

IUCN Conservation Outlook Assessment 2014 **(archived)**

Finalised on 12 November 2014

Please note: this is an archived Conservation Outlook Assessment for Wood Buffalo National Park. To access the most up-to-date Conservation Outlook Assessment for this site, please visit <https://www.worldheritageoutlook.iucn.org>.

# Wood Buffalo National Park

## SITE INFORMATION

Country:

Canada

Inscribed in: 1983

Criteria:

(vii) (ix) (x)

Site description:

Situated on the plains in the north-central region of Canada, the park (which covers 44,807 km<sup>2</sup>) is home to North America's largest population of wild bison. It is also the natural nesting place of the whooping crane. Another of the park's attractions is the world's largest inland delta, located at the mouth of the Peace and Athabasca rivers. © UNESCO

## **SUMMARY**

### **2014 Conservation Outlook**

#### **Good with some concerns**

In general, the site's conservation values are sound and, in fact, improving with respect to overall boreal forest ecology and bison and whooping crane populations. The exception is the Peace Athabasca Delta where conservation values are being lost through drying due to a combination of hydrological alteration and global warming. The Delta is also at significant risk from upstream industrial development with associated water withdrawals and the potential for accidental and long term discharges of toxic material including petroleum products. Since designation, protection and management has steadily improved reaching a relatively high standard with the adoption of improved ecological monitoring and the forging of important partnerships with other agencies and the scientific community. A priority to further engage local indigenous people in management is a positive initiative. Protection and management may, however, be adversely affected as a result of significant budget reductions being experience by Parks Canada nationally.

#### **Current state and trend of VALUES**

##### **Low Concern**

##### **Trend: Stable**

Most elements of the World Heritage values are either stable or improving with credit due to sound fire management, the elimination of commercial logging and better science and monitoring. The exception is the Peace-Athabasca Delta which is a critical lynchpin to so many of the World Heritage Values. Alteration of vegetation composition due to climate change and upstream damming has been identified as an existent threat. Upstream industrial development is a potential threat although recently enhanced monitoring has not identified any specific negative impacts. The risk will, however, continue to exist necessitating ongoing monitoring and the maintenance of an appropriate response capacity.

## **Overall THREATS**

### **Low Threat**

The potential for negative impacts to the Peace-Athabasca Delta due to upstream discharges from oil sands and pulp and paper production should be a cause for concern and ongoing vigilance. Continued drying of the delta is a product of dam-caused hydrological alteration about which little practical can be done short of removal of the dam. The potential for additional hydro generation dams and pressure for bison depopulation have not entirely disappeared and could resurface quickly and exacerbate threat levels. The “threat level” is identified as “low” at this time in the absence of a specific, tangible driver. The hydrology of the delta is driven by climate variability as well as by flow regulation; there is some potential to use targeted flow releases to address some impacts of flow regulation.

## **Overall PROTECTION and MANAGEMENT**

### **Mostly Effective**

Overall, protection and management of the site is effective. Site management recognizes the issues and threats facing its heritage values and has responded within the limits of its jurisdiction and responsibility. Ensuring continued diligence in matters with respect to upstream industrial development is a federal-provincial challenge best met by the national government. Park management has established the Peace-Athabasca Delta Ecological Monitoring Program (PADEMP) with a range of partners (Aboriginal groups, government, ENGOs) to coordinate research and monitoring efforts in the delta, including the use of both Traditional Knowledge and Western Science to best inform management actions. The objective is to build upon the knowledge gained through PADEMP, Parks Canada and partner efforts to effect with the upstream Peace River hydroelectric sector periodic flow releases to enhance spring ice-jam flooding events. These events will help to restore delta hydrological regimes and mitigate threats to the World Heritage Values.

# FULL ASSESSMENT

## Description of values

### Values

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#### World Heritage values

► **Great Plains-Boreal Grasslands Ecosystem**

Criterion:(ix)

The most ecologically complete and largest example of the Great Plains-Boreal Grasslands Ecosystem of North America including some of the largest undisturbed grass and sedge meadows left in North America (Statement of Significance, 1983).

► **Great concentrations of migratory waterfowl**

Criterion:(vii)

The Peace-Athabasca Delta is one of the most important waterfowl nesting and staging areas in North America (Wood Buffalo National Park Management Plan, 2010), including snow geese, white-fronted geese and Canada geese, whistling swan, diver, all seven species of North American grebe and species of duck (Statement of Significance, 1983).

► **The only breeding habitat in the world for the Whooping Crane**

Criterion:(x)

Breeding and nesting habitat of the only wild and self-sustaining flock of the endangered whooping crane) (Statement of Significance, 1983)

► **The largest inland delta in the world**

**Criterion:(vii)**

At more than one million hectares, the Peace Athabasca Delta is the largest inland delta in the world at the confluence of the Peace and Athabasca Rivers. It provides resting and nesting habitat for some of the largest concentrations of migratory waterfowl in North America (Statement of Significance, 1983; Wood Buffalo National Park Management Plan, 2010)

► **Salt Plains**

**Criterion:(vii)**

A large expanse of salt flats described as “unique in Canada. (IUCN World Heritage Nomination Technical Review, 1983)

► **Gypsum karst landscape**

**Criterion:(vii)**

Internationally significant examples of the gypsum karst landscape including large sinkholes and cave systems providing important northern bat habitat (Statement of Significance, 1983).

► **Ecological completeness**

**Criterion:(ix)**

A large intact ecosystem with outstanding examples of fully natural, ecological processes including predator-prey relationships such as between wolves and bison (Statement of Significance, 1983).

► **North America’s largest population of wild bison**

**Criterion:(ix)**

Wood Buffalo provides habitat for the largest and most genetically diverse herd of wood bison (*Bison Bison Athabascae*) numbering approximately 5,000 in 2009. (State of the Parks Report, 2009)

**Other important biodiversity values**

- ▶ **Wood Buffalo provides habitat for the largest and most genetically diverse herd of wood bison (*Bison Bison Athabascae*) numbering approximately 5, 000 in 2009. (State of the Parks Report, 2009)**

The park contains two large RAMSAR wetlands designated to be of international importance – the Peace-Athabasca Delta and a large area of marl ponds which provide the Whooping Crane breeding habitat.

## Assessment information

### Threats

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#### Current Threats

##### High Threat

The Peace-Athabasca Delta is central to values embodied in this World Heritage Site. It supports some of the largest migratory waterfowl concentrations in North America; provides critical habitat for the Site bison population; and is important culturally and economically to local Aboriginal people. Drying due to hydrological alternations associated with dam construction is occurring at a rapid rate while water quality throughout the delta is at considerable risk associated with upstream industrial development. Climate variability and change also plays a major role in changes to the delta's hydrology.

##### ▶ **Livestock Farming / Grazing**

###### Low Threat

###### Outside site

Cattle farming interests continue to press for elimination of potential sources of bovine brucellosis and tuberculosis through depopulating the Park bison herd. Although current government policy is not supportive of that option at this time (Wood Buffalo National Park Management Plan, 2010), past events have shown that an outbreak of brucellosis or tuberculosis in cattle herds

adjacent to the park would likely lead to a rapid re-examination of government policy based on past experience at the site and well documented analogous events in other jurisdictions.

### ► **Other Activities**

#### **Very Low Threat**

##### **Outside site**

Poaching of whooping cranes from the three migratory populations occurs but rarely and opportunistically mostly during migrations, A review of crane census data provided by the Whooping Crane Conservation Foundation indicates that it is not having a significant impact of overall numbers of cranes. (Whooping Crane Conservation Foundation and Gil-Weir et al.2012)

### ► **Dams/ Water Management or Use**

#### **High Threat**

##### **Outside site**

The Bennett Dam constructed in the early to mid 1960's on the Upper Peace River significantly altered the hydrological regime of the Peace-Athabasca Delta by reducing periodic downstream overbank flooding which "recharged" the biologically significant perched basis. The primary negative impact has been drying out of the Delta - particularly the perched basins - with significant losses of grasses and sedges and growth of woody stemmed shrubs and tree cover. Losses of critical winter bison forage and waterfowl habitat has been an associated impact. (Golder and Associates, State of the Park Report, 2009).

### ► **Mining/ Quarrying**

#### **High Threat**

##### **Outside site**

Continued expansion of oil sands development in the Athabasca watershed upstream from the park and associated urban development is thought by many to have the potential for adverse impacts to downstream water quality affecting the integrity of the Peace-Athabasca Delta and subsistence and commercial fish harvesting. Massive expansion of operations to capture crude oil from the bitumen deposits (tar sands) upstream on the Athabasca River has raised concerns about the introduction of toxic chemicals and

petroleum products into the river and alteration of hydrological processes as a result of removal of water required for the oil sands processing. Very little water quality monitoring has been undertaken in the past however an accelerated monitoring program has recently been put in place. Initial sampling results do not indicate deteriorating water quality in the Delta. (Commissioner of the Environment and Sustainable Development. 2010 Fall Report.) Introduction of contaminants into the air is also a concern.

## **Potential Threats**

### **Low Threat**

Potential exists for downstream dam construction. Pressures to de-populate the bison herd in response to the presence of brucellosis and tuberculosis and their threat to commercial livestock production could re-arise at any time.

#### **► Temperature changes**

##### **Low Threat**

##### **Inside site**

##### **Outside site**

Important wetland areas of the Park such as the Peace-Athabasca Delta already stressed by other threats are likely to see that impact exaggerated by increased global warming. (Environment Canada. 2000). Continued global warming is likely to lead to increased drying of wetland areas with associated impact on waterfowl and some ungulates. Some negative impacts on traditional harvesting are also postulated. The potential impact on forest cover is less well understood.

#### **► Storms/Flooding**

##### **Low Threat**

##### **Outside site**

Although there are two other notable populations of whooping cranes, the Wood Buffalo/Aranas population remains the largest and most important and also the only self-sustaining population of whooping cranes. The Wood Buffalo whooping crane population winters on the Gulf of Mexico in a relatively small area. A catastrophic storm associated with global climate change could result on high levels of mortality in this population (Various

sources including Gil-Weir et al. 2012).

### ► **Water Pollution**

**Low Threat**

**Outside site**

Large scale pulp and paper processing plants upstream on both the Peace and Athabasca Delta have generated concerns about discharge into the rivers containing some harmful chemicals. Alberta effluent standards are relatively stringent compared to other jurisdictions however limited monitoring indicate increased levels of dissolved metals and ions in open water conditions as well as increased nutrient loading associated with phosphorous levels. Continued monitoring is required. (Alberta 2005).

### ► **Dams/ Water Management or Use**

**Low Threat**

**Outside site**

One dam proposal currently exists - the Site C Clean Energy Project (BC Hydro). This proposal is currently undergoing environmental review.

## **Protection and management**

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### **Assessing Protection and Management**

#### ► **Sustainable finance**

**Mostly Effective**

Compared to many World Heritage Sites, Wood Buffalo is relatively well financed although is experiencing some budget reductions through 2012 and beyond.

Despite budget reductions imposed in 2012, the site has core science, science support and geomatics capacity, as well as the capacity to augment core capacity commensurate with ecological integrity priorities as they arise. This field capacity is supported by a national network of senior level scientists in species management, veterinary science, monitoring and restoration.

► **Relationships with local people**

**Mostly Effective**

The Park Management Plan (2010) has identified a priority to develop an improved framework to engage local people, particularly First Nations and Métis people, in park planning and management. Current relationships are supportive of Heritage Site values. (Wood Buffalo National Park Management Plan, 2010)

► **Legal framework and enforcement**

**Mostly Effective**

Fully gazetted under the National Parks Act, the Site has an effective management framework embodied in the Park Management Plan (2010). Regulations governing subsistence harvesting are generally regarded as out of date but under revision. (State of the Parks Report, 2009)

Members of a First Nation group signatory to Treaty 8 can exercise their treaty rights to harvest for traditional subsistence purposes within the park.

► **Integration into regional and national planning systems**

**Mostly Effective**

In the absence of contrary indications, it is appropriate given size, the largely wilderness location and number of separate jurisdictions – municipal, territorial, provincial and First Nations.

► **Management system**

**Mostly Effective**

Management system is effective in understanding Outstanding Universal Values and addressing threats to the degree possible. (State of the Park Report, 2009 and Wood Buffalo National Park Management Plan, 2010)

► **Management effectiveness**

**Mostly Effective**

The protection and management system of the site is adequate and likely to maintain the site's values over the medium term. Longer term effectiveness will depend on the development of capacity and support to influence

activities far afield of the site boundaries including upstream industrialization and resource exploitation and both up and downstream development of hydro-electric dams. (Assessment based on reports from the Commissioner of the Environment, 2010, The State of the Park Report, 2010, news reports pertaining to a recent Slave River Dam proposal and personal communications with park staff and others).

## ► **Implementation of Committee decisions and recommendations**

### **Highly Effective**

Decisions and recommendations have been implemented appropriately. The Committee, since 1983 have expressed concern about the following - bison disease management, logging within the park and winter road construction. Logging has been terminated. The proposal to eliminate the bison herd to reduce transmission threats has been taken off the table and there is no longer a proposal to construct additional winter roads with the park. (<http://whc.unesco.org/en/list/256/documents/>; Wood Buffalo National Park Management Plan, 2010 and various other sources).

## ► **Boundaries**

### **Highly Effective**

Given the huge size and location of the Site and the absence of contrary indications, the Site boundaries are appropriate from an ecosystem representation and protection perspective. (State of the Park Report 2009).

## ► **Staff training and development**

### **Mostly Effective**

Human Resources at the site have been adequate to ensure sound and knowledgeable site management relying on a mix of highly trained and experienced staff and a broad array of partnerships with other agencies and with the scientific community. The above-noted reductions may have some impact (Personal communication with Park staff).

## ► **Sustainable use**

### **Data Deficient**

Since the cessation of commercial logging, resource use is restricted to

traditional hunting, trapping and fishing by Aboriginal people. The State of the Park Report, 2009 characterizes the moose and snowshoe hare populations to be in "FAIR" condition based on limited data. Moose are the most important traditional hunting species while snowshoe hare populations have some correlation with lynx populations. Lynx are an important species to trappers in the park. The State of the Park Report 2009 concludes that fish communities are in good condition and stable however the last data upon which this conclusion is based is ten years old. In general, there is very little data related to the impact of traditional activities on fish and wildlife populations. (State of the Park Report, 2009)

### ► **Education and interpretation programs**

#### **Some Concern**

The Park Management Plan (2010) identifies a priority to improve education and interpretation programs.

### ► **Tourism and interpretation**

#### **Mostly Effective**

The Park Management Plan (2010) identifies a priority to build awareness and promote visitation.

### ► **Monitoring**

#### **Mostly Effective**

In general, heritage value monitoring has been appropriate to the nature of the site. Recently enhanced monitoring of water quality associated with oil sands production has been initiated. The State of the Park Report concedes some deficiencies with respect to herbivore monitoring. (Personal Communication, Superintendent)

### ► **Research**

#### **Highly Effective**

The site has an excellent record of engaging scientists from other agencies and from the academic sector in to better understand heritage value issues. It is assumed that this will continue although government agency budget

reductions may result in some fall-off in that area.

## **Overall assessment of protection and management**

### **Mostly Effective**

Overall, protection and management of the site is effective. Site management recognizes the issues and threats facing its heritage values and has responded within the limits of its jurisdiction and responsibility. Ensuring continued diligence in matters with respect to upstream industrial development is a federal-provincial challenge best met by the national government. Park management has established the Peace-Athabasca Delta Ecological Monitoring Program (PADEMP) with a range of partners (Aboriginal groups, government, ENGOs) to coordinate research and monitoring efforts in the delta, including the use of both Traditional Knowledge and Western Science to best inform management actions. The objective is to build upon the knowledge gained through PADEMP, Parks Canada and partner efforts to effect with the upstream Peace River hydroelectric sector periodic flow releases to enhance spring ice-jam flooding events. These events will help to restore delta hydrological regimes and mitigate threats to the World Heritage Values.

### **► Assessment of the effectiveness of protection and management in addressing threats outside the site**

#### **Mostly Effective**

There are two major external threats with the potential to adversely affect the heritage values of the site – water quality impacts associated with upstream industrial activity (oil sands development and pulp and paper manufacturing) and dam construction. The agency of jurisdiction is somewhat limited in its ability to influence activities associated with these threats due to the huge economic importance and high government policy priority associated with the oil sands. Fortunately, other interests including Aboriginal organizations and environmental NGO's have been able to exert some influence.

Site management continues to work with external management authorities to prevent and mitigate threats.

## ► Best practice examples

Peace-Athabasca Delta Ecological Monitoring Program:

Parks Canada has been leading development of the Peace-Athabasca Delta Ecological Monitoring Program (PADEMP) since 2008, with the goal of developing an integrated ecological monitoring program that can measure, evaluate and communicate the state of the Peace-Athabasca Delta ecosystem, including any changes resulting from cumulative regional development and climate change.

PADEMP is designed to incorporate both Traditional Ecological Knowledge (TEK) and western science-based sources of information.

PADEMP is guided by a Steering Committee comprised of representatives from:

- Mikisew Cree First Nation, Ft. Chipewyan Metis Local 125, Athabasca Chipewyan First Nation (observer), Salt River First Nation, Smith's Landing First Nation, Deninu'Kue First Nation, Katl'odeeche First Nation, NWT Metis Nation, Ft. Resolution Metis Council, Hay River Metis Council, Little Red River Cree Nation.
- Parks Canada Agency, Environment Canada, Fisheries and Oceans Canada, Aboriginal Affairs and Northern Development Canada (NWT), the Government of the Northwest Territories (Environment and Natural Resources), Alberta Environment and Sustainable Resource Development.
- World Wildlife Fund Canada and Ducks Unlimited Canada.

PADEMP's progress to date includes:

- Relationship building among partners
- Collection and synthesis of available information on the delta (both TEK and western science-based)
- Identification of key monitoring questions and information gaps
- Development of a Vulnerability Assessment (due in 2014), which will include recommendations to guide development of an integrated environmental monitoring program and area management plan for the Peace-Athabasca Delta in Wood Buffalo National Park
- Coordination of two PADEMP Forums in Ft. Chipewyan, Alberta. These Forums bring scientists engaged in regional monitoring programs (Joint Oil Sands Monitoring Plan, ABMI, MCFN CBM, etc.) together with Traditional Knowledge holders and community members to discuss key concerns and

questions, and to stimulate collaboration and communication.

The design of PADEMP takes into consideration the work being undertaken by other relevant monitoring programs in the region that have other specific goals. Key regional monitoring programs that PADEMP complements, and incorporates the results of, include: the Joint Alberta-Canada Implementation Plan for Oil Sands Monitoring (JOSM), community-based monitoring (CBM) programs (Mikisew Cree First Nation and Athabasca Chipewyan First Nation CBM, Slave River and Delta Partnership), Alberta Biodiversity Monitoring Institute (ABMI), Wood Buffalo Environmental Association (WBEA), and monitoring undertaken by the Cumulative Environmental Management Association (CEMA).

Communication and engagement of PADEMP with these other programs is an important, on-going activity. PADEMP will not duplicate sound and effective monitoring efforts being undertaken by other programs. Rather, PADEMP will address those areas where key monitoring information is not being collected, and will ensure that TEK and traditional use values are incorporated into its monitoring efforts. PADEMP assessments of cumulative impacts on delta ecosystem health will utilize the best information available through PADEMP and other monitoring programs. To this end, the design of PADEMP ensures that its monitoring results can be compared with those of other key regional monitoring programs.

## **State and trend of values**

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### **Assessing the current state and trend of values**

#### **World Heritage values**

##### **► Great Plains-Boreal Grasslands Ecosystem**

**Low Concern**

**Trend:Stable**

Forested elements of this ecosystem have improved with a sound fire management regime. Some grasslands and particularly the sedge meadows in the Delta continue to dry out with associated increases in woody stem shrubs and tree cover and loss of important bison habitat. Should a decision

be taken to proceed with construction of a dam on the Slave River, this conclusion would need to be re-assessed (State of the Park Report, 2009).

► **Great concentrations of migratory waterfowl**

**Good**

**Trend:Stable**

Migratory waterfowl populations have remained largely stable since inscription. (North American Bird Conservation Initiative 2012)

► **The only breeding habitat in the world for the Whooping Crane**

**Low Concern**

**Trend:Stable**

The Wood Buffalo flock continues to increase slowly although the total North American population causes the species to remain “endangered”. Although the species is still endangered, it is less at risk due to the existence of other flocks (Whooping Crane Conservation Foundation - various reports and Gil-Weir, 2012; State of the Park Report 2009).

► **The largest inland delta in the world**

**High Concern**

**Trend:Deteriorating**

Risks to the natural values of the Delta have steadily increased with upstream industrial development.(State of the Park Report, 2009, Report of the Commissioner of the Environment and Sustainable Development, 2010, and others.)

► **Salt Plains**

**Good**

**Trend:Stable**

The Salt Plains environment remains stable. No significant threats have been identified through review of the literature and consultations.

► **Gypsum karst landscape**

**Good**

**Trend:Stable**

The gypsum karst features in the park remain largely undisturbed. No known

threats have been identified in the literature and through consultations.

► **Ecological completeness**

**Good**

**Trend:Stable**

The Site is the largest protected area in Canada at 44,000 sq. km. It was designated as a World Heritage Site Inferentially in recognition of its relative ecological completeness. There have been no changes in boundaries since designation.

► **North America's largest population of wild bison**

**Good**

**Trend:Data Deficient**

The wood bison population in the park was numbering approximately 5,000 in 2009 (State of the Parks Report, 2009).

**Other important biodiversity values**

► **Wood Buffalo provides habitat for the largest and most genetically diverse herd of wood bison (*Bison Bison Athabascae*) numbering approximately 5, 000 in 2009. (State of the Parks Report, 2009)**

The park contains two large RAMSAR wetlands designated to be of international importance – the Peace-Athabasca Delta and a large area of marl ponds which provide the Whooping Crane breeding habitat.

**Summary of the Values**

► **Assessment of the current state and trend of World Heritage values**

**Low Concern**

**Trend: Stable**

Most elements of the World Heritage values are either stable or improving with credit due to sound fire management, the elimination of commercial logging and better science and monitoring. The exception is the Peace-Athabasca Delta which is a critical lynchpin to so many of the World Heritage Values. Alteration of vegetation composition due to climate change and

upstream damming has been identified as an existent threat. Upstream industrial development is a potential threat although recently enhanced monitoring has not identified any specific negative impacts. The risk will, however, continue to exist necessitating ongoing monitoring and the maintenance of an appropriate response capacity.

► **Assessment of the current state and trend of other important biodiversity values**

**High Concern**

**Trend: Deteriorating**

Ramsar Wetlands

The wetland providing Whooping Crane nesting habitat remains largely undisturbed. The Peace-Athabasca Delta RAMSAR site is significantly at risk due to upstream industrial development and climate change.

## **Additional information**

### **Key conservation issues**

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► **Industrial spills/Peace-Athabasca Delta**

**Regional**

The scale of industrial development along both the Peace and Athabasca Rivers exacerbates the potential for accidental spills of toxic material and petroleum products from pipelines and other sources.

► **Long Term losses in water quality - PAD, Peace River, Slave River, Athabasca River**

**Regional**

Monitoring indicates some losses of water quality in the Peace-Athabasca Delta and three great rivers that flow through or border the site. These losses are generally associated with industrial activity.

► **Hydrological regime change - current - Peace-Athabasca Delta**

**Regional**

Since construction of the Bennett Dam upstream on the Peace River, regular flooding of perched basins has been infrequent resulting in drying of large areas and significant vegetation change affecting the availability of primary grazing.

► **Hydrological regime change - potential - Slave River Lowlands and Peace-Athabasca Delta**

**National**

Energy demands from oils sands production facilities will likely lead to re-emergence of a proposal to construct a dam in the vicinity of the Slave River rapids with associated potential for flooding of the Slave River lowlands within the park.

An additional hydroelectric dam on the Peace River (Site C) is currently undergoing environmental review.

► **Global Warming**

**Global**

Climate change forecasts suggest that the park climate will be hotter and dryer with associated wetland drying and changes in overall vegetation composition. Climate change is also affecting the hydrology of the major rivers that flow into the park (Peace and Athabasca). Forest fires may be more frequent and more intense.

► **Bison Management**

**Regional**

There are two conservation issues associated with the park bison herds. The first is the challenge of maintaining herd size and genetic diversity. The second is responding to existence of disease in the herd with the potential for transmission to cattle on ranches west of the park and to bison thought to be disease-free to the north and northwest and south of the park.

► **Whooping Crane Recovery**

**National**

The Wood Buffalo-Aransas Whooping Crane population is recovering some numbers but remains a very small population that is vulnerable to catastrophic

loss from weather events or oil and other spills in the wintering grounds.

## Benefits

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### Understanding Benefits

#### ► Is the protected area valued for its nature conservation?

Although generally less diverse than other biomes, northern boreal forests and grasslands (taiga) represent a significant land mass. The size and protected status of the park ensures a high degree of continuing representation of species associated with this biome and makes a particular contribution to the future of several species at risk and important ecological relationships such as predator-prey.

The WBNP bison herd is the most genetically diverse of any wood bison herd.

#### ► Is the protected area valued for its nature conservation?

Habitat with the site is critical to species at risk such as wood bison, whooping crane, peregrine falcon and others.

#### ► History and tradition, Wilderness and iconic features

Although Aboriginal people have moved into larger communities over the past century, the site was an important homeland to a people that lived off the land in smaller, family-oriented groups. An attachment to this land continues.

The site continues to be an important homeland and territory for many Aboriginal groups with regard to traditional harvesting and other important cultural heritage values.

#### ► Legal subsistence hunting of wild game

Traditional hunting trapping and fishing with the site continues to be an important activity for several communities.

#### ► Is the protected area valued for its nature conservation?

The Site provides critical habitat for more than eleven faunal species at risk

including whooping cranes, wood bison and peregrine falcons.

### ► **Water provision (importance for water quantity and quality)**

At the confluence of two large river systems and watersheds, the Peace Athabasca Delta is an important symbol of the importance of water quality in light of upstream industrial development and resource exploitation.

## **Projects**

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### **Compilation of active conservation projects**

<b>Nº</b>	<b>Organiz ation/ individu als</b>	<b>Pr oj ec t d ur at io n</b>	<b>Brief description of Active Projects</b>
1	Parks Canada - Wood Buffalo National Park		Wood Bison Population Monitoring Objective: to provide an estimate of the number of wood bison in the park. How: every 5 years an aerial survey is conducted in late winter.
2	Parks Canada - Wood Buffalo National Park		Peace-Athabasca Delta Vegetation Monitoring Objective: to monitor the change in vegetation species composition in the delta. How: every 5 years vegetation transects and macro-plots are monitored.
3	Parks Canada - Wood Buffalo National Park		Moose Population Monitoring Objective: to provide an estimate of the number of moose in the park. How: every 10 years aerial surveys are conducted in early winter.

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<b>No</b>	<b>Organization/individuals</b>	<b>Project duration</b>	<b>Brief description of Active Projects</b>
4	Parks Canada - Wood Buffalo National Park, Government of the NWT, Government of Alberta		Bison Disease Containment Strategy Objective: to reduce the potential for disease transmission from the greater Wood Buffalo National Park bison population to neighboring disease-free wood bison herds and domestic cattle herds. How: bison free zones are established in an area adjacent to the park and bison found in these areas are removed.
5	Parks Canada, Environment Canada, Alberta, Saskatchewan, Yukon, NWT, British Columbia, Manitoba		National Wood Bison Recovery Strategy Objective: to ensure the recovery of Wood Bison, a threatened species in Canada How: cooperation across jurisdictions to address threats and limiting factors to wood bison recovery.
6	Parks Canada, Environment Canada, NWT, Alberta, Saskatchewan and Manitoba		Recovery Strategy for the Whooping Crane in Canada Objective: to ensure the recovery of whooping cranes, an endangered species in Canada How: cooperation across jurisdictions to address threats and limiting factors whooping crane recovery.

№	Organization/ Individuals	Project duration	Brief description of Active Projects
7	Parks Canada - Wood Buffalo National Park		Flood Monitoring and Water Extent in the Peace-Athabasca Delta Objectives: to provide annual measurement of wetlands in the delta; to determine areas covered by open water, emergent vegetation and dry land. How: Remote sensing images are used to detect the three classes of ground cover (open water, flooded vegetation and dry ground) within the delta. Park staff visit numerous sites in the delta at roughly the same time as the satellite images are collected to report what is seen on the ground.
8	Environment Canada and Parks Canada - Wood Buffalo National Park		Suspended sediment sampling on the Athabasca River downstream of the oil sands region in Alberta Objectives: to assess contaminant levels in suspended sediments from the Athabasca River downstream of the Alberta oilsands; to compare results from two methodologies for collecting the suspended sediments (use of continuous flow centrifuges vs. passive collection) How: Sediments will be collected using a continuous flow centrifuge and a passive sediment tube.
9	Parks Canada - Wood Buffalo National Park		Snowshoe hare monitoring Objective: to provide an indication of relative abundance of snowshoe hare in the park. How: every year the abundance of snowshoe hare pellets is monitored along permanent transects.
10	Environment Canada and Parks Canada		Whooping Crane Monitoring Objective: to document the number of nesting pairs and the number of fledged chicks each year. How: survey flights take place each year in May and in early August.

№	Organization/ Individuals	Project duration	Brief description of Active Projects
11	Environment Canada and Parks Canada - Wood Buffalo National Park.		Water Quality Monitoring on the Athabasca and Peace Rivers Objectives: To monitor water quality along the lower reaches of the Athabasca and Peace Rivers. How: Since 1989, water sampling for monitoring of basic water quality parameters (such as pH, conductivity, turbidity, dissolved oxygen, temperature, and nutrient levels) has been occurring on a regular basis. In 2012, automated water quality monitoring stations were set up on floating platforms on the Athabasca and Peace Rivers. The stations are designed to continuously monitor basic water quality parameters such as pH, conductivity, turbidity, dissolved oxygen, and temperature, as well as additional parameters that may be linked to industrial activities in the region. The automated stations include passive water quality samplers which are suspended from the platforms for the collection of monthly water samples. These samples will be sent to a lab for analysis of levels of polycyclic aromatic hydrocarbons, metals and naphthenic acids.
12	Environment Canada - Water- Climate Impacts Research Centre, and Parks Canada		Peace-Athabasca Delta Hydro-Ecology Objective: To develop a science-based framework for the monitoring and assessment of deltaic wetland ecosystems, with a focus on the Peace-Athabasca Delta. This will include the development of diagnostic tools that can be used to interpret hydrological and ecological change in deltaic environments. How: A suite of climatic, hydrometric, water chemistry and biological data will be collected and analyzed. A water balance model will be developed.
13	Environment Canada / Parks Canada / Mikisew Cree Commun ity- Based Monitori ng Program		Assessing impacts of oil sands development on fish eating birds Objectives: to assess the state of the environment, with a focus on identifying pathways of toxic chemical transfer to wildlife and possible impacts; to measure contaminant levels in fish-eating bird eggs and determine spatial and temporal trends How: Freshly-laid gull and tern eggs are collected and sent to a lab for chemical analysis of oil sands-related chemicals such as mercury, arsenic, and polycyclic aromatic hydrocarbons. Stable isotopes of nitrogen and carbon are measured to provide an indication of bird diet. Numbers of nests are also counted at colony sites.

№	Organization/ Individuals	Project duration	Brief description of Active Projects
14	Keyano College, Environment Canada and Parks Canada - Wood Buffalo National Park.		<p>Health of Amphibian Populations Objectives: to address concerns about the potential impacts of industrial development, including oil sands mining activities, in the Peace-Athabasca Delta and elsewhere in northern Alberta and the NWT; to assess the health of frog populations at varying distances from disturbances including oil sands operations. The health of frogs can serve as an indication of the larger ecosystem; to monitor the level of contaminants such as mercury in frog tissues and pond water because contaminants may enter the food chain through frogs How: We are examining relationships between the health of frog populations and distance to different kinds of disturbance, especially oil sands mining and upgrading activities. Wood frogs are a good species to study because they are widely distributed in the boreal forest and are sensitive to changes in the environment. Tissue samples are collected from frogs to test for disease, and to test for levels of contaminants. Frogs are examined for physical deformities and other indications of poor health. Water samples are collected to test for general water quality, and to test for the presence of contaminants.</p>
15	Environment Canada		<p>Acid Lakes Survey Objectives: To obtain contemporary water chemistry data from a randomly-selected subset of lakes in the region potentially affected by acidifying emissions from the oil sands industry. How: Approximately 350 lakes have been sampled for water chemistry.</p>
16	Environment Canada and Parks Canada - Wood Buffalo National Park		<p>Air Quality Monitoring - CAPMoN Objective: to monitor the long-range transport and trans-boundary transport of air-borne contaminants, including those emitted from the oil sands development area. How: By developing a Canadian Air and Precipitation Monitoring Network (CAPMoN) site in WBNP. Measurements will include daily integrated samples for the determination of concentrations of major ions and tracer metals in aerosols as well as precipitation. Additional high priority measurements could include NO, NO<sub>2</sub>, NO<sub>y</sub>, NH<sub>3</sub>, SO<sub>2</sub>, and VOCs as well as weekly composite samples for metals in precipitation and composite PM<sub>2.5</sub> samples. Consideration will be given to atmospheric Hg sampling, PACS, O<sub>3</sub>, CO and H<sub>2</sub>S.</p>

№	Organization/ Individuals	Project duration	Brief description of Active Projects
17	Environment Canada, Parks Canada, Aurora Research Institute, Ontario Genomics Institute, and other partners.		Biomonitoring 2.0 Objectives: to identify and quantify species richness (biodiversity) at a site using genetic material gathered from pitfall trapping, soil, water and benthic sampling. To obtain biodiversity sample sets from wetland sites in Wood Buffalo National Park for DNA sequencing analysis; to obtain local habitat information associated with the biodiversity samples collected - including historical trend information, GIS data, and local physico-chemical analysis. How: This project will utilize DNA barcoding which is a genomics tool used to identify individual species from only a short segment of DNA whose sequence is unique to that species. Aquatic and terrestrial microhabitats will be sampled for both macro-organisms (such as benthic macroinvertebrates) and micro-organisms using standard collection techniques. Water and soil samples, along with other field survey information, will be collected to provide relevant physico-chemical data for interpretation of biodiversity patterns resolved by DNA sequencing.
18	Peace-Athabasca Delta Ecological Monitoring Program (PADEMP)		Muskrat Monitoring Objectives: To determine: the trend in relative abundance of muskrats within the Peace-Athabasca Delta over time; whether there is a difference in muskrat abundance between basins receiving water from the Athabasca and Birch Rivers; whether there is a difference in water quality between productive and unproductive basins; how long it takes for muskrats to re-establish after average to above-average snowfall years, or after flood events. How: muskrat push-ups and houses are counted and measured within 15 basins. At each basin, habitat measurements (snow depth, ice thickness, water depth, physical water quality parameters) are recorded and water quality samples are taken.
19	Parks Canada - Wood Buffalo National Park		Fire Frequency and Extent Monitoring Objective: to monitor the annual area of forest burned in the park. How: Every year, each fire that burns in the park is mapped and the total area burned calculated.
20	Parks Canada - Wood Buffalo National Park		Monitoring Water Quality in Lakes Objective: to monitor the water quality of Pine Lake and Rainbow Lakes as representative lake ecosystems in the park. How: monthly water samples are taken from each lake during the open water season

<b>No</b>	<b>Organization/individuals</b>	<b>Project duration</b>	<b>Brief description of Active Projects</b>
21	Mikisew Cree First Nation and Athabasca Chipewyan First Nation		Community-based Monitoring Program Objective: To track changes to the water and land in the traditional areas of the Mikisew Cree and Athabasca Chipewyan First Nations. How: The program relies on both scientific and Indigenous Knowledge monitoring methods to allow ACFN and MCFN members to better understand the environmental changes they see at both local and regional scales.

### Compilation of potential site needs

<b>No</b>	<b>Site need title</b>	<b>Brief description of potential site needs</b>	<b>Support needed for following years</b>
1	Parks Canada, Environment Canada, Alberta, NWT and Aboriginal groups	Wood Bison Monitoring, Research and Management Program Objective: improve our understanding of wood bison population dynamics (including the interaction of disease with predation and other environmental factors), movement and habitat use. How: implement a research program in collaboration with neighboring governments and Aboriginal groups.	

<b>No</b>	<b>Site need title</b>	<b>Brief description of potential site needs</b>	<b>Support needed for following years</b>
2	Government, Industry, ENGOS and Aboriginal groups	Mitigating cumulative effects on the hydrology of the Peace-Athabasca Delta. Objective: develop a strategy to mitigate the cumulative effects of upstream industrial development and climate change on the hydrological regime of the Peace-Athabasca Delta. How: in the context of an Area Management Plan for the Delta, and through the use of both Traditional Knowledge and Western Science, explore the consequences of flow regulation and water withdrawals under various plausible climate change scenarios and develop, test and implement effective mitigation options.	

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