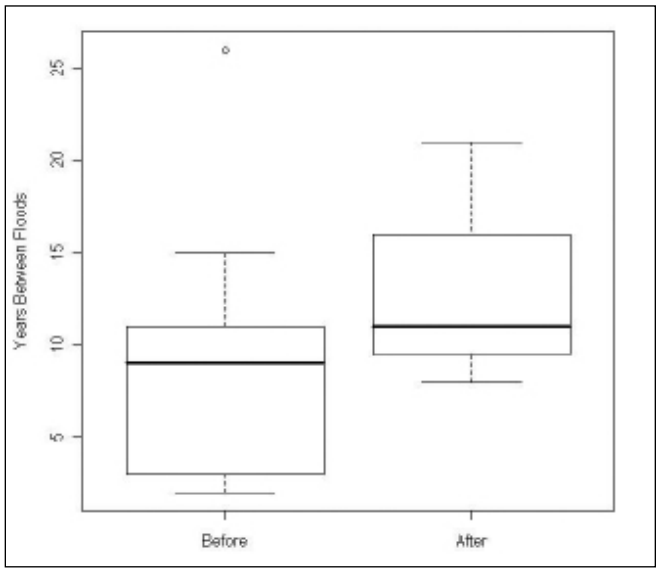


Figure 13. *Years between major flooding before (1850-1967) and after (1968-2008) dam construction on the Peace River. The boxplots indicate median flood-free period (dark line), the box indicates the 25th and 75th percentiles (percentiles divide the range of observed values into 100 equal proportions) while the whiskers indicate the 5th and 95th. Only magnitude three events were considered in setting thresholds.*

floods occurred in years 1974, 1996 and 1997, but with a general increase in the number of intervening years between floods (Figure 11).

Paleolimnological study of lake sediment cores indicates that flood frequency has been highly variable over the last 300 years, was in decline prior to Peace River regulation and included several multi-decadal periods without a major flood (Wolfe et al. 2006). The 22-year period from 1974 to 1996 was one of the longest on record without a major delta-wide flood. As of 2009, it has been 12 years since the last flood. This measure is rated as fair with a declining trend based on the observed decline in flood frequency.

3.2.2.3 Measure: Plant Community

Condition: Fair
Trend: Declining

Several types of plant communities thrive in the delta due to the abundance of water, nutrients and light during the short but intense growing season. Plants are sorted according to their tolerance or affinity for standing water– from those that require standing water most or all of the time, to those that tolerate flooding for only brief periods or not at all. While water levels can change quickly, plant communities react more slowly since they are rooted in place (although some simply float with the current) and many are adapted to or able to tolerate floodwaters for at least short periods of time.

On high levees of the delta, stands of alder and white poplar thrive; diamond willows dominate the fringes of many basins while sand bar willows are early pioneers on mud and sandbars. The delta is famous for its many large meadows dominated by just a few species of grass and sedge. These cover thousands of hectares and are some of the most productive and extensive native grasslands in North America. Aquatic plant communities dominated by cattails, bulrushes and swamp horsetail are found in standing water. In deeper and permanently flooded locations there are open water communities dominated by floating plants. Comparing the relative abundance of the plant communities and the aerial extent of open, flooded and dry plant cover provides a measure of the condition of the plant communities and a measure of habitat availability.

Remote sensing provides an economical way to monitor this large and isolated area. A combination of optical and radar satellite images have been used since 1996 to estimate the area of open water, flooded vegetation and dry vegetation. In 1996 and 1997, 1,500 to 2,000 square kilometres of flooded vegetation were recorded in the delta. This represents 30 to 35 per cent of the region. It resulted from flooding caused by ice jams on the Peace River and high flows related to an emergency draw down

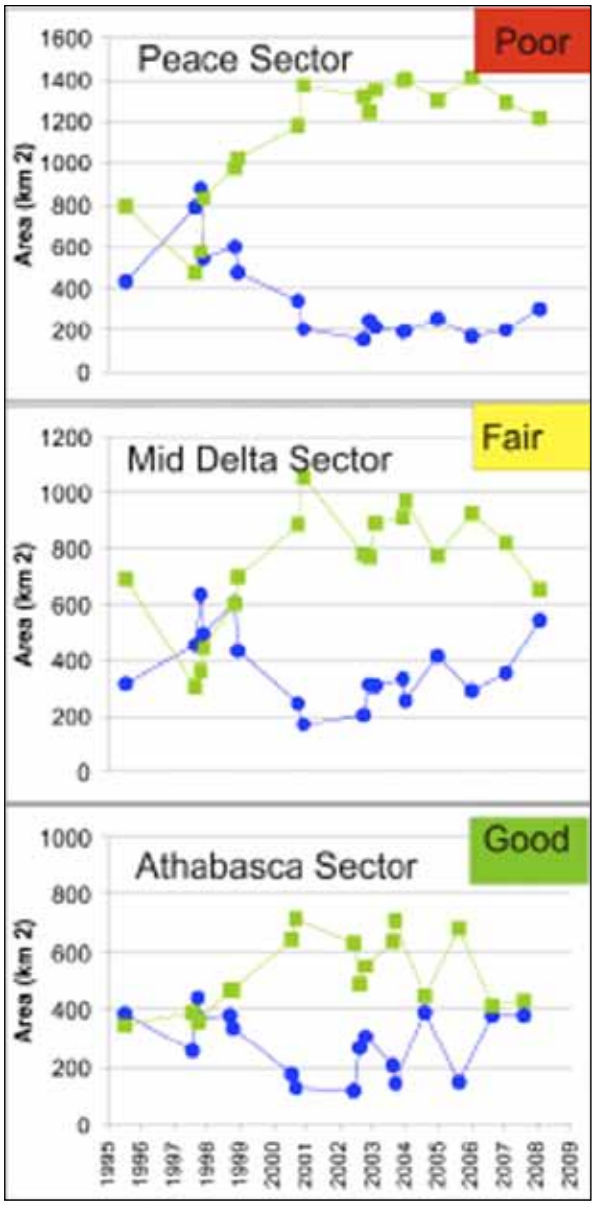


***Figure 14**. Quantity of flooded vegetation (circles) and dry vegetations (squares) (km^2) determined by satellites for three sectors of the Peace-Athabasca Delta 1996 - 2008. Since the last major flood in 1996-97 the Peace and mid-Delta sectors have experienced more drying than the Athabasca sector.*

of the Williston Reservoir (June-September 1996). At that time, areas of open water and flooded vegetation were common in all sectors of the delta (the Peace, Mid-Delta and Athabasca sectors). Since then, the Peace sector has experienced considerable drying while other sectors have experienced cycles of wetting and drying. For example, in 1998, 55 per cent of the Peace sector of the delta was covered by flooded vegetation or open water. By 2008, this was reduced to only 33 per cent. Without a flood in the next few years, encroachment by willows and non-native plants already underway will likely continue.

Permanent transects installed between 1993 and 1995 allow on-the- ground monitoring of vegetation at 36 locations in the delta. The project quantifies the location and abundance of aquatic, meadow and forest plant communities representative of the delta, including bulrushes, sedges, cattails, rat root and woody plants, especially willows. The transects stretch 200 to 900 metres from a levee into basins and often end in open water. Along this distance, the elevation typically changes by only 50 to 150 centimetres, which shows how extremely flat this area is.

There is no single pattern that describes the changes observed in vegetation in the delta. Some transects have experienced a cycle of wetting and drying and show very little change in the abundance and location of various plants and plant communities (aquatics, sedge meadows and willow thickets) over 15 years. Many sites flooded extensively in 1996 and 1997. This led to die back of willows and other woody vegetation. Other sites have simply followed a drying trend since the beginning of the study where meadows are being encroached by willows and trees.

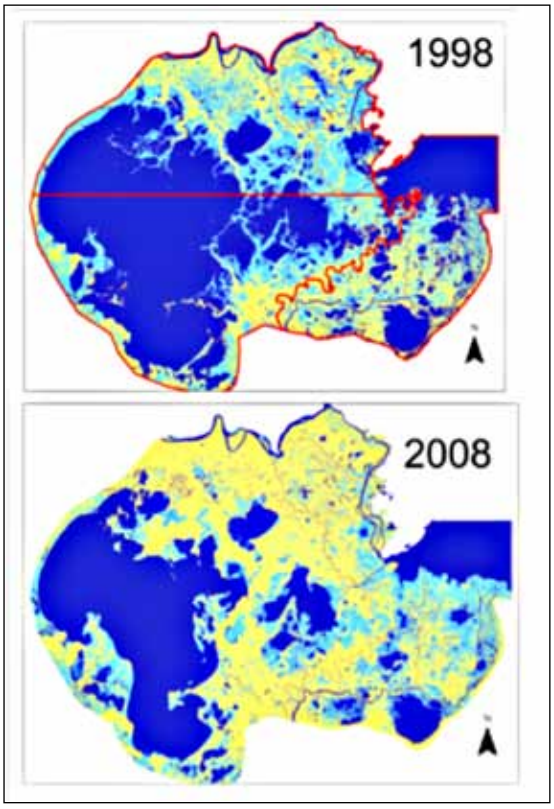


Figure 15. *The extent of open water (dark blue), flooded vegetation (light blue) and non-flooded vegetation (yellow) recorded by satellite imagery in 1998 adn 2008 for the Peace-Athabasca Delta. Upper map also shows delta sectors, Peace sector (top), mid-Delta (lower left) and Athabasca sector (lower right).*

Of concern are the vegetation monitoring program results, which show an abundance of non-native plants occupying large areas of the delta meadows. Two species of particular concern are Canada thistle and perennial sow thistle. Non-native plants were recorded on nearly half of the 36 sites starting back in 1993. The abundance of non-native species within the Athabasca River and Mid-delta sectors of the delta has been relatively stable. Meanwhile, the frequency of non-native plants in the Peace River sector was significantly higher and showing an increasing trend over time.

Due to the loss of flooded vegetation, in-growth of willows and an increase in invasive plant species, primarily in the Peace sector of the delta, plant communities were rated as fair and declining.

PROJECT	CONDITION	TREND
Water extents	Fair	Declining
Invasive plants	Good	Declining
Plant communities	Fair	Stable
Overall	**Fair**	**Declining**

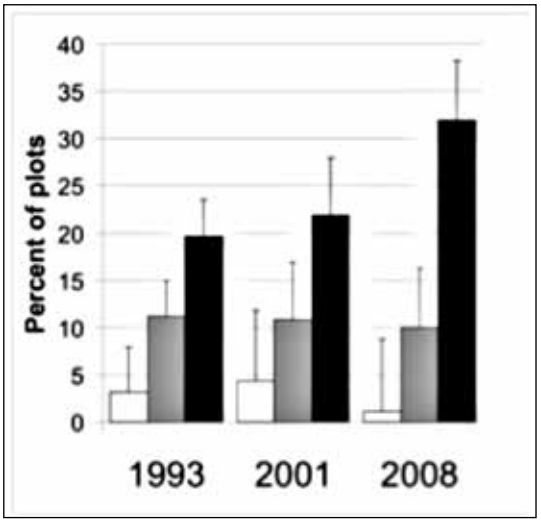


Figure 16. *Relative number of sampling plots with non-native plants across three sectors of the Peace Athabasca Delta. White = Athabasca sector, Grey = Mid-delta and Black = Peace River sector. Non-native species included Canada thistle and perennial sow thistle.*

Condition: Good
Trend: Stable

Fish community is an important ecological integrity measure of the delta because the biomass and number of fish species can substantially influence the relationships among other aquatic organisms and because fish have social and economic value to the residents of the delta. In addition, it's useful to monitor fish communities to assess changes in water and habitat quality. Using the approach and data presented by Donald et al. (2002), two field measures are examined to evaluate the fish community measure: Community structure and goldeye catch per unit effort.

Community structure status is measured against the relative abundance of fish in the catch from Mamawi and Claire lakes. Any long-term change in the relative abundance of fish species in these lakes would indicate a significant change in the delta ecosystem. Since the late 1940s, the fish community structure remains dominated by goldeye with other species in order of decreasing relative abundance being: northern pike > lake whitefish = flathead chub > walleye > longnose suckers > white suckers > burbot. Therefore we rate fish community structure as good with a stable trend.

PROJECT	CONDITION	TREND
Fish community structure	Good	Stable
Goldeye catch per unit effort	Good	Stable
Overall	**Good**	**Stable**

Goldeye catch per unit effort provides a measure of the population status of the most abundant delta fish species. The good-fair condition threshold is a mean catch per unit effort of 10 and the fair-poor condition threshold is a mean catch per unit effort of 5.5, the point at which a significant decline in the population could be demonstrated (after Donald et al. 2002). There was no significant change in mean catch between 1973 and 2002, when the mean catch per unit effort was 15. Therefore, we rate the goldeye catch per unit effort condition as good with a stable trend.

The overall condition for this measure is rated as good with a stable trend, based on the status of these sub-measures.

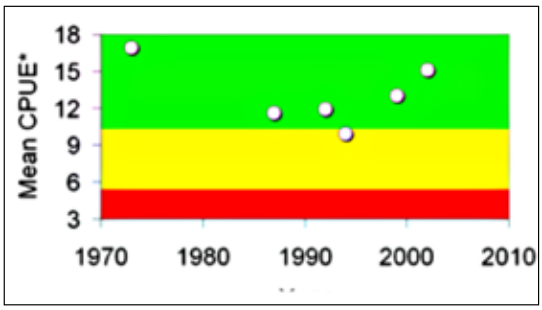


Figure 17. *Catch per unit effort for goldeye from Mamawi and Claire lakes in June and July 1973 to 2002 (determined from gill-nets with mesh size ranging from 3.8 to 10.2 cm). * Mean number of goldeye caught per 100 meters.*

Year	1947	1949	1954	1976	1977	1992	1994	1999	2002
Gill-net size	10.2	9.5	8.9-10.2	3.8-8.9	3.8-8.9	3.8-10.1	3.8-10.2	3.8-10.2	3.8-10.2
Fish species									
Goldeye	56	61	92	79	67	60	71	51	71
Northern Pike	20	21	4	15	19	19	11	39	23
Flathead chub	0	0	0	0	2	8	6	0	0
Lake whitefish	7	7	0	2	8	5	8	5	2
Walleye	8	3	2	2	2	5	3	5	3
Suckers	10	8	2	2	2	3	1	1	1
burbot	0	0	0	0	present	present	0	0	0
Catch	204	108,954	563	4158	1154	725	744	815	901

Table 3. *Fish Community Structure, per cent composition by species in Mamawi and Claire lakes.*

Condition: Fair
Trend: Unrated

The herbivore community measure of the delta ecosystem indicator is monitored through population surveys of moose, wood bison and muskrat.

The muskrat population is an important element of this measure because it can be extremely abundant at the peak of its 10-year cycles, can modify the vegetation in its feeding areas and is an important food for smaller predators. Muskrats are a keystone species in the delta and a good indicator of habitat condition. They have also been the most important fur-bearing animals in the trapping economy and traditional culture of First Nations and Métis in the delta. For the relevance of surveying moose and wood bison, see the herbivore community measure of the forest ecosystem indicator.

In 2007, the Fort Chipewyan moose survey indicated that moose density was eight moose per 100 square kilometres. Thresholds for moose in the delta are the same as those for moose in the forest (good = 14 to 20 moose per 100 km^2, fair = seven to 13 moose per 100 km^2 and poor = two to six moose per 100 km^2). Therefore the moose population was given a fair condition rating. A trend rating is not possible to establish at this time as only two surveys have been conducted.

The delta is the largest suitable bison habitat in Wood Buffalo National Park (Jensen, 2005). The delta bison subpopulation began increasing in 1999. The 2009 subpopulation estimate for this population was 1197 animals. Thresholds were established using 1.5 standard deviations from the mean of the baseline condition, derived using data collected from 1987 to 2007. Therefore the bison condition rating is fair, with an increasing trend.

To better understand what influences bison population trends and what causes the observed differences in growth among subpopulations, a thorough assessment of the interaction between predation and disease, along with the effects of hydrologic and vegetation changes in the delta, is required.

Figure 18. *Moose are surveyed in three study areas in Wood Buffalo National Park. Only the Fort Chipewyan Study area is used to assess condition and trend for this measure in the Peace-Athabasca Delta.*

Figure 19. *There are five subpopulations of Wood Bison in Wood Buffalo National Park. All subpopulations contribute to the condition and trend rating for the forest indicator, whereas only the delta subpopulation is used to assess condition and trend for this measure in the Peace-Athabasca Delta.*

A condition rating for the muskrat population has not been assigned at this time, as additional data are required to determine baseline condition and interim thresholds. Muskrat abundance has fluctuated with water levels in the delta, increasing sharply after floods in the mid-late 1990s then declining until 2002 and rebounding by the last survey conducted in 2005-06. Because the periodicity associated with water level is expected in the muskrat population, the trend for muskrat is rated stable.

The overall condition for herbivores in the delta is fair while the trend is unrated due to the lack of information available across all the projects included here.

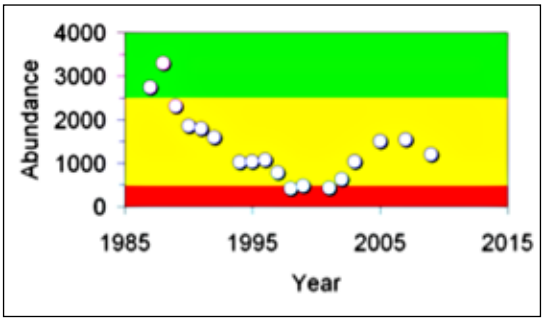


***Figure 20**. Wood bison abundance in the Peace-Athabasca Delta, 1987 to 2007*

PROJECT	CONDITION	TREND
Moose population	Fair	N/R
Wood bison population	Fair	Increasing
Muskrat population	N/R	Stable
Overall	**Fair**	**N/R**

3.2.2.6 Measure: Air Quality

Condition: Good
Trend: Stable

Long distance transport of air pollutants from urban, industrial and agricultural activities can impact remote areas. Naturally occurring forest fires also contribute smoke and fine particulate matter that impact both human and ecosystem health. The air quality station closest to Wood Buffalo National Park is at Fort Chipewyan, Alberta, on the shore of Lake Athabasca and it is operated by Wood Buffalo Environmental Association.

Four air emission parameters are monitored at the station: fine particulate matter, nitrogen dioxide, ozone and sulphur dioxide, which together are used to calculate the air quality index. An index of zero to 25 indicates good air quality, 26 to 50 is fair, 51 to 100 is poor, and more than 100 is very poor. Between November 2000 and August 2008, air quality was reported as good 75 to 90 per cent of the time. There was an obvious seasonal trend where air quality was good over the winter, good or fair in early summer and improved again in fall. The air quality index was poor less than 0.2 per cent of the time (<20 hours a year). Brief periods of poor air quality index occurred in June and July. At this time of year, higher levels of particles and ozone are associated with poor index ratings. Likely sources of these pollutants include industrial activity and forest fires. An obvious deficiency of the monitoring was the frequent periods when no air quality index was reported due to maintenance, technical problems or other reasons. This was particularly a problem in 2002 and 2006 when 20 to 23 per cent of the time no index was available.

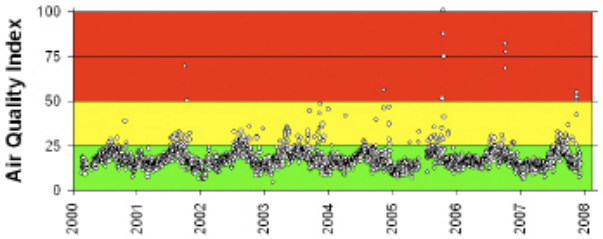


***Figure 21.** Daily maximum air quality index from November 2000 to August 2008 at Fort Chipewyan monitoring station on Lake Athabasca. Good= 0-25, fair= 25-50, poor= 50-100 and very poor >100. Index based on measured values of particulate matter, nitrogen dioxide, ozone and sulphur dioxide.*

3.2.3 Indicator – Lakes

Hundreds of lakes, mainly small ones, dot the landscape in Wood Buffalo National Park. The lakes are of karstic and glacial origin. The deepest lakes in the park, Pine Lake and Rainbow Lake, are karst features (uvalas). All lakes have a limited existence that is influenced by morphology, nutrient and sediment input and geographic and geologic setting. During its existence, a lake is an ecosystem of complex physical, chemical, and biological interactions. The lake ecosystem indicator for Wood Buffalo National Park will report on lake water levels and water quality. It will also report on bird communities, specifically the Common Loon, whose presence provides an approximate measure for condition. However, there is insufficient information to rate the relative health of the lakes indicator at this time.

MEASURE	CONDITION	TREND
Bird community (Loons)	N/R	N/R
Hydrology	N/R	N/R
Water quality	N/R	N/R
Overall	**N/R**	**N/R**

3.2.4 Indicator – Wetlands

The park's wetlands support plant communities and animal populations that are characteristic of wetland habitats in the boreal region. In addition, the whooping crane nesting area wetland complex provides the only continuously inhabited breeding ground of the endangered whooping crane in the world. An assessment of the wetland indicator for Wood Buffalo National Park is based on the size of the Whooping Crane population and the hydrology of the wetlands that provide nesting habitat to whooping cranes. Future assessments will also consider invertebrates and amphibians, two groups sensitive to environmental change.

3.2.4.1 Measure: Whooping Cranes

Condition: Poor
Trend: Increasing

Wood Buffalo National Park protects the only wild, self-sustaining population of whooping cranes in the world. Whooping cranes are a Committee on the Status of Endangered Wildlife in Canada-listed endangered species and are one of the rarest birds on earth.

The whooping crane population has been increasing since 1968 when there were only 50 cranes. Sixty-six pairs nested in and adjacent to the park during the 2008 breeding season. At least 64 chicks successfully hatched and at least 41 of those survived to fledging age. In January 2009, the Wood Buffalo – Aransas flock was made up of 232 adults and 38 juveniles. By March however, eight birds (almost seven per cent of the flock's population) died as a result of poor habitat conditions on the wintering grounds in Texas.

The fair-poor condition threshold of 1,000 animals was set based on the recommendations of the Recovery Strategy for the Whooping Crane in Canada (2007). Data are not sufficient to identify a fair-good condition threshold at this time. Therefore the whooping crane condition rating is poor, with an increasing trend.

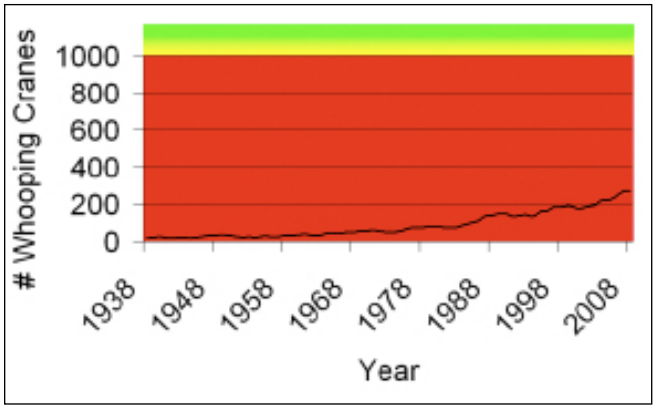


Figure 22. *Total number of whooping cranes in the Wood Buffalo - Aransas flock (1938 to 2008).*

Condition: Good
Trend: Stable

The low plain that covers the northern half of the park represents the primary nesting habitat for Whooping Cranes. Here, extensive areas of marsh, fen, bog and shallow ponds are found supporting aquatic invertebrates, the favoured food for cranes. These wetlands are also thought to deter potential predators, foxes, coyotes and other terrestrial mammals from intruding on nesting cranes.

Within this area, water levels at 2 creeks and 3 ponds have been monitored from spring to late summer each year since 1999. Water levels reach their maximum following spring run-off in May and decline over the summer to a minimum in fall (Figure 21).

Since 1999, water levels have varied from year to year and, site to site, but have remained generally stable. The June observations were assessed in detail, since at this time cranes have established nests and are tending eggs in the nest. Over 11 years, ponds have fluctuated but appear to be stable (Figure 23). Creeks tend to vary in depth across a wider range but are also stable over the years. In 2009, following a cool, wet summer, water levels were above average. Future analysis of this measure will include additional ponds to better characterize this large area and a test of the relationship between climate variables (ppt and temp.) and water depth.

MEASURE	CONDITION	TREND
Whooping cranes	Poor	Increasing
Amphibians	N/R	N/R
Hydrology	Good	Stable
Overall	**Fair**	**N/R**

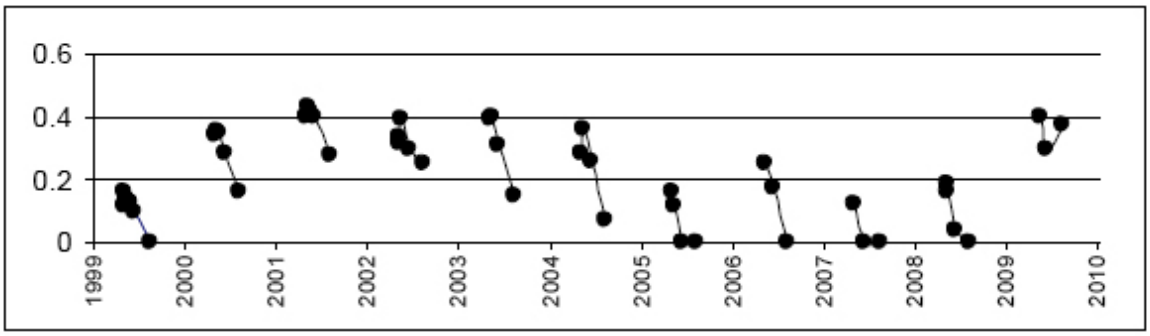


Figure 23. *Water Depths (m) at Pull-off Pond (1999-2009) showing the typical fluctuations from spring highs to late summer lows.*

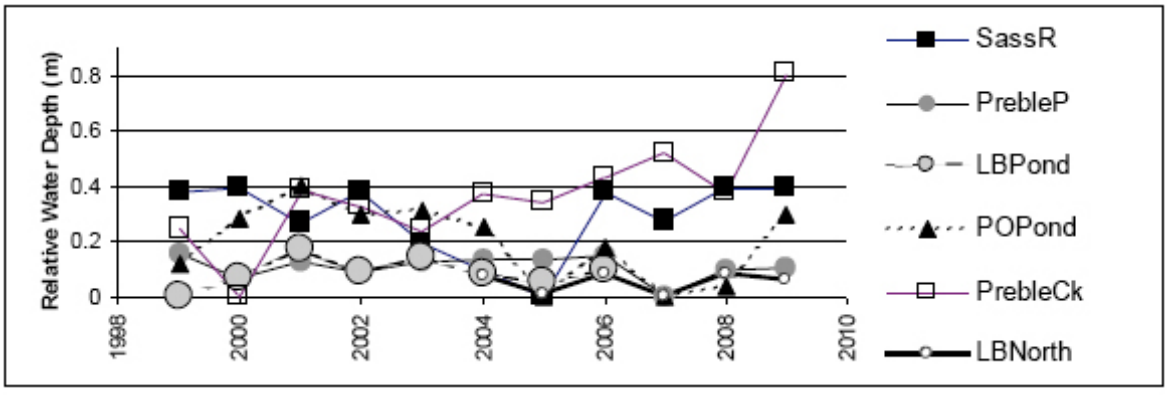


Figure 24. *Relative water depths (meters) in June for creeks and ponds within the Whooping crane nesting area 1999-2009. Zero depth does not indicate no water, but simply the lowest recorded level observed in June over an 11 year period.*

3.2.5 Indicator – Grasslands

Grasslands occur throughout the park, including small openings within the boreal forest and large expanses in the Peace-Athabasca Delta, Hay Camp and elsewhere. Grasslands may be maintained by disturbances such as wildfire, grazing and floods or occur on a variety of soil types that are otherwise too wet, too dry or too salty to allow forests to develop. While disturbances are in some cases important to maintaining grasslands, this also makes them susceptible to invasion by non-native plants (weeds). Grasslands represent an important component within the boreal forest, including habitat for rare plant communities and critical grazing areas for bison. Grassland communities found in Wood Buffalo National Park include plant species more typical of areas found much further south.

Detailed knowledge of grasslands within the park is limited to a few sites and includes sedge meadows, fens, saline meadows and dry grasslands. For example, an historic grassland at Peace Point has developed into an aspen forest over the past century. Saline meadows at Benchmark Creek represent unique communities in an area otherwise dominated by boreal forests. Elsewhere, reduced flooding has allowed for the in-growth of willows and trees in what were previously wet meadows. Limited information on the historical and current extent of grasslands (wet and dry types) makes it difficult to assess current conditions and trends.

3.2.6 Indicator: Streams and Rivers

Alberta's two largest rivers, the Peace River and Athabasca River, flow into and through the park. Hydro-electrical production, industrial activities, including pulp and paper production, oil sands extraction and agricultural and urban development are all potential stressors. Hydrology and water quality are the core measures since they are the main drivers of the health of the aquatic ecosystem.

3.2.6.1 Measure: River Hydrology

Condition: Poor
Trend: Stable

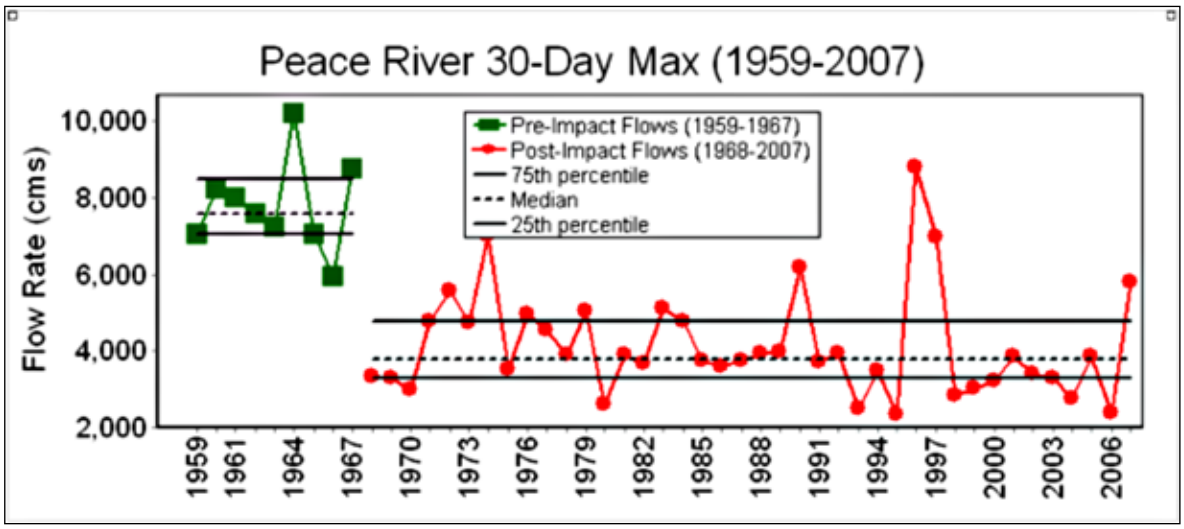
Over the period of record (1959 to 2008), flow regulation (acting in concert with regional climate trends toward warmer and drier conditions) has led to significant changes in the frequency and duration of peak flows of the Peace River and the Slave River (the Peace River comprises 60-80% of the water flowing into the Slave River during most of the year).

One method to assess the health of river systems includes consideration of 33 hydrologic factors that describe variations in timing and duration of flows following an alteration (Nature Conservancy 2007). On the Peace River, 29 of the 33 hydrologic factors have been altered since flow regulation. On the Slave River, 21 of 33 hydrological factors have been altered. For example, prior to flow regulation (1959-1967) annual peak flows in June averaged 7,402 cubic metres per second on the Peace River. After flow regulation, annual peak flows in June have averaged 3,453 cubic metres per second, nearly half pre-regulation levels. Lower flows in summer reduce the probability of summer flood events. Changes in winter flows are also evident. Since flow regulation, winter flows have averaged 1,454 cubic metres per second on the Peace River, more than three times greater than pre-regulation levels. Higher flows in winter reduce the seasonal drawdown in delta lakes and channels may contribute to the reduced frequency of spring ice-jam floods. Given the existing and potential impacts on the form and function of the river channel and the delta as a result of flow regulation and regional climate trends, the hydrology of the Peace River and of the Slave River is rated as poor but stable.

The Athabasca River remains one of the largest unregulated rivers in North America and continues to show the characteristic annual variation in discharge (summer peaks and winter lows). However, over the past ten years the Athabasca has experienced reductions in annual flow (Glozier et al. 2009) and five contiguous years of extreme low winter flows. Cumulative reductions

in flow are the result of regional trends toward warmer and drier conditions, together with increased municipal, industrial and agricultural water withdrawals.

PROJECT	CONDITION	TREND
Peace Riber	Poor	Stable
Athabasca River	Good	Declining
Slave River	Poor	Stable
Overall	**Poor**	**Stable**



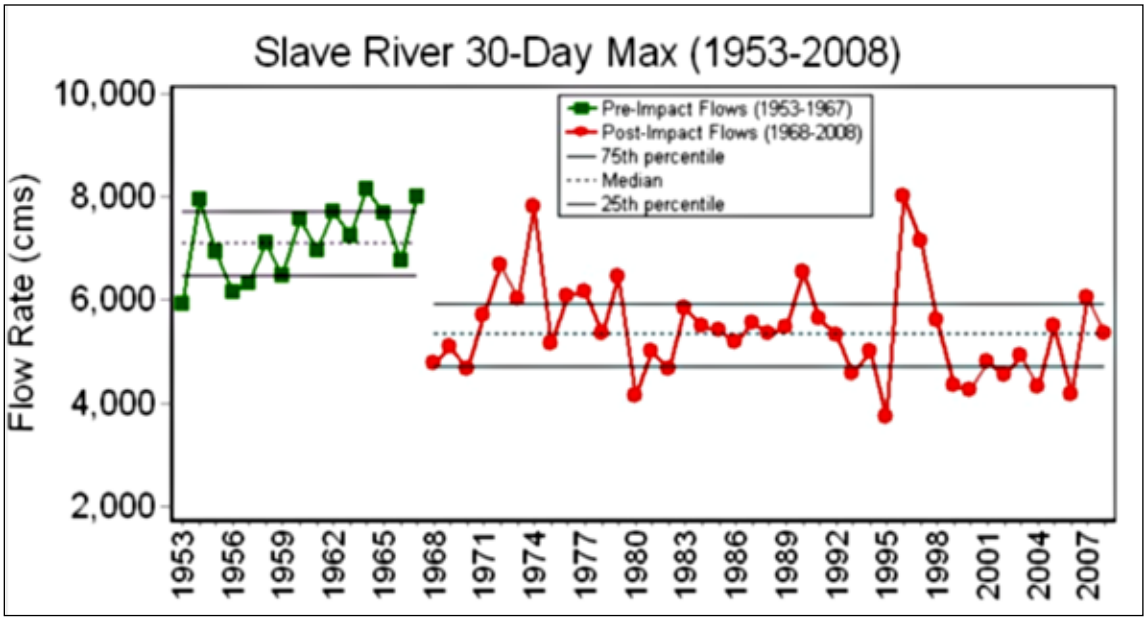


Figure25a and 25b. *Median river flow (cubic meters per second) for the Peace River (Peace Point) and Slave River (Fort Fitzgerald). A significant shift in summer maximum flows occurred following the construction of the Bennett Dam in 1968 as shown here (30-day maximum flows) 1950's-1967 (squares) compared to 1968-2007 (circles). Black lines indicate the range of variation, dashed line median value pre- and post-dam construction. Note: an emergency release from the Bennett dam throughout the summer of 1996 contributed to high flows.*

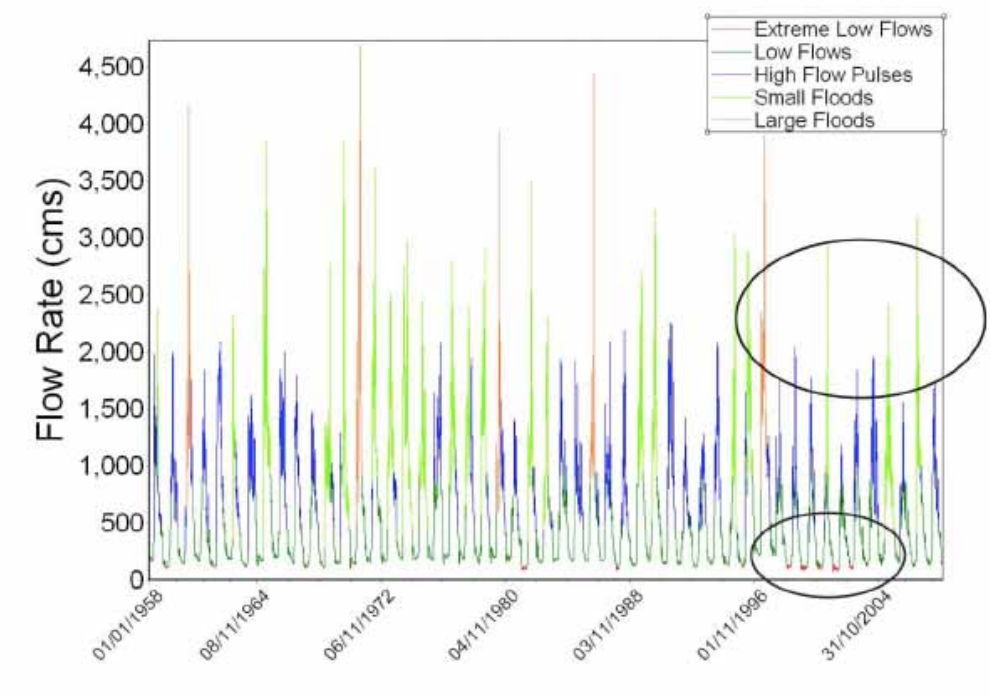


Figure 26. *Annual flow events for the Athabasca River (below Ft McMurray), 1958-2008 (cubic metres per second). Winter low flows (dark green) followed by flow pulses with small (light green) or large (orange) flood events. Extreme winter low flows indicated in red, repeat years of extreme low flows in winter and reduced flows in summer circled.*

3.2.6.2 Measure: Water Quality

Condition: Fair
Trend: Declining

High water quality must be maintained to preserve the natural ecological functions of rivers. Water quality data have been collected on the Athabasca and Peace Rivers in Wood Buffalo National Park, and on the Slave River just outside of the park since 1989 (Glozier et al. 2009). The monitoring program was established largely to assess general water chemistry and potential changes in nutrients due to point source inputs in upstream reaches. These existing data do not provide the opportunity to describe the occurrence and abundance of a broad suite of petroleum and oil-based contaminants. Consequently, the data currently collected cannot and should not be used to perform a comprehensive evaluation of the effects of upstream development on the rivers and delta. Increased monitoring of petroleum and oil-based contaminants is urgently required.

Based on existing data, two key findings of concern follow:

1. The seasonal patterns of dissolved metals and ions in the Peace and Slave Rivers have been substantially changed from natural patterns in unregulated rivers. Normally, peak concentrations would occur in winter when a river is ice covered and flow rate is at its lowest. Currently, peak concentrations are occurring in the open water period (spring to fall) with minimum concentrations in winter. The implications for the aquatic ecosystem of this shift are unknown.

2. Nutrient levels are increasing along with decreasing discharge in the Athabasca and Slave Rivers. Increasing trends in phosphorus are signalling an overall increase in potential nutrient loadings and productivity. Nutrient addition leads to increased plant growth. As the plants die, rapid decomposition leads to increased activity by bacteria that use up more oxygen. Depleted oxygen levels may stress and even kill fish and other aquatic organisms.

Water Quality Indices were also calculated for five, three-year moving periods (for example, 2001-2003 and 2002-2004) for the period 2001 to 2007 to further assess this measure. The 11 contributing parameters and their guidelines are the same as those used by the national reporting program on environmental sustainability for these sites (Canadian Environmental Sustainability Indicators). This approach was taken for two reasons: to be consistent with previously published index scores for these sites (Environment Canada, Statistics Canada, Health Canada 2007) and to allow comparisons to the overall national results. Index scores were within the marginal to fair Canadian Council of Ministers of the Environment (CCME) Water Quality Index categories. Of the parameters assessed with this index, the most frequent exceedances were from total phosphorus, total copper, total zinc, and total lead. This was not unexpected, for they largely occurred in association with high-discharge, high-sediment conditions and probably have no impact on the ecosystem (Glozier et al., 2009). Total nitrogen, dissolved arsenic and dissolved oxygen had a few exceedences, while ammonia, chloride, total nickel, and pH did not exceed the published guidelines. It should be noted, however, that the application of CCME guidelines to waters with a high sediment load is not ideal. Development of a site-specific objective for total metals, nutrients, and the presence and abundance of organic and non-organic contaminants of concern would provide a better assessment of risk to aquatic life.

The condition for this measure is rated as fair, based on the marginal-fair Water Quality Index scores and the change in seasonal patterns of dissolved parameters in the Peace and Slave Rivers. Increasing nutrient levels (Athabasca and Slave Rivers), and decreasing discharge rates (Athabasca), contribute substantially to the declining trend for this indicator.

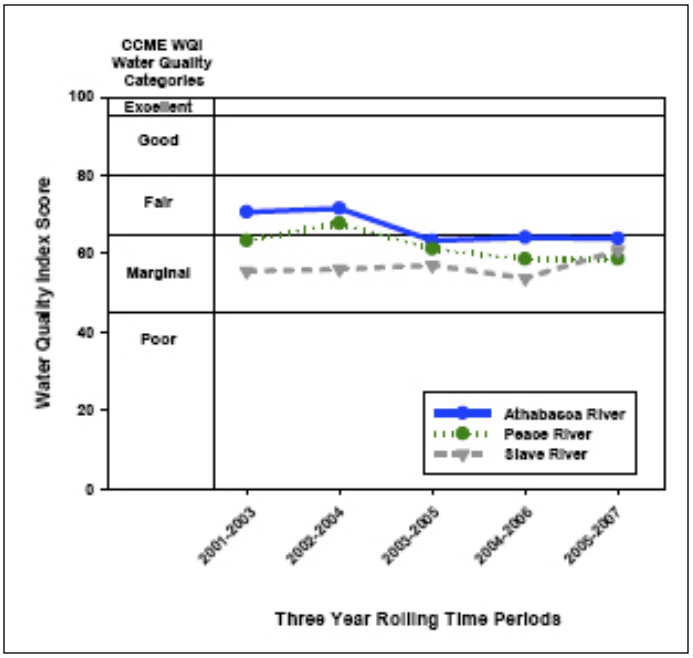


Figure 27. *Canadian Council of Ministers of the Environment Water Quality Indices calculated for three- year rolling time periods from 2001-2007 for the three river stations in Wood Buffalo National Park. Categories of water quality based on the Water Quality Index are from Canadian Council of Ministers of the Environment, 2001.*

4 State of Cultural Resources

4.1 Cultural Resources Context

Archaeological evidence indicates that people have inhabited the area encompassing Wood Buffalo National Park for more than 8,000 years. Immediately before the arrival of Europeans in the early 1700s, the Chipewyan, Slavey and Beaver inhabited the area. Traditional lifestyles revolved around seasonal hunting, fishing, food and resource gathering and the production of tools and equipment that their livelihoods required. Most of the resources that were harvested then are still present in the park. Today, communities in and around the park include the Cree, Chipewyan, Métis and non-Aboriginal people.

The archaeological and cultural resources recorded in the park reflect a variety of human uses and activities by both indigenous and non-indigenous peoples. These range from Aboriginal traditional land use (hunting, fishing, trapping, gathering, trails, campsites, tool-making sites and quarries), fur trade activities (trading posts, salt mines/mounds, travel corridors), economic initiatives such as logging (saw mills, timber berth area, cut blocks, landings and roads) and bison management (corral systems, bombardier trails) and park establishment and development (fire towers, cabins, transportation corridors, roads and trails). Evidence of these vestiges exist in the park and are reflected in the cultural resource inventory.

No comprehensive and systematic inventory of archaeological sites has been undertaken for the park. The existing cultural resource inventory is limited and based on mitigation and impact assessment surveys conducted in relation to development in specific areas of the park. Most of these surveys were conducted in the early 1980s and were focused along the main waterways of the Peace and Slave Rivers.

Recent archaeological mitigation work has incorporated advanced scientific research techniques (protein residue analysis) as well as standard dating techniques (radiocarbon dating) to maximize the understanding of the cultural history. Park staff worked with local First Nations on these projects, which included public archaeology components.

There are no national historic sites in Wood Buffalo National Park and currently no Level 1 cultural resources have been identified. The Jackfish Warden Patrol Cabin is the only building recognized by the Federal Heritage Buildings Review Office. It is one of the remaining original patrol cabins in the park.

Some landscape and landscape features have been identified in the park through various Cultural Resource Management projects. Examples include the documentation and recording of Sweetgrass Station and Hay Camp and their role in the history of bison management in the park. Other possible landscapes and their features have been identified during recent discussions with the Aboriginal groups about human history themes. There are many other landscapes and landscape features that need to be discussed with stakeholders.

Intangible cultural heritage includes oral traditions, social practices and rituals, storytelling, traditional music, dance, craftsmanship and the life stories of people

who lived, worked and traveled in the park. Staff are working with long-time residents and those with a strong knowledge of and connections to the park to better understand these aspects of cultural heritage.

4.2 State of Cultural Resources

The cultural resources in the park include archaeological sites, buildings and structures, landscapes, objects and artifacts, records and intangible cultural heritage.

4.2.1 Archaeological Sites

The database of known archaeological sites includes buildings defined as structures having walls and a roof. For the purposes of this evaluation, they are included in the Buildings and Structures section. In addition, informant-documented and archival-based sites have not been given a rating. This leaves 210 archaeological sites evaluated from the original 383.

The archaeological sites encompass the Pre-contact to Post-contact periods. Overall, there are a wide variety of site types; however, 68 per cent (143) of these sites are cabins, campsites or lithic scatters (stone tools or chipped stone artifacts).

The vulnerability of archaeological sites were recorded at the time of inventory. The sites were rated as highly threatened (2%), threatened (18%), partly threatened (52%) and stable (28%). Condition was evaluated for 71 per cent (150) of these sites. The main source of impact was erosion due to wind, water or slumpage (78%). Other impacts included animal disturbance or vegetation growth (9%); development such as ground levelling, forest clearing, construction of cabins, fire towers, picnic areas and gravel testing (9%) and decay (4%).

Known archaeological sites are limited to a small area within the park. Many of these sites are located along the Peace and Slave Rivers and have been impacted by natural processes such as erosion and slumpage. Many of these sites have not been revisited since they were initially identified 30 years ago and the full extent of these sites is not understood. To date only limited investigation has been conducted and the site size and other details are not known. A systematic inventory for WBNP has not been conducted to provide a cross-section of the types of sites nor the distribution of sites within the park. Indeed, the majority of the park area has not been surveyed. There are geographical areas that have not been visited for archaeological or cultural resource inventory and a monitoring program still needs to be established for the park. The overall condition of archaelogical sites is Not Rated.

NUMBER OF SITES	PERCENTAGE	CONDITION
58 sites	28%	Good
110 sites	52%	Fair
42 sites	20%	Poor
Overall	**100%**	**Not rated**

Table 4. *Summary of archaeological sites rated as good, fair and poor. 210 archaeological sites were rated. Two sites were not rated here but under the Buildings and Structures section. 171 sites were not rated because they are informant or archival-based and have not been verified.*

Figure 28. *Archaeological excavation on the Slave River, August 2007*

There are 61 buildings and structures in Wood Buffalo National Park that are owned by Parks Canada. These can be broken down as 52 buildings (including seven fire tower residences), six fire towers (still standing), two fire lookouts and one set of bison corrals. Of these 61 buildings and structures, 22 (36%) are considered to be cultural resources (have historic value). Six of the 18 buildings and structures associated with the fire management program are considered to have historic value. Of the 16 patrol cabins strategically located throughout the park, seven were rated as having historic value. The remaining buildings are at Sweetgrass (5), Pine Lake and Salt River Day Use Areas (3) and Carlson's Landing (1).

The Jackfish Patrol Cabin is considered the oldest structure in the park. It is a single-storey, gabled-roof log building built by park wardens in 1929. The cabin is the only pre-1950 structure in the park. The next era of existing patrol cabins that are considered to have historic value were built in the 1960s.

Along with patrol cabins, there are many trapper cabins throughout the park. These are not owned by Parks Canada so could not be rated but there are a few historic cabins that stand out as excellent examples. One such cabin is located across from Peace Point on the southern bank of the Peace River. The cabin was built at the time the national park was being formed and has been occupied for an extended amount of time up until very recent years.

Sweetgrass Station dates back to the mid 1950s when a small community was established to support a large bison management and research centre and a slaughterhouse for large-scale round-ups. In 2002, the buildings associated with the Sweetgrass Station were formally evaluated in a workshop format as Level 2 cultural resources. Although many of the original structures were removed, foundations and evidence where previous structures stood are still visible. Three buildings, one metal shed and an extensive corral system still exist.

The park had 20 fire towers located in strategic areas. Six fire towers and two lookouts are still standing in the park with only two towers and two lookouts in active use today. Angus Fire Tower was submitted for consideration under the Federal Heritage Building Review Office policy but was not considered a heritage building. However, the park considers the tower to be a Level 2 resource worth protecting and presenting for its interpretive structure and as a heritage landmark.

Thirty-two per cent of the buildings and structures are rated in poor condition as they are quickly deteriorating and require urgent mitigation or stabilization. Structural decay and deterioration of wooden elements of the early patrol cabins is one example; both the Birch River and Gull River patrol cabins require major repairs to their roofs. Angus Fire Tower was decommissioned along with many other towers because it did not meet current safety standards and could no longer be used for its original design and purpose. The loss of the squeeze chute, a critical component of the Sweetgrass corral system, along with the increasing encroachment of vegetation are also having severe impacts to the resource's condition.

Threats to buildings and structures continue to have an impact on their condition including natural processes such as riverbank erosion and fire, usually caused by lightning strikes. Many cabins that are not accessible by road and not located on the river corridors do not get visited and are threatened due to lack of use and general maintenance.

NUMBER OF SITES	PERCENTAGE	CONDITION
4 sites	18%	Good
12 sites	55%	Fair
7 sites	32%	Poor
Overall	**100%**	**Poor***

Table 5. *Summary of buildings rated as good, fair and poor. 20 buildings and two structures (Sweetgrass corrals and Angus Fire Tower) were rated. Four buildings were not rated and the remaining building were not eligible. *When there are six or more resources of a given type and 15 per cent or more of these are in poor condition, the rating is Poor. Evaluation of Cultural Resources in National Parks, State Of the Park Rating Guide, December 31, 2007.*

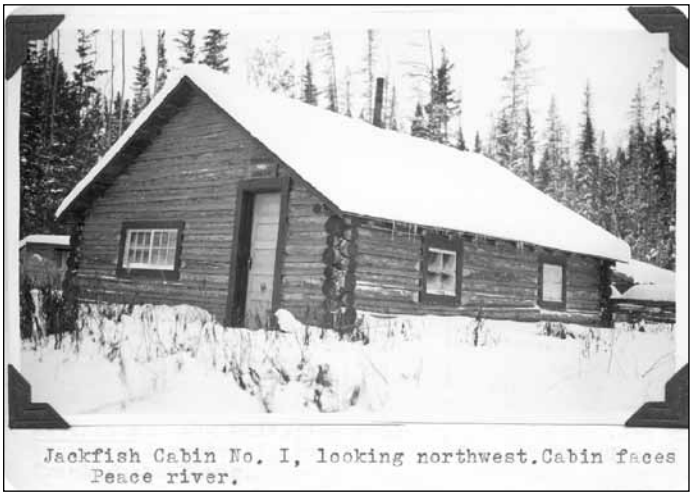


Figure 29. Jackfish Patrol Cabin 1934

Figure 30. Jackfish Patrol Cabin Restoration 2008

4.2.3 Landscapes and Landscape Features

A cultural landscape is a place that encompasses the relationship between people and the physical environment. An Aboriginal cultural landscape is a place that is valued by Aboriginal peoples because of a long and complex relationship with the land (Parks Canada, 2003). Value may be rooted in physical resources such as cabins, but is often based in broader relationships to the land, such as patterns of travel or spiritual significance. Archaeological investigation in Wood Buffalo National Park has revealed more than 8,000 years of Aboriginal use; as a place of value to Aboriginal peoples, the entire park constitutes an Aboriginal cultural landscape.

The park has not yet formally identified landscape features within a Cultural Resource Values Statement framework. For some features, such as trapping trails and sites of former sawmills, more information is needed before they can be adequately assessed. For other features, such as the following two examples, considerable information has been documented:

1. The Peace-Athabasca Delta (4,500-square kilometres) is a landscape with diverse habitats and species. This has given rise to knowledge, practices and beliefs that evolved through multi-generations. For decades, Fort Chipewyan was also the centre of the fur trade in northwestern Canada. Oral history, archaeological surveys, archival resources, as well as scientific tools and techniques, have been used to describe this complex landscape and the cultural values associated with it.

2. The physical layout and history of the former Sweetgrass Bison Management Station in the Peace-Athabasca Delta has been documented through preliminary archaeological investigations and oral histories. Plans are in place to collaborate with the relevant First Nations on additional inventory and assessment of this cultural landscape.

4.2.4 Artifacts/Objects

The Wood Buffalo National Park artifact collection is a small assemblage of 41,262 artifacts and samples (for example, soil, charcoal) recovered from excavations over the past 28 years. Most of the artifacts are from archaeological investigations in the 1980s and date to the Pre-contact Period with a smaller collection of historical objects. The majority of artifacts are housed at the Western and Northern Service Center except for a small collection of archaeological material kept in the park.

The artifact collection was reviewed and upgraded in 2007 to collections management packaging standards. Although the entire collection is inventoried in a paper record, only about half of the collection has been entered into the archaeology database (18,601 artifacts of 41,262). Once updated, this will enable the artifact data to be used to its full potential as electronic retrieval provides immediate accessibility for collections management and research.

During the process of upgrading the database, artifacts are assessed for inclusion in reference collections and for conservation requirements. In 2007, the beginning of a reference collection of 37 artifacts was developed. The artifact reference collection includes examples of stone and bone tools, stone flakes, cores and raw materials identified at a number of archaeological sites. The artifacts represent time periods, site activities and various manufacturing technologies.

The Cultural Resource Management level was not assigned to individual artifacts but the overall condition rating of the collection at Parks Canada's Western and Northern Service Centre is Good.

4.2.5 Intangible Cultural Heritage

Along with the tangible resources found on the land (buildings and archaeological objects), the park is making efforts to document the intangible cultural heritage associated with this vast landscape.

Intangible cultural heritage is defined by the UNESCO Convention in 2003 as a living heritage, the expression and the practices associated with a specific group or community that have been passed down from generation to generation. Intangible cultural heritage includes oral traditions, place names, knowledge and practices concerning the land, storytelling, song and dance and traditional arts and craftsmanship. These are all integral to the indigenous people whose traditional territories fall within the park.

Aspects of intangible cultural heritage can also provide a vivid picture of the stories and activities related to the long history of park management and operations since 1922. Unfortunately, with each passing year, there are fewer elders and those knowledgeable that can actively pass on the skills, observations and experiences related to traveling on the land and in the park. There is a need to record and ensure the transmission of this knowledge for present and future generations.

The park is taking steps to document and preserve this type of information. One example is working cooperatively with a local Aboriginal group to document place names and stories associated with traditional use in the park.

4.2.6 Selected Management Practices

4.2.6.1 Inventory

There are 383 archaeological sites currently documented in Wood Buffalo National Park and only 210 of these will be evaluated as archaeological sites. Most archaeological investigations have been initiated because of proposed development, such as a dam on the Slave River and construction of trapper cabins. As a result, only a small area of the park has been investigated. A plan is being developed to do a multi-year survey in conjunction with Aboriginal communities.

The majority of the sites that have been recorded for Wood Buffalo National Park fall within the Post-contact Period (27%). There are also a large number of documented Pre-contact Period sites (66%), while a small number of sites extend through the Post-contact to Pre-contact Periods (6%). Two sites (1%) were not assigned to a time period because they only contained bone that could not be evaluated to a time period.

Documented site types are varied. Post-contact site types include trading posts, quarries, refuse pits, cairns, caches, hunting blinds, corrals, dams, campsites, kilns, sawmills, settlements, stables, cabins, tent frames and trails. In addition, there are 25 burials and cemeteries. Pre-contact sites include campsites, quarries, lithic (stone and bone tools and stone flakes) scatters, a portage and a number of isolated finds or single artifact recoveries such as stone flakes or projectile points. The site inventory includes a large number of informant-documented and archival-based sites (38%). Many of the burials, cemeteries and cabins are informant-based and their locations have not been confirmed.

INDICATOR	STATE	COMMENT
Landscapes	N/R	Landscapes have not been formally identified within the park. Consultations in conjunction with development of the Cultural Resources Management Strategy will be used to help with the definition of cultural landscapes.
Buildings and structures		There is a loss or deterioration of critical components. Many have collapsed roofs, rotting exterior log walls or foundations, in some cases affecting and accelerating the deterioration of other buidling components.
Archaeologial sites	N/R	Known archaeological sites are limited to a small area within the park. 210 sites were evaluated based on vulnerability and threats recorded at the time of inventory. Resources are not stable and the condition is threatened due to natural processes causing major deterioration to known archaelogical sites. A systematic inventory has not been conducted and the majority of the park has not been surveyed.
Archaeological and historical objects (owned by Parks Canada)		The archaelogical collection of 41,262 arifacts is housed at the Western Northern Service Centre and is well maintained. The records associated with the collections are maintained according to archival standards. Older records have been updated.
Intangible heritage	N/R	The park is taking steps to document and preserve this type of information in cooperation with the local Aboriginal communities. It is difficult to put a limit on the amount of information that can be collected. The park does not have a formal process in place to collect this information. Consultations with the communities required to identify the type of information to be collected, how it will be collected and incorporated into park programming.
Overall	N/R	

***Table 6**. Resource condition indicators for cultural resources in Wood Buffalo National Park*

K´átł'odeeche Community Gathering at Buffalo Lake – Northwest Territories Protected Areas Strategy

Since time immemorial, the Buffalo Lake area has been a significant traditional land-use area for the K´átł'odeeche First Nation. The community is interested in preserving this culturally and ecologically rich area.

A community gathering took place on Buffalo Lake from August 16th -20th, 2007. Throughout the five-day gathering, Aboriginal Traditional Knowledge information was captured through interviews and talking circles with elders and harvesters. Day trips were taken by boat to document cultural sites around the lake and on various rivers. Parks Canada provided professional and technical support to research and document these areas.

This project has provided a unique opportunity for park staff to spend time with the elders and community members of K´átł'odeeche First Nation and to discuss the conservation of cultural resources that are important to them. This information will help guide future Cultural Resource Management inventory plans in this area.

Beginning in 1992, a Cultural Resource Management database was established for the park. The Western and Northern Service Centre maintains this database where original field records, slides, photographs, digital images, maps, reports and artifact collections are held. The artifacts are curated with provenience and descriptive information and recorded in a collections database. The collections and Cultural Resource Management databases are used to produce a Cultural Resource Inventory binder and updates. This inventory summarizes basic site information, resource descriptions, site conditions, history of investigations and 1:50,000 National Topographic System map sheets with site location. The binders are housed at the Western and Northern Service Centre and Southwest Northwest Territories Field Unit.

The Wood Buffalo National Park Values at Risk database is a comprehensive, ranked list of known values (refer to 4.2.9 Monitoring Program). The Values at Risk includes but is not limited to buildings, structures, gravesites and spiritual sites. The database is an excellent record that is maintained and updated on a regular basis, especially during the fire season. Park staff use this database, along with the Cultural Resource Inventory database, to verify locations.

There are a number of cultural landscapes that have been identified, described and assessed through other processes, though not formally inventoried and assessed as cultural landscapes. For example, field and service centre staff, along with a contractor, held a community workshop with three Aboriginal groups in Fort Chipewyan to identify the cultural values of the Sweetgrass area.

Figure 31. *Birch River Patrol Cabin 2006*

Figure 32. *Isidore Lake Patrol Cabin 2005*

4.2.6.2 Evaluation

The park does not yet have a Cultural Resource Values Statement. The purpose of the values statement is to formally identify the heritage values of the cultural resources in terms of physical and associative values (for example, human history themes) developed for Wood Buffalo National Park.

Steps are underway to develop human history themes for the park. This will help identify and evaluate buildings and structures, landscapes and landscape features, archaeological sites and historical and archaeological objects.

The park has submitted five buildings to the Federal Heritage Building Review Office for evaluation: the Jackfish Warden Patrol Cabin, Sweetgrass buildings (3) and the Angus Fire Tower. The Jackfish Warden Patrol Cabin is the only building in the park that has been given recognition by the Review Office as having federal heritage value. However, the buildings at Sweetgrass Station were evaluated for historic value in a community workshop held in 2002 at Fort Chipewyan. This process determined that the buildings are considered to have historic value together with the corrals and any remaining features at the site. Participants at the workshop identified the need to preserve and document the physical remains of the corrals, buildings and remnants of foundations, walkways and other features. Also stressed was the importance of maintaining the present buildings and interpreting the site so that future generations can continue to understand the history of this place.

There are 14 buildings owned by park that are currently 40 years or older and may have historic value. These include different construction styles and types of cabins (such as shelters and patrol cabins) and buildings related to bison and fire management. These have been designated by the park to be submitted to the Federal Heritage Buildings Review Office. Some buildings constructed after 1970 were considered for their heritage value because of their unique qualities.

As described in the inventory section, although cultural landscapes have not yet been assessed in the Cultural Resource Value Statement framework, they have been assessed under different frameworks. For example, guided by the Cultural Resource Management Policy, a community workshop was held to assess the state of cultural landscapes, such as Sweetgrass. This information will be incorporated into the Cultural Resource Value Statement framework. In addition, the resource conservation function has for decades been documenting the impact on harvesting activities of ecological change in the delta.

4.2.6.3 Cultural Resource Management Strategy

A draft Cultural Resource Management Strategy is in place that identifies a field unit approach. Wood Buffalo National Park and Nahanni National Park Reserve are included in this broader strategy. This strategy ensures a multi-disciplinary approach to cultural resource management and was drafted in 1999. It has been updated to reflect the on-going activities in both the national parks and national historic sites in the field unit.

Cultural Resource Management priorities identified in the strategy include updating the inventory of cultural resources. This will enhance our understanding of the cultural history of the park, identify gaps and help in the development of a thematic framework.

Wood Buffalo National Park is focusing on two main areas of the strategy that require further development. They include human history themes to evaluate cultural resources and an approach for public engagement with the 11 Chipewyan, Cree, Dene and Métis associated with the park and other stakeholders. The park has developed a plan and timeline for the engagement and involvement of the Aboriginal peoples around the park. This will contribute to building a vision for the management and presentation of the cultural resources while fostering stronger relationships.

4.2.6.4 Monitoring Program

A formal monitoring program has not yet been developed for the park. Over the course of their daily activities, park staff have been systematically visiting unverified sites and threatened sites over the past three years. This information has been used to update the existing Cultural Resource Management database.

In 1995, a photo collection was developed of the natural and cultural resources in the park. The photo collection was replaced by a Values at Risk database that was updated in 2002 and again in 2006 as part of the Wood Buffalo National Park fire management program and it incorporates digital photos. The database has information about each resource including: GPS location, age, description, basic condition assessment and assigned value, owner, contact information and current photos. A challenge for the park has been to develop a way to better link the Values at Risk database with the Cultural Resource Management database.

INDICATOR	STATE	COMMENT
Inventory		While a strategic inventory for archaeological sites is well advanced, there is a lack of archaeological investigation in the vast majority of the park. The inventory for buildings and structures and objects is almost complete. Inventory for landscapes and landscape features are incomplete.
Evaluation		No Cultural Resource Values Statement is in place. Workshops are underway to identify sites/places/resources in the park that are important to Aboriginal Peoples and to develop human history themes.
CRM Strategy		Draft Cultural Resource Management Strategy in place but not yet approved. Strategy needs to be updated to reflect the results of the workshop process for public engagement and human history themes.
Monitoring		There is no formal monitoring in place. Verifying and monitoring sites happens on an opportunistic basis when staff are traveling in the park.
Overall		

***Table 7**. Selected Management Practices for cultural resources in Wood Buffalo National Park*

5 State of Visitor Experience

5.1 Visitor Experience Context

Surveys have shown that visitors come to Wood Buffalo National Park to experience the wildlife and scenery of the Northern Boreal Plains and to learn about nature and the environment. Key attractions in the park include free-roaming bison and other animals of the boreal forest, unique salt plains, sinkholes and other karst features, a garter snake hibernaculum (hibernating area), the beautiful aquamarine waters of Pine Lake and the Peace-Athabasca Delta, one of the largest inland freshwater deltas in the world.

Road travelers get to the park via Northwest Territories Highway 5, an all-weather road that has some unpaved sections of hard-packed gravel. They pass through the northern end of the park before arriving in Fort Smith. The nearest regional centre is Hay River, Northwest Territories, a 260-kilometre drive from Fort Smith. The nearest large urban centres are Edmonton, Alberta, 1,475 kilometres south of Fort Smith, or Yellowknife, Northwest Territories, a 750-kilometre drive north of Fort Smith. Although commercial air service is available from Edmonton or Yellowknife, surveys show that 95 per cent of visitors to the Fort Smith Visitor Reception Centre arrive by road.

Access to the Peace-Athabasca Delta is via water from Fort Chipewyan, Alberta. Fort Chipewyan is a remote, isolated community. Scheduled air service is available year-round from Fort McMurray, Alberta and air charters are available from Fort Smith. A winter ice road corridor connects Fort McMurray, Fort Chipewyan, and Fort Smith, providing winter access to the park. The winter road is usually open from mid-December to mid-March. In summer, boaters from Fort McMurray arrive on the Athabasca River, and then continue farther north on the Peace and Slave rivers.

5.1.1 Visitor Segments

Park users can be grouped into the following key segments: Touring public, wilderness adventurers, local and regional residents, happenstance visitors and traditional users.

5.1.1.1 Touring Public

The touring public segment refers to visitors who include Fort Smith and Wood Buffalo National Park on their travel itineraries. These visitors generally arrive in Fort Smith by road. They spend time at the Visitor Reception Centre viewing the exhibits, and multi-media presentations and talking with visitor information staff. These visitors are interested in experiencing frontcountry attractions and activities. June to September is the peak visitor season for this segment.

Regional residents touring and visiting with friends and relatives represent a sub-group of this segment. Another sub-group consists of winter road travelers (excluding local and regional residents) who are accessing or

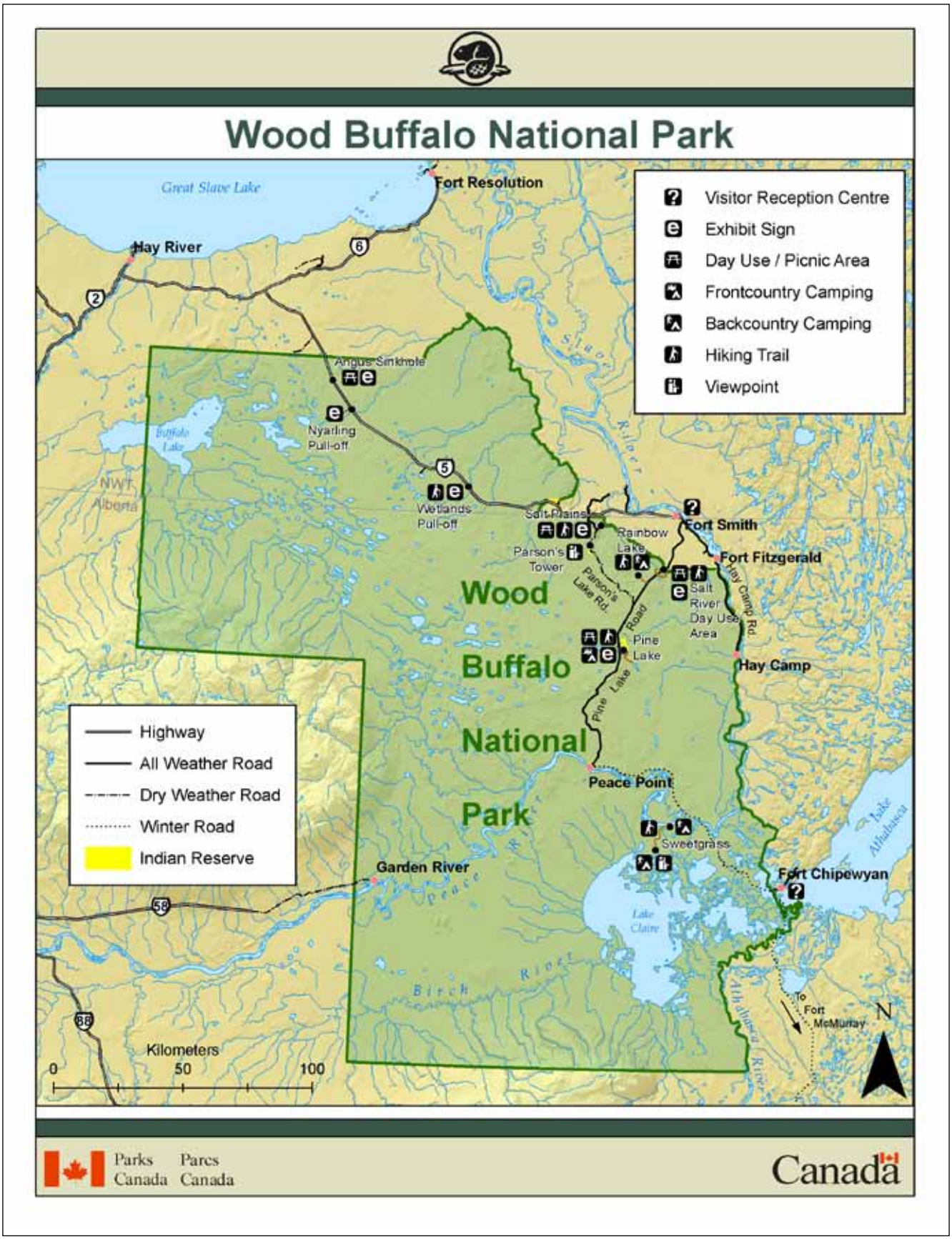


Figure 33. *Map of Wood Buffalo National Park showing Visitor Experience facilities.*

passing through the park via the winter road. These visits occur during the three-month period between December and March and often include visits to the Fort Chipewyan or Fort Smith Visitor Reception Centres.

5.1.1.2 Wilderness Adventurers

These visitors enjoy pitting their personal wilderness travel and survival skills against the challenges of traveling in remote and rugged terrain. Most are canoeists on extended trips along the major rivers of the region. Some enter the park from the west on the Peace River. Others skirt along the park boundary from the south via the Athabasca River and continue north along the Slave River. For many of these river travelers, visiting the park is not a destination but it is along their route. A small number will make side trips into the Peace-– Athabasca Delta. May to September is the peak season for wilderness canoeists.

Other wilderness adventurers include backcountry hikers, non-local boaters, wilderness skiers and winter campers.

In recent years the winter road has attracted a niche group of extreme wilderness adventurers such as mountain bikers, motorcyclists, snowmobilers and users of all-terrain vehicles. These groups are traveling on the winter road in organized long-distance rallies for recreational challenge and in some cases as part of charitable fund-raising events.

5.1.1.3 Local and Regional Residents

This segment includes residents of Fort Smith, Fort Resolution, and Hay River, Northwest Territories and Fort Fitzgerald, Fort Chipewyan, and Fort McMurray, Alberta. With the exception of Hay River and Fort McMurray, the communities listed above are small and predominantly Aboriginal. Hay River is a larger regional centre with a population of 3,648 (2006 Statistics Canada Census), of which 44 per cent are Aboriginal peoples. Fort McMurray, with a population of 65,400 (2007 Regional Municipality of Wood Buffalo Census), is a growing urban centre with a strong multi-cultural component.

Residents of Fort Smith, Fort Fitzgerald, Hay River, and Fort Resolution can access the park by all-weather road year-round. Residents of Fort Chipewyan access the park via waterways or the winter road. Residents of Fort McMurray can access the park via the Athabasca River, the winter road, or by driving around the park to the northern entrance on the all-weather road, a distance of 1,554 kilometres.

There are strong family ties among the surrounding communities and so access issues are important to this visitor segment. Local and regional residents are repeat users of the park both for practical purposes (travel between communities) and for recreation and enjoyment.

5.1.1.4 Happenstance Visitors

This segment is generally in a community for business and will visit the Visitor Recreation Centres but is not able to spend time in the park due to transportation and/or time issues.

5.1.1.5 Traditional Users

Traditional (Aboriginal peoples) users hunt, trap, fish and pick berries among other activities. They access the park by road, boat, all-terrain vehicle, or snowmobile. Aboriginal residents of Garden River, Jean D'Or, and Fox Lake are included in this segment.

Some traditional users have cabins in the park and requests for cabin building are increasing. The Values at Risk database (2006) lists 53 cabins in good to fair condition and 12 cabins in poor condition.

5.1.2 Visitation Trends

Visitation has been stable at about 1,000 to 1,100 visitors a year over the last four years. The average visitation at the Visitor Reception Centres was 1,093 to the Fort Smith centre and 157 to the Fort Chipewyan centre. These figures exclude visits by those who bypass the Visitor Reception Centres, primarily regional residents who are visiting for recreation and/or travel between communities and traditional users. While there is no method in place to track regional resident use, it is estimated that actual visitation is in the range of 2,500 to 3,800 visitors annually.

Based on Visitor Reception Centre records from 2004-2008, 81 per cent of park visitors are from Canada, 11 per cent are international visitors and seven per cent are from the United States, with one per cent unknown. Of the Canadian visitors, 66 per cent are from either Alberta (30%) or the Northwest Territories (36%).

The 60th Parallel Visitor Information Centre is on the main highway access point to this region at the Alberta/ Northwest Territories border. Over the past three years the numbers at this centre have fluctuated between

8,000 and 11,000 visitors. Yellowknife is consistently the main attraction for these visitors. Some visitors at the 60th Parallel are drawn through the Dehcho Loop to northern British Columbia, which was a promoted tour experience in 2008.

5.1.2.2 006 Government of the Northwest Territories Exit Survey

Parks Canada partnered with the Government of the Northwest Territories on a 2006 Visitor Exit Survey designed to obtain baseline information on visitor numbers and visitation characteristics. Three Parks Canada questions were included on the survey.
The 2006 exit survey shows that Wood Buffalo National Park attracts about three per cent of all visitors to the Northwest Territories. The general touring segment is the single largest group of visitors to the South Slave Region, with 59 per cent of them visiting the park. Of the visitors to the South Slave, 23 per cent of the visiting friends and relatives, six per cent of the outdoor adventures, eight per cent of the fishers and four per cent of the business travelers segments visited the park. These figures suggest that the general touring and visiting friends and relatives segments would be the key markets for increasing visitation to Wood Buffalo National Park.

The park attracted a greater proportion of first-time visitors than the South Slave Region as a whole. It also attracted most of the international visitors who came to the South Slave Region. The preliminary survey results suggest that most visitors to Wood Buffalo National Park had included the park on their travel itinerary. Also of note, the park does not seem to be attracting visitors who come to the Northwest Territories for other reasons.

5.1.2.3 Northern Alberta Tourism Market

According to a 2004 Travel Alberta report (based on 2002 Statistics Canada data), the Alberta North region received only seven per cent of total visits to Alberta. Canadians made 96 per cent of these visits, with 77 per cent from Alberta, and 17 per cent from British Columbia. From those visitors to Alberta North who stayed at least one night, 33 per cent were from the visiting friends and relatives segment, 33 per cent were traveling for pleasure, 24 per cent were traveling for business and 12 per cent for other reasons.

The Travel Alberta survey points to a limited target market of road travelers to the South Slave Region and Wood Buffalo National Park, mainly due to its remote location. The most common feedback received from personal contacts at trade shows is that the park is "too far away." Recreational vehicle travelers at trade shows have also indicated that the gravel roads in the South Slave Region are a deterrent.

	VISITOR INFORMATION CENTRES	TOTAL VISITORS RECORDED 2003
NWT	WBNP (Fort Smith)	887*
	Fort Smith	359
	Hay River	371
	60th Parallel	8,643
	Yellowknife	6,970
Alberta	WBNP (Fort Chipewyan)	123*
	Fort MacMurray	9,303
	Garden River	Not available**
	High Level	2,400

***Table 7**. Comparison of community visitor numbers in the Wood Buffalo National Park area in 2008.*
**Wood Buffalo National Park statistics show visitors to the Visitor Reception Centres.*
*** Garden River is the southwest road and river access point. There are no park staff or community visitor reception facilities in the community.*

5.1.3 Frontcountry Facilities

Frontcountry facilities in the park include roads, Visitor Reception Centres, campground, Day Use Areas and trails (45km in total). Apart from the Visitor Reception Centres, frontcountry facilities within the park are not staffed. Maintenance is a challenge due to limited staff resources and much of the infrastructure is aging and deteriorating. The park lacks a dedicated trail crew for regular and ongoing trail maintenance. This has, on occasion, resulted in concerns regarding visitor saftely on the trails due to issues such as a lack of signage and trail overgrowth. However, a trail crew was hired for the first time in the summer of 2008 to improve the trails.

5.1.3.1 Visitor Reception Centres

Wood Buffalo National Park has two Visitor Reception Centres located outside the park – a large centre at the park headquarters in Fort Smith, Northwest Territories and a smaller one in Fort Chipewyan, Alberta. Both are open year-round with expanded hours during the peak visitor season from May to September. Visitor Centres are fully serviced and accessible, providing information and orientation, backcountry registration, interpretive exhibits and audiovisual presentations.

5.1.3.2 Roads

The parks 350-kilometres of roads play an integral part of visitor experiences in Wood Buffalo National Park. None of the roads in the park are paved or chip-sealed. The condition of the roads is a deterrent for some visitors, especially those traveling with recreational vehicles. Discussions have been ongoing for several years between the Government of the Northwest Territories and Parks Canada about chip-sealing Highway 5.

5.1.3.3 Highway 5

Frontcountry facilities along Highway 5 include Angus Sinkhole Day Use Area (picnic area, playground, interpretive signs and overview of the sinkhole), Nyarling Pull-off (interpretive signs and outhouse), Wetlands Pull-off and Interpretive Trail (interpretive signs and trail) and Salt Plains Day Use Area (picnic area, interpretive signs and trail).

5.1.3.4 Pine Lake Road and Parson's Lake Road

Frontcountry facilities along Pine Lake Road and Parson's Lake Road include: Salt River Day Use Area, Salt River Trail System (18.55 km), Rainbow Lake Trail (13 km), Pine Lake Campground and Recreation Area, Lakeside Trail (6.4 km), Lane Lake Trail (13 km) and Kettle Point Group Camp.

The Pine Lake Recreation Area is a popular destination for Fort Smith residents. It includes a 17-site frontcountry campground, swimming beach, day use area, trails, group camp and 16 private cottages. Visitor statistics have not been collected for these areas, making it difficult to report accurately on the number of visitors.

The Pine Lake Campground was used by an average of 131 campers per year between 2004 and 2008. Actual use is believed to be higher but it is difficult to track at a self-registration kiosk. Compliance has improved with personal staff contact. Statistics show 50 per cent of visitors were Northwest Territories residents, 17 per cent Albertans, 13 per cent other Canadians, nine per cent Americans and 11 per cent international visitors.

The 2008 Visitor Experience Assessment indicated that the lack of regular staff presence and the campground's location, far from the lakeshore and in the buggy forest, reduces the quality of visitor experience. Recent improvements at the campground, such as the provision of drinking water, firewood and better brushing of the campsites have resulted in positive feedback.

The Kettle Point Group Camp consists of a large shelter, outhouse, playground, picnic tables, fire pit and beach. It is available by reservation and is used mainly by residents and organizations based in Fort Smith. From 2004 to 2008, Kettle Point was used by an average of 143 people annually, with an annual average of 372-visitor-nights. This facility is well-used on weekends but is under-used on weekdays and during the shoulder seasons.

5.1.3.5 Hay Camp Road

Hay Camp Road provides access to a boat launch on the west side of the Slave River. Primarily local and regional residents use it as a jump-off or pick-up point for river trips on the Slave River for recreation, traditional use or travel between communities.

At one time, the Hay Camp Road was a loop road, connected with Carlson's and Pine Lake Road to provide a road touring opportunity from Fort Smith. It was decommissioned in the early 1990s because of budget restraints. The decision was made without consulting the local communities and proved to be very unpopular with local residents.

5.1.4 Backcountry Facilities

There are two backcountry facilities that include three backcountry campsites and one backcountry trail (12 km total). They are currently under-used.

5.1.4.1 North of the Peace River – Rainbow Lake

The Rainbow Lake backcountry campsite is at the end of a six-kilometre hike from Pine Lake Road. This facility is not well used. Only four park-use permits were issued for overnight stays at Rainbow Lake from 2004 to 2008. The deteriorated campsite was repaired and improved in 2007. At one time it was located at the mid-point of a longer trail that allowed for a multi-day hike. The extended portion of the trail was closed a number of years ago due to public safety concerns because of unstable karst. There have been ongoing discussions about redeveloping this trail.

5.1.4.2 South of the Peace River – Sweetgrass

Sweetgrass Landing on the Peace River and another campsite 12 kilometres inland from Sweetgrass Landing

are basic backcountry campsites. The infrastructure at both of these locations is badly deteriorated and in need of work.

Sweetgrass was historically and is potentially one of the park's premier adventure destinations for both independent wilderness travelers and as a destination for guided eco-tours. Remote canoeing and hiking access and a unique combination of vast meadows formed by the delta, historical bison corrals and opportunities for wildlife viewing are available here. There are no outfitters licensed to guide in this area of the park. The lack of local and regional tourism operators may be due partly to the cumbersome licensing process and the Parks Canada Agency's requirement for insurance coverage. Sweetgrass represents an underdeveloped and under-used opportunity in Wood Buffalo National Park.

5.1.5 Recreation Trends

The 2000 Visitor Information Program survey indicated that day hikes, at 63 per cent of respondents were the most popular recreational activity. Picnicking at 31 per cent and camping at 28 per cent were also popular. In 2008, the Visitor Information Centre survey indicated that 86 per cent of respondents engaged in wildlife viewing, photography and driving/sightseeing. Additional research is needed to determine visitor numbers for recreational use of the park by local and regional residents and traditional users.

Facilities most used by local and regional residents include roads, boat launches, day use areas, Pine Lake Campground and Recreation Area and hiking trails.

5.1.6 Trail Use

Trail counters were installed on frontcountry trails in 2007. Results indicate that 2,102 visitors used trails that year and that the Salt Plains Trail and the Karstland Loop are the most popular trails in the park.

The lack of a dedicated trail crew for regular maintenance has reduced the quality of existing trails and has limited efforts to develop new trail experiences.

TRAIL	DISTANCE	TOTAL USE (2007)
Salt Plains Access	500 m	886
Karstaland Interpretive Trail	750 m	436
Grosbeak Lake	N/A	290
Salt River Meadows Loop	1.3 km	223
North Loop	7.5 km	228
South Loop	9 km	N/A (errors in data)
Lane Lake	13 m	40

***Table 9**. Trail Counter Data, 2007*

5.1.7 Backcountry Use

Most of Wood Buffalo National Park is remote backcountry wilderness. Park use permits are mandatory for overnight stays in the backcountry. Sixty-one per cent of park use permits issued between 2004 and 2008 were for multi-day wilderness canoe trips along the major rivers.

Twenty-eight per cent of the park permit users were hiking, 6.5 per cent backcountry skiing and four per cent boating. Backcountry registration records show an average of 23 people per year on overnight stays averaging 67.8 visitor nights per year between 2004 and 2008. Backcountry users stay for an average of 2.9 nights.

5.1.8 Special Events

The annual Parks Day Pine Lake Picnic is a popular event drawing an annual average of 300 mostly local visitors. The event is well supported by the community. Most of the food, prizes, advertising and money required to make this event a success are donated by local businesses and organizations.

A cross-country ski loppet was presented at Pine Lake (in partnership with the Fort Smith Ski Club) in 2007 and 2008. The purpose was to promote winter recreation and build positive relationships with the local community. Positive feedback was received from the almost 30 skiers that participated each year.

5.1.9 Interpretation

Interpretive programming is offered both at the Visitor Reception Centres and in the park as requested. The main users of interpretive programs are local school and community organizations.

In the summer of 2008, staff tested various types of scheduled interpretive events. Community response was enthusiastic but attendance was low. Further testing of program types and marketing methods is required. Between 2004 and October of 2008, an average of 988 people have participated in interpretive programs each year.

Non-personal interpretive exhibits and signs can be found at the Visitor Reception Centres, at roadside pull-offs and at key frontcountry attractions. The most popular interpretive trail is the 750-metre Karstland Interpretive Trail at the Salt River Day Use Area near a garter snake hibernaculum. A trail counter installed here in 2007 counted 604 visits over 15 days during the snake-mating season. Staff provide on-site monitoring and interpretation on weekends during the mating period.

5.1.10 Partnering

Wood Buffalo National Park has partnered with the Government of the Northwest Territories Department of Industry, Tourism and Investment to develop and enhance visitor facilities along Highway 5, such as the Wetlands Interpretive pull-off and a welcome pull-off at the west entrance. The park has worked and partnered with Travel Alberta, Fort Smith Tourism Advisory Board, Fort McMurray Visitors Bureau, and Northwest Territories Tourism on regional, provincial and territorial marketing initiatives.

Building and promoting successful partnerships has been challenging because surrounding communities are small and remote with limited services. Resource harvesting such as oilsands mining to the south, diamond mining to the north and hydroelectric development and commercial logging have been the commercial focus of the region. The tourism trade consists of hotels and restaurants focussed on transient workers and business travelers and small, independent tourism outfitters.

The opportunities provided by tourism have yet to be fully embraced by communities. Investment in the required infrastructure from the private sector has yet to be realised. The park is seeking to work with the communities to identify private sector groups that will develop and improve the tourism industry.

5.2 State of Visitor Experience

5.2.1 Personal Connection

Measure - Visitors feel a sense of personal connection to the park.
Targets - Visitors consider the place meaningful to them.

The 2000 Visitor Information Program survey indicated 92 per cent of respondents (largely from away) were satisfied with their overall experience and 68 per cent of respondents were very satisfied. The 2008 Visitor Information Program survey shows 96 per cent agreed the park was more meaningful to them after their visit and 84 per cent agreed that they had learned something about what contributes to ecological integrity.

Local and regional residents and traditional users are regular repeat users. The park has been a traditional landscape for Aboriginal peoples of the region for generations and many local and regional residents have strong personal connections through living and/or working in the park.

A small number of regional residents have strong connections to Wood Buffalo National Park through their Pine Lake cabin leases or trapper cabins, some of which have been in the same family for multiple generations.

Wood Buffalo National Park has multiple uncontrolled access points by road and water resulting in inaccurate methodology for determining visitor use and satisfaction for the local and regional resident and traditional user segments.

5.2.2 Marketing and Promotion

Measure – Canadians visit Wood Buffalo National Park.
Targets – Increase the number of visits to Wood Buffalo National Park annually.

Park visitation has been stable at 1,000 to 1,100 visits a year over the last five years. Over the last decade there has been a slight increase in Canadian visitation and a significant decrease in American visitation. International visitation has remained stable at 10 to 12 per cent.

The 2000 and 2008 Visitor Information Program surveys suggest that the strongest motive for coming to the park is to view wildlife. Table 11 summarizes the key motives based on the 2000 Visitor Information Program survey. Updated results from the 2008 Visitor Information Program survey will be available later.

5.2.2.1 Current Marketing and Promotion

Promotion of Wood Buffalo National Park is limited by both internal budget restrictions and a low number of interested private sector partners.

Current marketing efforts rely heavily on government-to-government partnerships, in-kind support and industry cooperation. Regional private businesses are small operations and often look to the park to fund marketing efforts. In this environment of limited resources, the park has worked hard to build relationships and take advantage of opportunities as they arise.

Wood Buffalo National Park participates in regional, provincial and territorial marketing initiatives – both in tourism publications and online. The park is promoted in the Northwest Territories Explorer's Guide, Travel Alberta and Alberta North publications (including an Aboriginal tourism brochure for the province), and the Fort McMurray Visitors' Guide. Travel Alberta, Northwest Territories Tourism, Industry, Tourism and Investment and the Town of Fort Smith all promote the park on their websites. The park also participates in local marketing initiatives, such as those from the Fort Smith Tourism Advisory Board and local First Nations.

Planning publications are distributed to regional Visitor Information Centres. The park has a trip-planning section on the website and has recently developed an interactive web map.

Wood Buffalo National Park participated in trade shows in partnership with tourism stakeholders and partners in the past. In recent years, however, the park has participated in fewer trade shows due to fiscal restraints.

Wood Buffalo National Park has benefited greatly over the years from promotion by filmmakers, magazine writers and the media. It has been featured in the Great Canadian Parks series, CG Kids, a Japanese television documentary on World Heritage Sites, BBC productions and others. Wood Buffalo National Park has also been featured in many travel articles such as in Up Here magazine, the Alberta Motor Association's West World magazine, Edmonton Journal, Edmonton Sun, Calgary Herald and Calgary Sun among many others.

While marketing has fostered positive relationships within a diverse small-business tourism industry and has helped to maintain visitor numbers, it has not served to increase visitor numbers. The park lacks a marketing strategy.

VISITORS	2000 VIP SURVEY	2008 GNWT EXIT SURVEY	2004-2008 VRC RECORDS
% Canadian	71%	78%	81%
% American	19%	10%	7%
% International	10%	12%*	11%

***Table 10**. Wood Buffalo National Park Visitation Trends by Origin. *6% Germany, 6% Switzerland. Total visitation (including visitors who bypass the Visitor Reception Centres) is estimated to be 2,500 to 3,800 visitors annually. The park is developing methods to more accurately count total visitation.*

	AGREE	STRONGLY AGREE	TOTAL
View wildlife	13%	83%	96%
View scenery	19%	70%	89%
Experience wilderness	24%	63%	87%
Learn about nature & the environment	22%	57%	79%
Be in a quiet peaceful setting	17%	56%	73%
Learn about local culture and history	33%	39%	72%
TaKe part in an out-door activity or hobby	16%	43%	59%

***Table 11**. Visitor Motives for Visitor Reception Centre visitors who come to Wood Buffalo National Park.*

5.2.3 Interpretation

Measure - Visitors to Wood Buffalo National Park learn from their experience and participate actively.
Targets - A majority of participants in learning activities feel they learned something about the park's ecological integrity.

The 2008 Visitor Reception Centre Survey found that 79 per cent of reception centre visitors participated in a learning activity and visitors were satisfied with the learning activities at the park.

An average of 988 people participate in personal interpretive programs (offered on a request basis) each year. No formal studies have been conducted to measure knowledge retention; however, informal feedback suggests a satisfactory level of learning.

The 2008 Visitor Information Program survey results show only 40 per cent of Visitor Reception Centre visitors participated in a staff-led learning activity and only 16 per cent took part in a guided tour. Possible reasons might include a lack of availability of programs, a lack of interest in those specific activities, and/or a lack of time.

The 2006 Visitor Experience Assessment and the 2008 Community Questionnaire suggest that repeat users would like more interpretive programs, such as Pine Lake Theatre programs, guided hikes and buffalo creeps.

The 2006 Visitor Experience Assessment indicated that the park is continuing to do well in the area of non-personal interpretation. A significant number of new interpretive signs have been developed since the 2000 Visitor Information Program survey. Staff have also received positive feedback on the Wood Buffalo Tales visitor publication.

Table 12 summarizes satisfaction ratings from the 2000 Visitor Information Program survey for elements related to interpretation.

The park lacks an interpretive strategy or plan.

	GOOD	VERY GOOD	% SATISFIED (TOTAL)
Displays and exhibits	15%	83%	98%
Side or video programs	11%	88%	99%
Staff-led activities	22%	75%	97%
Guided tours	18%	76%	94%
Size and layout of visitor reception area	30%	57%	87%
Overall visit as an educational experience	**25%**	**68%**	**93%**

Table 12. *Satisfaction ratings (per cent of question respondents; 2000 Visitor Information Program survey)*

5.2.4 Activities and Services

Measure - Visitors to Wood Buffalo National Park enjoyed their visit.
Targets - Eighty-five per cent of visitors to Wood Buffalo National Park enjoyed their visit.

The 2008 Visitor Information Program survey shows that on the whole, most visitors (92%) enjoyed their visit to the park and many (67%) enjoyed their visit a lot.

The following table summarizes satisfaction ratings from the 2000 Visitor Information Program survey for elements related to the quality of service provided by staff. Updated results from the 2008 Visitor Information Program survey will be available at a later date.

The availability of park information before a visit was flagged as an area needing attention in the 2008 Visitor Information Program survey.

Satisfaction results from the 2000 Visitor Information Program survey related to recreation are summarized in the table below. Updated results from the 2008 Visitor Information Program survey will be available at a later date.

	GOOD	VERY GOOD	% SATISFIED (TOTAL)
Staff availability	18%	75%	93%
Staff friendliness and courtesy	7%	91%	98%
Staff helpfulness	8%	90%	98%
Usefulness of information about park activities	35%	56%	91%
Usefulness of information about safety precautions	28%	64%	92%
Usefulness of information about trails	28%	54%	82%
Usefulness of information about campgrounds	40%	43%	83%

Table 13. *Satisfaction ratings (per cent of question respondents; 2000 Visitor Information survey)*

The park is below the national average rating of 92 per cent for satisfaction of the overall visit as a recreational experience, however only 59 per cent of Visitor Reception Centre visitors indicated outdoor activities as a motive for visiting.

The primary recreational users are the local and regional residents and traditional users and their satisfaction ratings were not captured in the 2000 Visitor Information Program survey.

The 2006 Visitor Experience Assessment and the 2008 Community Questionnaire indicate repeat users would like significant improvements made to recreation infrastructure. They would like the Hay Camp Loop Road re-opened for road touring, improvements to existing trails and the development of new trails for hiking and mountain biking. They also want improvements made to the Pine Lake Campground; relocation of campsites to the lakeshore, electrical hook-ups and showers. Some recent improvements, including brushing and re-signing of trails and clearing overgrowth at the campground resulted in positive feedback from local residents.

Table 15 summarizes satisfaction ratings from the 2000 Visitor Information Program survey for elements related to activities and services:

	GOOD	VERY GOOD	% SATISFIED (TOTAL)
Overall visit as a recrecational expereince	24%	58%	82%

Table 14. *Satisfaction ratings (per cent of question respondents; 2000 Visitor Information Program survey)*

	GOOD	VERY GOOD	% SATISFIED (TOTAL)
Directional signs to the visitor reception centre	20%	41%	61%
Parking lot (visitor reception centre)	24%	35%	59%
Gift shop	32%	42%	74%
Availability of washrooms	22%	61%	83%
Cleanliness of washrooms	20%	77%	97%
Size & layout of visitor reception centre	30%	67%	87%
Cleanliness of grounds	20%	71%	91%

Table 15. *Satisfaction ratings (% of question respondents; 2000 Visitor Information Program survey)*

6 Public Outreach Education

6.1 Public Outreach Education Context

Outreach education plays an important role in promoting public awareness, appreciation and understanding of Wood Buffalo National Park and the Parks Canada mandate. The park's outreach initiatives are targeted to a variety of audiences with a long-term goal of increased stewardship, engagement and public support and that Canadians appreciate the significance of heritage places administered by Parks Canada and understand the importance of protecting and presenting them. Key target audiences include schoolchildren/youth, local and regional residents, educators and Canadians at large.

It should be noted that there are some areas of overlap between target audience categories. For example, some local and regional residents and other Canadians (including new Canadians) may be reached through outreach initiatives targeted to their children either at school or through other venues.

Wood Buffalo National Park covers Program Activity 3 (external relations) and Program Activity 4 (visitor experience) responsibilities with four staff spread over two communities. This has translated into an almost singular focus on the visitor services in the park for six months of the year around the summer months. In the winter season, the staff split the remainder of their time between promotion, developing visitor information tools and publications, responding to visitor requests and working on outreach initiatives and communications projects.

A generalist approach dictates that dedicated time on outreach initiatives has to be rationed and focused to meet available windows of opportunity. It also means that time for developing improvements and new ideas is limited by other demands and available dollars. Innovative ideas and projects can rest for many years in the background waiting for time and money as a result of these pressures. Recent park priorities have focused heavily on social science work and investment in visitor experience research leaving the external relations function lacking in social science data to measure or support its public education outreach efforts. This needs to be a priority to plan for future investments and initiatives.

6.1.1 Schoolchildren / Youth

The park invests strongly in an annual school outreach program targeted to 10 local and regional communities around Wood Buffalo National Park. The communities range in size, from small predominantly Aboriginal communities to mid-size urban centres with a more multicultural mix. Communities in both Alberta and the Northwest Territories are included. The programs are designed for elementary students in Grades 1 to 6. Each year the programs feature a different interpretive theme and reach more than 2,000 students. The programs

ensure the park has a positive presence in communities, helping to build relationships with students, educators and other community members while increasing awareness and understanding of heritage values. Teacher evaluations for the programs are consistently positive.

In addition to the annual school outreach program, staff provide teacher-requested school programs to their local schools and community colleges as capacity allows. Youth programs are offered to schoolchildren in Fort Chipewyan through a nature club that was started in partnership with the school. On two occasions, staff assisted in organizing park field trips and Nature Club students experienced the park first-hand after learning about it through outreach.

In the summer, youth programs are offered in Fort Chipewyan through the local recreation society's Summer Fun program and in 2008 an outreach program was offered to local youth participating in a University of Alberta Discover E Science Camp. Resource conservation staff joined communications, visitor services and heritage presentation staff to offer aquatic ecology stations for youth during the Keepers of the Water Conference in the summer of 2008.
Staff participate in small local career fairs as well as larger regional career fairs such as one in Yellowknife organized by the Department of Education. In 2008, staff attended the National Aboriginal Achievement Foundation's Blueprint for the Future Student Career Fair held in Yellowknife.

Figure 34. *Presenting the Magnificent Moose Program to elementary school children.*

6.1.2 Local and Regional Residents

Outreach is provided to local and regional residents as opportunities arise. In Fort Chipewyan, outreach is tied into community events whenever possible. These outreach initiatives are targeted to the general public and may include both adults and youth.

The Look See Paint program (part of a pilot for Parks Canada) has been offered on an outreach basis at various community events such as the Keepers of the Water Conference, organized by the Athabasca Chipewyan First Nation, and a culture camp organized by a local family during the Residential School Gathering and to local organizations.

Other outreach opportunities have included a community eco-fair in Fort Chipewyan and science festivals in both Fort Chipewyan and Fort McMurray. Park staff played a lead role in planning and organizing the 2003 Fort Chipewyan Science Festival in partnership with Science Alberta.

Environment Week outreach is offered every year in Fort McMurray in partnership with the Fort McMurray Environment Week Committee. In addition to school outreach, public programs are offered at a variety of venues in Fort McMurray during this time. Examples include booths at special Environment Week family events, such as one in 2008 organized by the Cumulative Environmental Management Association in partnership with the Provincial Museum and outreach presentations, booths, and displays at the Oilsands Discovery Centre. Due to the unique population demographics of Fort McMurray, outreach efforts reach not only a more urban and multi-cultural audience, but also a large number of Canadians from other parts of Canada who are living there temporarily for work.

The park participates in local Canada Day parades in both Fort Chipewyan and Fort Smith.

A Wonder of Water portable display was developed by the field unit for use at local and regional venues. The display has been well used at environmentally-themed conferences and events in Fort Chipewyan, Fort Smith, and Fort McMurray.

6.1.3 Educators

Wood Buffalo National Park has provided strong support to the national Parks Canada in Schools program, which aims to reach students through the formal education system by focusing on curriculum integration. Staff participate on both the Alberta Education Team and the Pan-Northern Education Team and they have contributed to initiatives led by the Alberta and Northern education specialists.

Thanks to the collaborative efforts of education specialists Wood Buffalo National Park, the Peace-Athabasca Delta and Fort Chipewyan (as a national historic site) are included in the text of the new Alberta Grade 4 Social Studies textbook, "Our Alberta" (Book 1). Park staff were given the opportunity to review the text for accuracy and provide images. Park images were also provided for the Northwest Territories Experiential Science 10 textbook on terrestrial systems.

Through the national Parks Canada in Schools program, 10,000 teachers were personally contacted at teacher conventions and 1,000 teachers participated in specialized workshops featuring Parks Canada educational resources. Wood Buffalo National Park contributed staff time and resources. Park staff also developed a template and led a working session to help Alberta Education Team members match their respective park interpretive themes to the new Alberta Grade 4 and 5 Social Studies curriculum.

Each year staff build relationships with local teachers to help increase awareness of Parks Canada related resources. In Fort Chipewyan, an orientation to the park's educational resources is provided to local teachers each year.

6.1.4 Canadians

Wood Buffalo National Park broadly reaches Canadians through its Visitor Reception Centres, through the Parks Canada website and through third-party media such as magazines, newspapers, films, television and independent websites. Some of these means will reach international audiences as well. The park lacks strategic outreach approaches and products targeted to specific audiences and social science methods to gauge the awareness of Canadians about the park. This can be directly linked to limited past investment in time and staff resources and the resulting multitasking approaches taken in the current operational structure.

6.2 State of Public Outreach Education

6.2.1 Awareness

Wood Buffalo National Park lacks public awareness as a top-of-mind destination. There may be some general awareness of the park in the Canadian education community if the frequency of student requests for park information for school projects (from the elementary level to the post-secondary level) is used as an unscientific indicator.

The absence of a coordinated national Parks Canada Agency public awareness program requires that the field unit use its resources to reach out to Canadians.

With limited private sector partnership opportunities for promoting awareness of the park, combined with small budgets to build necessary products, the cost-effective solution has been the creative use of third-party print, film and television opportunities, along with Parks Canada products such as the website and publications. Current park-specific efforts to develop awareness have been opportunistic rather than strategic.

6.2.2 Understanding

The park has focused its social science work on the visitor experience program for Wood Buffalo National Park. No survey has been designed to measure how targeted audiences who are not visiting understand the reasons for the park's establishment.

The nature of the products available to audiences is not specifically targeted to increasing understanding and products were designed with a broad appeal due to availability of time and investment dollars.

The park has lacked funding for social science data required to identify and analyze the level of understanding of targeted Canadian audiences that are far away.

On a local and regional level, informal feedback from students attending our school programs indicates at least a short-term understanding of why Parks Canada places are created, as this is one of the topics addressed in every school program. Social science research is needed to determine long-term retention of this understanding over time.

6.2.3 Appreciation

From a Wood Buffalo National Park perspective, investment is lacking in this component of outreach programs. Existing outreach programs are broad and in cases like third-party print and film media, it is challenging to measure and monitor their impacts on appreciation. Dedicated time and money would help the park develop appropriate experiences and products and to monitor their effectiveness.

On a local and regional level teacher evaluations of the park's school outreach programs are consistently positive. This suggests that appreciation objectives for the programs are at least minimally achieved.

6.2.4 Learning

Wood Buffalo National Park targets local Aboriginal peoples that are present and future management partners though school outreach opportunities. There has been no formal social science done to measure success in terms of learning. Informal feedback from teachers (and students attending the school programs) suggests a satisfactory level of learning in the short-term. Longer-term retention is more difficult to measure and would require social science expertise and methodology.

The park provides broad learning opportunities to school-aged children anywhere in the country through its support of products produced by the Parks Canada In School Program and the Parks Canada website. Products are very broad and general in application and have not been specifically developed for targeted Canadian audiences. The park lacks access and funding for the social science information and support it needs to identify and understand what these targeted Canadian audiences want to learn.

7 State of Aboriginal Group Engagement

7.1 Aboriginal Group Engagement Context

Parks Canada has relations with 11 Aboriginal groups in the communities of Fort Smith, Fort Chipewyan, Garden River, Hay River and Fort Resolution, which surround Wood Buffalo National Park in Northeast Alberta and the Southeast Northwest Territories. Seven of the groups – Athabasca Chipewyan First Nation, Mikisew Cree, Little Red River Cree, K´átł'odeeche First Nation, Deninu'Kue, Salt River and Smith's Landing – are Treaty 8 First Nations with treaty rights in the park. The balance are Métis groups in Fort Chipewyan, Fort Smith, Fort Resolution and Hay River who have sought similar recognition to exercise their own rights in Wood Buffalo National Park.

A number of these groups, including the Mikisew Cree, Smith's Landing and Salt River, have negotiated Treaty Land Entitlement Agreements, which created Indian Reserves within the park boundaries. Other groups such as the Deninu K'ue in Fort Resolution, K´átł'odeeche First Nation in Hay River and the Métis from Fort Smith, Fort Resolution and Hay River are still in negotiation with Canada for regional lands and resource agreements. Little Red River Cree is in the final stages of negotiating with Parks Canada about the establishment of their reserve at Garden River in the southwest of Wood Buffalo National Park. A small number of Aboriginal groups are also in litigation with Canada relating to issues that have arisen either with their Treaty Land Entitlement Agreements or as a result of issues originating outside the park boundary such as the alleged impact of flow regulation on water levels in the Peace-Athabasca Delta. Parks Canada's Aboriginal relations at Wood Buffalo National Park are complex and in the past, in the absence of a park-wide management board, they have presented some legal and constitutional challenges on park management issues.

On a positive note, Parks Canada has proactively sought to engage Aboriginal peoples on either an individual or collective basis where opportunities have occurred or circumstances have dictated. Some of the most significant collaborative work going on at the moment includes: the Wood Buffalo National Park Game Regulations Review, which began in 2006 and involves all the groups around the park; the Peace-Athabasca Delta Ecological Monitoring Program which involves groups in Fort Chipewyan and Garden River; fire management, Aboriginal visitor experience planning in addition to economic development and employment opportunities, all of which have involved individual groups at different times. Smaller scale projects have included archaeological excavations, public outreach education visits to park communities and informal visits with Aboriginal hunters and trappers.

7.2 State of Aboriginal Group Engagement

Many of the Aboriginal peoples living in the communities surrounding the park have a strong link with the land whether as trappers, hunters or as families that originally lived in the park at the beginning of the 20th century before and immediately after the park came into being in 1922. Their lands represent to them a special place, which they hold in reverence and the protection of the park landscape is therefore of great importance.

As stated in the previous section, Aboriginal groups have been involved in many of Wood Buffalo National Park's processes and structures over the past few years. Seeking a resolution to the challenge of collaborative management for the park has been a priority of senior management for the past 10 years or more. However, for various reasons, the completion of land claims being one of many, past attempts to broker a park-wide solution have not led to fruition. Despite this lack of success, the influence of Aboriginal groups on park policies is high whether measured by the dialogue with Aboriginal group leaders or the discussions and negotiations that take place seasonally on sensitive issues connected with park operations, wildlife, forest fire management, and on a regular basis as a part of regional lands and resources negotiations.

Currently, Aboriginal peoples are intimately involved in the collaborative process that has been developed for Parks Canada's review of the park game regulations. This has led to discussions on how a similar level of collaboration could be organized in the upcoming review of the park management plan. Beyond these macro processes, Aboriginal groups have also been shaping park initiatives in other areas such as bi-lateral discussions on cultural resource management. Although there are opportunities for Aboriginal groups to influence park policies, it is recognized more work needs to be done by Parks Canada in this area.

Some Aboriginal groups are more involved than others in park management and operational areas due in part to the proximity and overlap between areas of traditional use and areas of park activity or study. For example, the Peace-Athabasca Delta is of particular interest for groups in Fort Chipewyan and forest fire management is a priority for groups in Fort Smith. Other groups have chosen to participate only in park activities or issues which directly affect them or their member's traditional areas of interest.

The size of Wood Buffalo National Park, the distance between communities and travel time to attend meetings all impact park meetings. The ability to participate in a park-hosted meeting or event is also dependent on the availability of funding to cover the cost of participation, as well as meeting expenses such as honorariums (especially if air travel is involved). For a number of groups, however, it is not just the significance of the park issue that determines their degree of involvement: it is also a question of priorities. Park management may be only one of a number of interests or forums in which Aboriginal groups are engaged and therefore leadership must decide to what extent they can afford the time or the resources to participate. Active involvement may not be an option for all the groups and selective involvement may be preferred. For example groups may fully participate in the park game regulations review, but moderate their level of involvement in another aspects of park management. A formal park-wide management board or committee could increase the level of active involvement and collaboration among Aboriginal Peoples on a number of park policy areas.

8 State of Stakeholder Engagement

8.1 Stakeholder Engagement Context

Wood Buffalo National Park has developed many relationships with stakeholders. They include local, regional, territorial/provincial and national groups. Stakeholders are key to the successful protection and presentation of the park.

Local park stakeholders include all of the communities that surround the park: Fort Smith, Fort Chipewyan, Hay River, Garden River, Fort Resolution, Fort McMurray, Fort McKay, Fort Vermilion, Fox Lake, Jean D'or Prairie and High Level. The park works with these stakeholders within a variety of processes such as the Peace-Athabasca Delta Ecological Monitoring Program, the Game Regulations Review Process, fire management, outreach education, management planning and traditional use.

Stakeholders that are involved with the park on a regional or territorial/provincial basis include: the Government of the Northwest Territories, the Government of Alberta, BC Hydro and the academic community. These groups are actively involved in structures such as fire management, bison management, anthrax work, the Peace-Athabasca Delta Ecological Monitoring Program, environmental management and research and monitoring. Wood Buffalo National Park staff sit on various regional tourism boards and regional and local establishments partner with the park to help with promotion and marketing strategies.

Nationally, the park works with Environment Canada, Indian and Northern Affairs Canada, and the Department of Fisheries and Oceans on such things as the Peace-Athabasca Delta Ecological Monitoring Program, Cumulative Environmental Management Association, the Environmental Impact Assessment Review and other research and monitoring initiatives.

8.2 State of Stakeholder Engagement

The indicators used to measure the state of stakeholder engagement are support, influence and active involvement. At this time, there is no data to accurately evaluate engagement. This should be a research priority for the park as national program tools are developed.

9 Results of Management Actions

MANAGEMENT ACTIONS FROM THE 1984 WOOD BUFFALO NATIONAL PARK MANAGEMENT PLAN			
Objectives	Actions	Action Status	Outcomes
Develop basic Interpretive presence on Highway 5.	Action 1: Improved signage and exhibits on Highway 5.	Complete	Positive comments from Visitors and partnerships developed with Territorial Government partners.
	Action 2: Whooping Crane Pull-off.	Complete	Popular pull-off to view marshlands and water birds. Unfortunately no whooping cranes visible and Wetlands Pull-off has become a more popular name.
Build on community networks and connections.	Action 1: Improve Loop Road.	Loop Road closed and removed. Pressure from community to re-open or do new road to Garden River.	Management plan directions were changed with economic realities of the 90s and this project took a different direction when maintenance costs to were too high. Decision was made to close and rehabilitate a section of the Loop Road.
Improve Visitor Opportunities.	Action 1: Upgrade facilities at Pine Lake campground.	Not Completed	Management plan directions were changed with economic realities of the 90s and these projects were shelved.
	Action 2: Develop Needle Lake Campground.	Not Completed	

MANAGEMENT ACTIONS FROM THE 1984 WOOD BUFFALO NATIONAL PARK MANAGEMENT PLAN			
Objectives	Actions	Action Status	Outcomes
Address non-conforming uses.	Action 1: Conduct environmental assessment and review procedures and resource monitoring activities related to timber harvesting operations.	Completed	Timber harvesting operations in the park stopped in 1991.
	Action 2: Adjust park boundary to excise the community of Garden Creek from the park.	Ongoing	See the section on Garden River below.
	Action 3: Formally delete the Peace Point Reserve from the park through land claims process.	Completed	See the section on Peace Point below.
Equitable settlement of Cree land claim with minimal impact to the ecological integrity of Wood Buffalo National Park.	Action 1: Resolution of land claim with respect to size and location and on terms satisfactory to Parks Canada.	A reserve, 1,280 acres on the north side of the Peace River at Peace Point, was agreed to between Parks Canada and the Mikisew Cree First Nation under the terms of a Treaty Land Entitlement Agreement signed on December 23,1986.	Peace Point Indian Reserve excised from Wood Buffalo National Park in 1988.
(i) Parks Canada will enter into an interim management agreement with the Department of Indian Affairs and Northern Development to define the responsibilities and jurisdiction for the administration and management of the Garden Creek Settlement. (ii) Parks Canada will remove Garden Creek as a non-conforming use in the park by way of excision and boundary adjustment so that the community is no longer within the national park.	Action 1: Parks Canada to complete negotiations with the Department of Indian Affairs and Northern Development to resolve short- and long-term future of the community.	(i) Parks Canada has received a letter of commitment from Department of Indian Affairs and Northern Development to establish an Indian Reserve at Garden River on completion of negotiations to excise the community from the park. (ii) Provision is included under s.38(1)(a) of the National Parks Act to amend or replace the description of Wood Buffalo National Park to withdraw lands for the creation of an Indian reserve at Garden River.	Parks Canada is in negotiations with the Department of Indian and Northern Affairs and the Little Red River Cree Nation to agree on the terms for the excision of the community from Wood Buffalo National Park.

MANAGEMENT ACTIONS FROM THE 1984 WOOD BUFFALO NATIONAL PARK MANAGEMENT PLAN			
Objectives	Actions	Action Status	Outcomes
Improve knowledge of park resource base.	Action 1: Initiate resource monitoring programs.	Ongoing	Resource monitoring ongoing.
Improve management measures for resource-harvesting.	Action 1: Discussions with park Aboriginal groups to review and update park game regulations. Following a meeting between the CEO and Aboriginal leaders in September 2004 at Pine Lake, Parks Canada Agency began a collaborative review of the park game regulations with Aboriginal groups in spring 2006.	Review of park game regulations begun in 2006 is nearing completion following detailed discussions with Aboriginal groups. Five Aboriginal Forums have been held and a draft discussion paper prepared which summarizes new proposals for Aboriginal harvesting in the park.	A more inclusive relationship between Parks Canada Agency, Treaty 8 First Nations and Métis interests from around the park on the issue of wildlife management. This commitment to renew the game regulations and see them from an Aboriginal perspective has engendered respect on all sides.
Continue participation in process to resolve Treaty 8 land claims and introduce more rigorous management measures for national park lands at Peace Point.	Action 1: Participation in the process for the resolution of Treaty 8 land claims which may impact Wood Buffalo National Park.	Parks Canada participated in the Northwest Territories Dene-Métis land claim process before the collapse of negotiations in 1990. Subsequently the Dene and Métis divided into five groups, each of whom pursued their own settlement with Canada.	In 2000 and 2002, Parks Canada was party to two land claim agreements affecting the park with Smith's Landing First Nation and Salt River First Nation. Canada is engaged in ongoing land, resource and governance negotiations with the Akaitcho Dene First Nations and Northwest Territories Métis Nation.
Active encouragement of the Government of the Northwest Territories to pave Highway 5.	Action 1: Parks Canada to initiate discussions with the Government of the Northwest Territories to negotiate road maintenance for the section of Highway 5, running through the park.	Parks Canada has been paying Government of the Northwest Territories for maintenance work as completed.	Government of the Northwest Territories has express political support to enter into a formal long-term maintenance arrangement. Negotiations are underway.
	Action 2: Parks Canada to initiate discussions with the Government of the Northwest Territories to pave the road.	Parks Canada has been discussing chip sealing with the Government of the Northwest Territories since August 2008.	Political support to chip seal has been received from the government. Discussions are ongoing to work out details and cost out contributions.

MANAGEMENT ACTIONS FROM THE 1984 WOOD BUFFALO NATIONAL PARK MANAGEMENT PLAN			
Objectives	Actions	Action Status	Outcomes
Management Actions initiated in more recent years			
Restore the role of water in the delta.	Action 1: Maintain and evaluate performance of outflow weirs.	Ongoing	Mackenzie River Basin Board responsibility.
	Action 2: Claire River restoration.	Complete	Channel obstruction removed at Peace River to allow flood inputs to delta during high Peace River flows.
Improve the knowledge and understanding of the cultural significance of the archaeological resources located at Peace Point.	Action 1: Archival information was collected regarding the signing of the Peace treaty between the Beaver and the Cree Indians at Peace Point.	Complete	Improved understanding of the significance of the site and the role of Mattonobee. Identified need to collect oral history research.
In cooperation with other groups or agencies, conduct further examination and assessment of the archaeological resources related to the prehistory of the park.	Action 1: Current archaeology in the park involves consultation with Aboriginal communities before beginning any work and partnering with Aboriginal groups by involving students, staff and community members.	Ongoing	Building relationships with Aboriginal peoples and a more complete understanding of the importance of the areas.
Work jointly with local residents of the park to inventory the location of cultural sites such as burial grounds and cemeteries and to protect them from development or activities that would negatively affect them.	Action 1: Conduct meetings and workshops with Aboriginal groups to identify cultural resources and historic sites that are important to them and to develop human history themes that will provide criteria in the evaluation of these cultural resources.	Ongoing	Improved relationships with Aboriginal peoples by identifying common interests and opportunities for partnerships.
General management directions for cultural resources will focus on inventory and monitoring of resources, protection from development and interpretation to improve public understanding.	Action 1: The general public has been encouraged to get involved in recent archaeological investigations by way of tours on site and by incorporating a public archaeology component as part of the environmental assessment mitigation. Plans are now underway to develop educational products in conjunction with the community based on the results of mitigation.	Ongoing	This approach has maximized the archaeological mitigation/ impact assessment process to incorporate visitor experience and understanding as well as partnering with the Aboriginal groups.

MANAGEMENT ACTIONS FROM THE 1984 WOOD BUFFALO NATIONAL PARK MANAGEMENT PLAN			
Objectives	Actions	Action Status	Outcomes
Conclusion of the Northwest Territories Métis Nation lands and resources negotiations - a multi-departmental process between Canada, the Government of the Northwest Territories and the Northwest Territories Métis Nation.	Action 1: A more concerted and focussed effort was made by Parks Canada Agency in fall of 2007 to conclude their portions of this agreement.	Parks Canada Agency and the Northwest Territories Métis Nation are negotiating the Parks Canada Agency chapters of an Agreement in Principle between the Northwest Territories Métis Nation and Canada.	Better relations have developed between Parks Canada Agency and the Northwest Territories Métis Nation.
Resolution of litigation between Mikisew Cree and Canada regarding the Mikisew Cree's 1986 Treaty Land Entitlement Agreement.	Mikisew Cree initiated litigation in December 1996, regarding its 1986 Treaty Land Entitlement Agreement with Canada. Although Parks Canada Agency was initially implicated in the litigation, it has now been removed from the action.	In June 2009 Mikisew Cree is expected to hold a plebiscite with members over acceptance of the terms for a settlement.	Improved relations.

10 Key Issues

10.1 Aboriginal Governance

Aboriginal relationships and the involvement of all First Nation and Métis interests from the communities surrounding the park are a key priority for the future management of Wood Buffalo National Park. These relationships affect overall park management from traditional harvesting and monitoring, ecological management, visitor experience and park interpretation to the development of long-term policies affecting economic development and Aboriginal tourism.

Since the completion of the last park management plan in 1984, relations with a number of Aboriginal groups have been strained, if not fractured, leading to litigation and resolution by the courts. The recognition of treaty rights in the park in 2005 has removed a long traditional grievance, but a key challenge still remains in establishing a formal park management framework.

Determining how Aboriginal groups will become permanently engaged in the management of Wood Buffalo National Park and how that will be achieved remain unresolved issues at the heart of this debate.

10.2 Peace-Athabasca Delta

The rivers flowing into the Peace-Athabasca Delta drains a massive area of about 600,000 square kilometres in northern British Columbia, Alberta and Saskatchewan, an area that is experiencing rapid industrial development. Since the biological productivity and diversity of the delta depends upon regular inputs of water and nutrients from the Peace and Athabasca rivers and Lake Athabasca, impacts of development on water quantity and water quality are of primary concern. Flow regulation impacts on discharge rates of the Peace River are well documented and these changes have combined with changes in climate to reduce the frequency and magnitude of flooding that is needed to maintain delta wetlands. Park monitoring programs are showing that reduced flood frequency is leading to loss of wetlands and encroachment of woody species and non-native plants into productive sedge and grass meadows. Potential impacts on Athabasca River flow are also a concern as water withdrawals for industrial, agricultural and municipal use increase.

The delta landscape provides opportunity for unparalleled visitor experiences. This was historically and is potentially one of the park's premier adventure destinations with its remote canoeing and hiking access and unique combination of vast delta wetlands and meadows, historic bison corrals and wildlife viewing of bison, wolves and a diversity of birdlife. Visitor infrastructure at Sweetgrass Landing and Sweetgrass Station is however severely deteriorated and it affects the potential for visitors to have a positive experience in the delta.

The delta is also a significant cultural landscape, at the intersection of major historical travel routes that stretched across the continent and was for decades the centre of the fur trade in northwestern Canada. Cultural practices and a body of knowledge particular to the landscape evolved through generations of occupation and use. Ecological changes to the delta (such as

changing plant communities, water levels, and use by wildlife) have affected the cultural landscape by altering traditional use of and connection to the area.

10.3 Bison Management

The cattle diseases tuberculosis and brucellosis are present in the greater Wood Buffalo National Park bison population. These diseases may interact with other environmental factors (predation, winter severity, and range condition among others) to affect population growth and vigor. Although the park's bison herd has been increasing in numbers since 1999 and is the largest and most genetically-diverse wood bison population, more needs to be known about the impact of disease on the population. As well, the potential for disease transmission to disease-free wood bison recovery herds and domestic cattle and bison herds is a major concern.

10.4 Cultural Resources

Archaeological sites are not rated. There is not enough information on the current condition of archaeological sites and no monitoring program for archaeological sites is in place. The majority of the park has not had an archaeological survey and many of the identified sites are considered threatened by natural disturbances or to a lesser degree, by human impacts.

Natural processes such as erosion due to wind, water or slumpage are having the greatest impact on archaeological resources. The majority of the sites are located along major river corridors or on shores of lakes, explaining the high incidence of erosion. Threats from natural disturbance are more difficult to gauge or to mitigate.

The overall rating for buildings and structures is poor. These buildings and structures were all built in the mid- to late-1960s, mainly in remote areas of the park and are difficult to access or visit on a regular basis. This lack of use and maintenance has lead to their structural decay.

Buildings located on waterways are susceptible to erosion. In the Sweetgrass area, the natural cycle of flooding has contributed to the decay and deterioration of buildings and structures. Damage or complete loss from wildfire is also an imminent threat.

Our current understanding of the park's cultural history and the ability to communicate that history to the public is limited.

10.5 Visitor Experience

Cutbacks and other pressures on regional tourism have resulted in uncertainty towards reducing or maintaining assets and services. Managing visitor expectations within allocated resources and seeking to reinvest in core and new visitor experience opportunities is a management challenge.

The key issues are how to:

- Improve the park's existing aging and deteriorating infrastructure within existing funding.
- Address the current lack of local and regional tourism operators offering services and visitor experiences in the park.
- Improve the park's visitor experiences through diversification of recreational and experiential opportunities.
- Attract more visitors to a remote northern location given Canada's current demographic and economic realities and trends.

Onoing national External Relations and Visitor Experience restructuring is viewed as a positive step forward.

10.6 Public Outreach Education

Current structures, staff time and dollars are heavily committed to visitor experience priorities. Public education outreach has been mainly focused on local and regional school and community outreach. Onoing national External Relations and Visitor Experience restructuring is viewed as a positive step forward.

11 Moving Forward

The Wood Buffalo National Park State of the Park Report has summarized the overall state of the park including Aboriginal perspectives, ecological integrity, cultural resources, visitor experience, public outreach education and Aboriginal group and stakeholder engagement. It has identified results of management actions taken in the past and key issues to work on for the future. These key issues and the strategies designed to manage them, will be described in the Wood Buffalo National Park Scoping Document, the next document in the management planning process. The scoping document will also be the tool used for laying out public consultation plans, financial considerations and planning program schedules. This will lead to the management plan, which will set out a long-term vision for achieving the agency's mandate and associated direction for Wood Buffalo National Park.

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Glossary

Abiotic - The non-living components of the environment such as rock types, slope, geographic setting and climate that affect ecological functions.

Anion - A negatively charged ion.

Backcountry - Those parts of the park not accessible by motor vehicle.

Bioaccumulate - To gradually accumulate organic compounds in living tissue, typically from ingestion and/or absorption of food or water.

Bioindicator - Species or chemicals used to monitor the health of an environment or ecosystem.

Biomass - Weight of living matter.

Biomonitor - An organism that provides quantitative information on the quality of the environment around it.

Carnivore - An animal that feeds principally on the meat of other animals.

Cation - A positively charged ion.

Coliform - Designating, of, or like the aerobic bacillus normally found in the colon: a coliform count is often used as an indicator of fecal contamination of water supplies.

Ecological Integrity - "An ecosystem has integrity when it is deemed characteristic for its natural region, including the composition and abundance of native species and biological communities, rates of change and supporting processes." In plain language, ecosystems have integrity when they have their native components (plants, animals and other organisms) and processes (such as growth and reproduction) intact.

Evapotranspiration - The release of water vapour from the earth's surface by evaporation and transpiration.
Frontcountry - Those parts of the park accessible by motor vehicle.

Graminoid - All grasses and grasslike plants.

Herbivore - An organism that eats only plants.

Herbivory - The consumption of living plant tissue by animals.

Hibernaculum - The protective place where an animal hibernates, or spends the winter.

Indicator - A nationally or bio-regionally consistent summary reporting statement that provides a comprehensive synopsis of each element of the agency mandate. It is based on a combination of data, measures and critical success factors that provide a clear message about current condition and the change since the last measurement.

Karst - An area of irregular limestone in which erosion has produced fissures, sinkholes, underground streams and caverns.

Lithic - Stone, or made of stone.

Measure - Data, surveys or other measures that present conditions or trends. Measures are components of indicators.

Morphometry - Refers to the physical characteristics of a lake such as size and shape of a lake basin, mean depth, maximum depth, volume, drainage area and flushing rate.

Proglacial - Occurring or formed in front of a glacier.

Target - Aim or objective set by managers and to be achieved within a specified time frame.

Threshold - Level of an indicator or measure that represents a good"(green), fair (yellow), or poor (red) condition. It represents the point of transition between the three levels of condition on which the agency reports.

Tortrix - A genus of moths.

Trophic - Pertaining to levels in a food chain.

Uvala - A karst depression consisting of several smaller closed depressions joining together into an irregular form.