

IUCN Conservation Outlook Assessment 2017 **(archived)**

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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**

### **2017 Conservation Outlook**

#### **Significant concern**

This assessment conveys two seemingly contradictory messages. On the one hand, vast areas of Wood Buffalo National Park are in a good state of conservation due to its sheer scale and remoteness. The recovery of the iconic Whooping Crane, for all its fragility along the migration route and in the winter range, is one of the most spectacular species conservation stories worldwide. On the other hand, the fate of the Peace-Athabasca Delta stands in stark contrast to the positive conservation status and outlook across large parts of the national park. The combination of climate change and massive hydrological alteration has resulted in ecological, socio-economic and cultural impacts. Simultaneously, the delta is at significant risk from upstream industrial development along both the Peace and the Athabasca Rivers, most strikingly from the expanding Alberta oil sands. Threats and risks include water withdrawals and the potential for accidental and long term discharges of toxic material including petroleum products. Experienced scientists express concern about leakage from and breaches of tailings ponds (see Jaeger et al. 2016 for an overview). The management response is inadequate in light of the scale, pace and complexity of the challenges at a time when Parks Canada has recently suffered major budget cuts and lost important science capacity. Significant investment in better understanding and monitoring the impacts and risks from industrial development, including hydropower development in needed, as is enhanced water governance across jurisdictions and more meaningful of First Nations and Métis in the management and governance (decision-making) of the national park and its surroundings.

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

##### **High Concern**

##### **Trend: Deteriorating**

Many of the World Heritage values are stable due to the vast scale and remote

location of the property. Compared to ill-advised commercial logging and bison management in the past, it can be argued that there are some important positive trends in the management. Likewise, the rights of First Nations and Métis are starting to be taken more seriously than they have been in the past. The alarming exception is the Peace-Athabasca Delta which is a critical lynchpin to both many of the World Heritage values and cultural and socio-economic values. The combination of climate change and upstream dam construction has been changing the processes, vegetation and navigability of the delta. Upstream industrial development on both main rivers and in particular in the Alberta oil sands comes with impacts and risks. Despite considerable efforts, the monitoring and governance in place does not do justice to the scale and complexity of the challenges.

## **Overall THREATS**

### **High Threat**

Many of the observable ecological and cultural changes in Wood Buffalo National Park can be linked to decades of massive industrial development along the Peace and Athabasca river corridors. The concerns about impacts crystalize in the Peace-Athabasca Delta, which is arguably the most valuable and the most vulnerable part of the property. It is troubling that well-known and massive environmental management challenges do not receive the deserved attention despite consistent concerns by a wide range of credible actors, stakeholders and rights-holders. Very little is known about the cumulative effects of the various large-scale industries operating upriver of the property. Instead, numerous additional project proposals add complexity at a time when there are clear signs of major environmental change based on both science and local knowledge and overarching climate change would seem to call for a more cautious approach. While the overall state of conservation of most of the property continues to be good, the multitude of complex and growing threats and the simultaneous lack of an adequate, coordinated and coherent management response underpins the decision to rank the overall threats as high.

## **Overall PROTECTION and MANAGEMENT**

### **Some Concern**

Overall, protection and management of the actual national park site is mostly effective. As acknowledged in the State of the Park Report (Parks Canada, 2009)

there is considerable room for improvement in several areas of concern. With the exception of differing views on the role of First Nations and Métis in future governance none of such concerns is fundamental though. Despite recent budget and staff cuts, site management has the overall capacity to manage the property within the limits of its jurisdiction and responsibility. However, as noted above, the major threats to Wood Buffalo National Park neither originate in the park nor can they be solved in the there. Even leaving climate change aside, there are challenges in terms of integrating social and environmental considerations in the decision-making about upstream industrial development. To this day, there is not even a monitoring system of the oil sands which industry, First Nations and environmental NGOs could jointly agree on. This illustrates that mechanism to negotiate a more balanced approach to industrial development remain to be found.

# FULL ASSESSMENT

## Description of values

### Values

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#### World Heritage values

- ▶ **Irreplaceable example of a large Great Plains-Boreal Grasslands Ecosystem**  
Criterion:(ix)

WBNP is the largest and ecologically most complete remaining example of the Great Plains-Boreal Grasslands Ecosystem of North America and includes some of the largest undisturbed grass and sedge meadows left in North America (Statement of Significance, 1983). WBNP also harbors some of the largest relatively undisturbed and least fragmented forest and wetland ecosystems in all of North America (SoOUV, 2015).

- ▶ **Extraordinary concentrations of migratory waterfowl and other wildlife**  
Criterion:(vii)

The Peace-Athabasca Delta is one of the most important waterfowl nesting and staging areas in North America (Parks Canada, 2010), attracting, for example, huge numbers of snow goose (*Anser caerulescens*), white-fronted goose (*Anser albifrons*) and Canada geese (*Branta canadensis*), all seven species of North American grebe and species of duck (Statement of Significance, 1983). The national park is situated at the intersection of four major bird migration flyways.



## **Only summer range and breeding ground of wild Whooping Crane (Grus americana)**

**Criterion:(x)**

The property and its immediate surroundings are the only summer range and breeding ground of the only wild, self-sustaining migratory flock of the endangered Whooping Crane (*Grus americana*) (SoOUV, 2015, COSEWIC, 2010, Statement of Significance, 1983). The very survival and conservation success story of the species is intricately linked to the property. The overlapping Ramsar site named Whooping Crane Summer Range furthers demonstrates the global significance of the site for the conservation of the iconic species, North America's tallest bird.

### **► Massive and complex inland delta**

**Criteria:(vii)(x)**

The Peace, Athabasca and Birch Rivers and numerous smaller rivers and creeks form one of the world's largest and most complex inland deltas in the property, arguably the world's largest boreal inland delta. While it is not agreed what exactly constitutes the delta, it is widely accepted that roughly 80% of it is located within WBNP (Timoney, 2013). The delta provides resting and nesting habitat for some of the largest concentrations of migratory waterfowl in North America (SoOUV, 2015; Parks Canada, 2010). The natural resources of the productive delta have been and continue to be of major importance for traditional livelihoods of First Nations and Métis.

### **► Unique salt plains and gypsum karst landscape**

**Criteria:(vii)(ix)**

The property protects vast expanses of salt flats described as unique in Canada and internationally significant areas of gypsum karst, both associated with rare ecological communities. The gypsum karst landscape features impressive sinkholes and cave systems, which provide important bat habitat and sustain complex ecological communities (SoOUV, 2015, Statement of Significance, 1983).

### **► Mosaic of mostly intact ecosystems permitting processes with a high degree of naturalness at a large scale**

**Criterion:(ix)**

The large, interlinked and mostly intact ecosystems within the national park permit the continuation of longstanding and permanently dynamic processes, including comparatively natural fire and other disturbance regimes. The predator-prey relationships between exceptionally large grey wolf and wood bison stand out as another particularly prominent example (SoOUV, 2015, Statement of Significance, 1983).

### ► **Globally largest population of free-ranging Wood Bison**

#### **Criterion:(x)**

Wood Buffalo National Park and its immediate surroundings are home to the largest and most genetically diverse herd of wood bison worldwide (*Bison bison athabasca*) (Environment and Climate Change Canada, 2016). Recent estimates suggest roughly 5,000 individuals in the Wood Buffalo meta-population in 2016 (Ball et al., 2016), some 60% of the entire Wood Buffalo population in Canada (COSEWIC, 2013). The establishment of the national park in 1922 explicitly aimed at protecting northern Canada's last remaining bison herd of some 250 animals only at the time (COSEWIC, 2013).

## **Other important biodiversity values**

### ► **Freshwater biodiversity**

While the terrestrial biodiversity attracts more prominent attention in Wood Buffalo National Park, it is important to recall that the vast and diverse freshwater systems, including but not limited to the Peace-Athabasca Delta, host an an important and highly productive freshwater biodiversity.

### ► **Longstanding human interaction with the landscape and its biodiversity**

The natural environment and biodiversity of what today constitutes the property, have been shaping indigenous lifestyles and worldviews - while indigenous peoples simultaneously have been shaping the natural environment and biodiversity.

## ► Caribou

Boreal caribou populations (*Rangifer tarandus*, VU) has seen a decline across Canada, and WBNP is an area of critical habitat. Caribou were once an important part of the diet for indigenous people in the area. WBNP is one of the few places in western Canada that is a large enough protected area to make caribou maintenance/recovery likely.

## Assessment information

### Threats

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#### Current Threats

##### High Threat

Compared to most protected areas in the world, WBNP enjoys a high degree of natural protection through its location and unusually large surface area. Vast areas continue to be in a good state of conservation. The vast size and remoteness does not make the property immune to threats, though. This is most visible in the Peace-Athabasca Delta, which is both disproportionately valuable and vulnerable. A combination of pressures, including climate change as an overarching concern, individually and cumulatively increases pressure on the delta. Concerns include quantitative and functional changes of the hydrological system due to flow regulation and water abstraction but also declining water quality resulting from upstream industrial development along both the Peace and the Athabasca Rivers. The massive development of the Alberta Oil Sands is not accompanied by adequate monitoring and environmental management considering local knowledge, perceptions and interests. The proposed Teck Frontier Project would move the development frontier north near the immediate vicinity of the southern boundary of WBNP and the Peace-Athabasca Delta, in addition to threatening the future of the genetically important and disease-free Ronald Lake Wood Bison herd. The project can thus be seen as a political litmus test in terms of the balancing

between competing societal interests. Social change is a reality, which affects the relationship between the landscape and its traditional inhabitants. Past governmental policies have explicitly sought to assimilate indigenous peoples and the creation of the national park itself has restricted First Nations and Métis access to traditionally used natural and cultural resources. There is a risk of losing the attachment to the land at a time when First Nations and Métis are actively calling for respect for their in principle far-reaching rights.

### ► **Invasive Non-Native/ Alien Species**

#### **Low Threat**

**Inside site, localised(<5%)**

**Outside site**

While there appear to be no records of faunal IAS, Parks Canada (2009) noted "an abundance of non-native plants occupying large areas of the delta meadows", in particular of Canada Thistle (*Cirsium arvense*) and Perennial Sow-thistle (*Sonchus arvensis*). The mission report of the reactive monitoring mission notes First Nations concerns about introduced plant species in the Peace-Athabasca Delta.

### ► **Industrial/ Military Effluents**

#### **Low Threat**

**Outside site**

Somewhat overshadowed by the more visible Alberta Oil Sands, the pulp and paper industry has been impacting on the national park for decades. Glozier et al. (2009) note five mills are operating on both main rivers upstream of the property. Impacts from paper mill effluents can be categorized as (i) organic inputs; (ii) colour and turbidity; (iii) toxic effects; and (iv) eutrophication (Chambers, 1996). Despite technological improvements, the pulp and paper mills continue to be point source stressors to the main rivers flowing into the Peace-Athabasca Delta (Glozier et al. 2009), thereby contributing to the cumulative effects of industrial development along the Peace and Athabasca River corridors.

### ► **Habitat Shifting/ Alteration**

**High Threat**

**Inside site, throughout(>50%)**

**Outside site**

High latitudes and wetlands are known to be disproportionately affected by climate change. This illustrates that the property is exceptionally vulnerable, the complex Peace-Athabasca Delta serving as a prime example. Warmer and drier conditions, as well as changing precipitation patterns will strongly affect the hydrological and ecological processes.

► **Housing/ Urban Areas**

**Low Threat**

**Outside site**

While the focus of the discussion about impacts from the Alberta Oil Sands is on the industrial activities, it must not be forgotten that this highly industrialized part of Alberta created - and sustains - the growing town of Fort McMurray, which comes with its own ecological footprint, such as from pollution and poaching.

► **Forestry/ Wood production**

**Low Threat**

**Outside site**

Commercial logging of primary riparian White Spruce (*Picea glauca*) forests took place in the national park from 1951 to 1991, i.e. partially after the World Heritage inscription (Timoney, 1996). This unexpected and regrettable logging history could eventually be halted by court decision. Most observers consider it unlikely that commercial forest operations could return to the national park today or in the foreseeable future. Less obvious impacts stem from forestry operations outside of the property in both Alberta and the Northwest Territories. Environmental impacts include the modification of water regimes and characteristics, as well as the indirect consequences of facilitating motorized land access to remote wilderness. Logging is therefore known to be a major driver of landscape change across much of Canada's boreal forest region (COSEWIC, 2013, 2002).

► **Mining/ Quarrying**

**High Threat**

### **Outside site**

The Alberta Oil Sands are a globally significant fossil fuel deposit, which has been massively extracted along the lower Athabasca River since the mid 1960s. Over time, a highly industrialized zone has been expanding and moving ever closer to the southern boundary of WBNP. Surface mining and in situ approaches are applied and both have been raising well-documented concerns in terms of environmental and human health (Schindler, 2015, Hodson, 2013; Timoney, 2013, Kurek et al. 2013; Weinhold, 2011). The currently proposed Teck Frontier Project epitomizes the risks and conflicting interests and positions. If approved, the project would move the expanding development frontier close to the southern boundary of the property and thereby also much closer to the Peace-Athabasca Delta, causing major cultural (indigenous) and conservation concerns. Based on a literature review, the 2016 reactive monitoring mission distinguished major areas of concern as follows:

- (i) Tailings water ponds and contaminants causing risks of direct exposure to fish and wildlife, both leaks and spills convey contaminants into rivers that can affect aquatic organisms and be transported downstream towards the delta.
- (ii) Water withdrawals by oil sands operators from the Athabasca River that may be affecting in-stream flows towards the delta;
- (iii) Atmospheric deposition of particles containing contaminants such as polycyclic aromatic hydrocarbons (PAHs), nitrogen oxides, and sulphate;
- (iv) Avoidance of this highly industrialized region by migratory birds en route to WBNP or on their way south, including the endangered Whooping Crane;
- (v) Encroachment into the documented habitat of the Ronald Lake Bison Herd of Wood bison placing the actively mined oil sands region ever closer to the southern boundary of WBNP.

### **► Commercial/ Industrial Areas**

#### **High Threat**

#### **Outside site**

In addition to the threats from individual development projects and areas, there is longstanding and increasing concern about the poorly understood cumulative effects of multiple agents of environmental change. Besides the well-known concerns about hydropower development and the expanding Alberta Oils Sands region, there is also a long history of mineral exploration

and extraction, including past and proposed uranium mining near the property.

### ► **Other Activities**

#### **High Threat**

##### **Outside site**

Causes for migration mortality include collisions with power lines, exposure to toxic tailings ponds, decreasing stopover habitat and even some illegal shooting. The coastal marshes of the Gulf Coast of Texas in and near Aransas National Wildlife Refuge are the only winter range of the flock. This winter range is under increasing stress from multiple pressures (COSEWIC, 2010, CWS et al. 2007). It is clear that such concerns are beyond the direct control of site management, i.e. they can only be addressed by coordinated bi-national management and conservation efforts.

### ► **Changes in traditional ways of life and knowledge systems, Identity/ Social Cohesion/ Changes in local population and community**

#### **Low Threat**

##### **Inside site, throughout(>50%)**

##### **Outside site**

The ancient indigenous history of what is today the national park and its surroundings is intricately linked with the landscape and has contributed to shaping it. Assimilation policies and other factors, including access restrictions to the national park, have induced important changes to traditional ways of life. Furthermore, increasing human population and industrial installation of seismic lines and service roads, as well as motorized off-road transportation is leading to encroachment on WBNP. These pose threats not only to wildlife, but lead to competition of the resources guaranteed to support Indigenous Peoples by Treaty 8 of 1899.

### ► **Other Ecosystem Modifications**

#### **Low Threat**

##### **Outside site**

Caribou habitat and population is decreasing, affected by habitat loss, noise and increased predation by wolves.

## ► Dams/ Water Management or Use

### High Threat

### Outside site

Major hydropower development under British Columbia's "Two Rivers Policy" predates the World Heritage inscription. Despite its location far away from the property in another province, this policy has been affecting the property since the late 1960s when the Bennett dam was constructed. To this day, there are major water governance challenges across jurisdictional boundaries. Jointly, the Bennett and the Peace Canyon dams on the Upper Peace River constructed in the 1960s and 1970s, respectively, capture more than half of the runoff of the entire Peace River, thereby significantly modifying downstream water and sediment deliveries, including as regards the Peace-Athabasca Delta. Major assessments in response to the observable post-dam drying of the delta under the Northern River Basins Study (NRBS) and the Peace-Athabasca Delta Technical Studies (PADTS) found that the entire Peace-Athabasca-Slave system was influenced by both flow regulation and climate change (Prowse et al. 2006, Peters et al. 2010, 2001). The Bennett Dam, in particular, induced an array of hydrological and ecological impacts to the Peace River and downstream ecosystems in WBNP. While there are differing opinions regarding the relative importance of flow regulation versus climate change as contributors to ecological changes, important negative effects of flow regulation are well documented and widely accepted and in line with the increasingly advanced scientific understanding of the impacts of flow regulation. Regulation of the Peace River through the construction of hydropower projects along the upper reaches in British Columbia is therefore widely accepted to be a continual and significant threat to the integrity of the delta (Jaeger et al. 2016). First Nations and Métis plausibly associate the changed water regime with increasingly difficult access to the delta and a severe decline of muskrat populations, which are of vital ecological and livelihood importance. The Bennett Dam has also resulted in a significant reduction in sediment load, leading to negative impacts on the Slave River Delta (English et al., 1997). Similar potential impacts on the PAD has not been fully assessed, and is an area that requires further investigation. At a time when additional dams are under construction and/or planned, it is high time to invest in a better understanding of the effects of dam construction as a foundation for adequate assessment and

mitigation. The report documenting the 2016 reactive monitoring mission contains a useful overview of the discussion.

## **Potential Threats**

### **High Threat**

The particularity of most of the potential threats to the property is that they are typically not entirely new threats but rather stem from the potential intensification of well-known existing threats. The arguably highest threat to the conservation values as understood and protected today are the anticipated impacts of climate change. It is widely accepted and well-documented that climate change disproportionately affects the high latitudes and wetlands, suggesting major vulnerability of WBNP. While WBNP continues to be a solid pillar underpinning the exceptional conservation success story of the Whooping Crane, the species continues to be extremely vulnerable along its migration route and the coastal winter range in the U.S.A. Further dam construction, which is ongoing with plans for additional projects, adds complexity to the management of the already altered flows of the Peace River and possibly other rivers.

#### **► Temperature extremes**

##### **High Threat**

**Inside site, throughout(>50%)**

**Outside site**

Due to the amount of uncertainty, climate change is listed here as a potential rather than current threat despite already observable climate change. Unlike most other threats, one major concern is that climate change is likely to induce severe systemic change which would affect all conservation values of WBNP, as well as traditional natural resource use. It is clear that the Peace-Athabasca Delta - and other wetlands in the property - are particularly vulnerable to climate change. Timoney (2013) provides a useful discussion of the complexity of change that can be expected and is partially observable already.

#### **► Storms/Flooding**

**High Threat**

### **Outside site**

The Aransas-Wood Buffalo flock remains the largest and only self-sustaining population of Whooping Crane. A single catastrophic weather event could severely affect and potentially wipe out this critical population (Gil-Weir et al. 2012).

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

### **High Threat**

#### **Outside site**

Besides the controversial Site C project on the Peace River, under construction at the time of writing, another proposal named Amisk is under discussion. There are also longstanding project ideas on the Slave River, mentioned already in the World Heritage nomination and the IUCN evaluation in the early 1980s. Hydropower development is therefore considered both an important current and potential future threat.

## **► Livestock Farming / Grazing**

### **Low Threat**

#### **Outside site**

Cattle and bison farming interests continue to press for elimination of potential sources of bovine brucellosis and tuberculosis through depopulating the entire wood bison herd. Although current government policy is not supportive (Parks Canada, 2010) and strong public opposition is predictable, disease outbreaks in cattle or bison 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. As the likelihood of implementation seems low, the threat is ranked as low. At the same time, it is clear that a possible decision in favor of depopulating would raise severe conservation questions - in addition to practical, financial and ethical questions (see Shury et al., 2015).

## **Protection and management**

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### **Assessing Protection and Management**

## ► **Relationships with local people**

### **Serious Concern**

The current management plan (Parks Canada, 2010) acknowledges the need to improve the framework to engage local people, in particular First Nations and Métis in park planning and management. The long history of access restrictions to the resources in the national park has created tensions and conflicts which continue to strain relationships and trust. Local opposition to World Heritage status is likewise documented. Beyond tensions with Parks Canada as the land manager, there are conflicts with other governmental institutions and the private sector, in particular as regards the Alberta Oil Sands. As an example, all First Nations have withdrawn their initial involvement in the Joint Oil Sands Monitoring (JOSM) “due to concerns about the engagement process, limited incorporation of traditional ecological knowledge, and lack of transparency” (2015 State of Conservation Report).

## ► **Legal framework**

### **Some Concern**

WBNP is adequately gazetted under Canada's National Parks Act (CNPA) and corresponding regulations under the umbrella of the Parks Canada Guiding Principles and Operational Policies (GPOP, signed in 1994). The WBNP Game Regulations dated 1978 are acknowledged as being outdated and revision is pending (Parks Canada, 2009). Specific guidance is contained in the Management Plan (Parks Canada, 2010). Further relevant legislation includes, for example, the Canadian Environmental Protection Act (1999), the Fisheries Act (1985), the Migratory Birds Convention Act (1994) and the Species at Risk Act (2003). In terms of indigenous rights, the report of the 2016 reactive monitoring mission notes a lack of clarity as regards the overlapping layers of rights and how they relate to the national park.

## ► **Enforcement**

### **Some Concern**

Over many decades, law enforcement inside the national park focused on enforcing the access restrictions and predictably strained the relationship between park staff and local residents. Since the options for traditional harvesting have been improved, such tensions have reportedly relaxed.

Nevertheless, contentious incidents continue to occur into the recent past. It can be argued that the commercial logging occurring from 1951 to 1991 inside the property is likewise a law enforcement issue given that a court decision eventually declared the logging illegal.

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

### **Some Concern**

The property finds itself in a privileged position due to its large size, still comparatively remote location and the absence of direct pressures along most of its boundaries. At the same time, the federal management of the national park is not effectively coordinated with adjacent territorial and provincial jurisdictions and land use planning is not harmonized. Even the coordination between the national park and sub-national level protected areas, some of which are contiguous to the property, appears to be minimal. As the intensity of land and resource use increase in the Wider Wood Buffalo National Park Ecosystem, improved communication, coordination and cooperation seems highly desirable. This would constitute a step towards a functional buffer zone.

## ► **Management system**

### **Serious Concern**

The management system in the conventional protected area management sense is functional. As mentioned above, the challenge is that all key threats are stemming from outside the national park and are thus to a large degree beyond the reach and mandate of Parks Canada, the land manager of the federal national park (Jaeger et al. 2016).

## ► **Management effectiveness**

### **Mostly Effective**

The management in the conventional sense of the term is by and large effective, albeit partially compromised by budget cuts resulting in stretched human and operational resources. The main challenges are two-fold: First, there is a demand for a much more meaningful involvement of First Nations in the management and governance (decision-making) and it remains to be seen how this will be reflected in future management and governance. Second, most - if not all - threats stem from outside the national park, which

means that the land manager's mandate and capacity to influence decisive factors is severely limited. The longer term effectiveness will therefore to a large degree depend on the capacity to be involved in and influence decision-making beyond the park boundaries.

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

### **Some Concern**

Most decisions and recommendations have been implemented, albeit not necessarily as a function of the World Heritage context *pe se* and the implementation of most recent decisions remains pending. It is interesting to note that the inscription decision and subsequent decisions expressed concern about possible dam construction on the Slave River. To this day, there is interest in developing the the project and to this day the State Party has not distanced itself unambiguously from it. Over the years the Committee expressed concern about bison disease management, logging within the park and winter road construction. While logging was eventually terminated, this was a result of a court decision rather than a response to Committee concerns. The proposal to eliminate the bison herd to reduce transmission threats was likewise not put on ice due to the World Heritage status. It appears that World Heritage status did have a more meaningful role in the rejection of the construction of an additional winter roads within the national park even though non-governmental opposition appears to have been more decisive (<http://whc.unesco.org/en/list/256/documents/>; Parks Canada, 2010).

## ► **Boundaries**

### **Some Concern**

Similar to the above consideration of integration into broader planning schemes - or lack thereof - the privileged position of Wood Buffalo National Park deserves to be emphasized once more. The huge size and high degree of natural protection due to the remote location make the schematic configuration largely ignoring ecological landscape features acceptable. At the same time, it is clear that it would be beneficial to move to a more sophisticated boundary configuration in anticipation of intensifying land and resource use around the national park. One striking example is the fact that important parts of the Peace-Athabasca Delta are excluded from the national

park. Other examples include important wood bison range and Whooping Crane summer range outside of the park boundaries. The report of the reactive monitoring mission offered three options to respond to the simplistic boundary configuration (Jaeger et al. 2016): (i) the adaptation of the boundaries; (ii) the creation of a buffer zone, and (iii) integration into wider land use planning efforts.

## ► **Sustainable finance**

### **Some Concern**

While the financing of Wood Buffalo National Park permits basic management and operations, it suffered budget reductions in 2012 and despite its scale and importance the property was even switched to seasonal operations status. The Office of the Auditor General of Canada (2013) noted that Parks Canada “has not clarified how and by when, with significantly fewer resources, it will address the backlog of unfinished work, the emerging threats to ecological integrity, and the declines it has identified in the condition of many park ecosystems”, indicating the scale of the challenges.

## ► **Staff training and development**

### **Some Concern**

Staff is well-qualified and highly dedicated and cooperates with a broad range of agencies and research institutions. Budget cuts and switching to seasonal operations status has stretched the human resources and presence on the ground in key areas (Jaeger et al. 2016).

## ► **Sustainable use**

### **Data Deficient**

Since the cessation of commercial logging, resource use is restricted to traditional hunting, trapping and fishing by Aboriginal people. There is very little data related to the impact of traditional activities on fish and wildlife populations (Parks Canada, 2009).

## ► **Education and interpretation programs**

### **Some Concern**

The management plan (Parks Canada, 2010) identifies a priority to improve

education and interpretation programs, suggesting room for improvement.

## ► **Tourism and visitation management**

### **Some Concern**

The management plan (Parks Canada, 2010) identifies a priority to promote visitation and tourism. This is in line with a recent and controversial overall shifting of management priorities in Canadian national parks towards tourism. An alarming example of this trend drew international attention, when recent attempts to offer commercial flight tours over the sensitive nesting sites of Whooping Crane, one of the rarest birds in the world. The incomprehensible proposal could only be halted at the last minute while the tours were already offered (Parks Canada, n.d.).

## ► **Monitoring**

### **Some Concern**

Conventional monitoring inside the park is largely functional, albeit limited due to resource constraints. The main challenges are related to the monitoring of the impacts of highly complex and large-scale industrial development. Such monitoring inevitably requires the involvement of multiple institutions, stakeholders and rights-holders, many of which have different interests, positions, incentives etc. and limited to no mutual trust. Despite considerable investment, agreed protocols and working modes remain to be found, as illustrated by the fact that all First Nations have left a major joint monitoring effort in response to a perceived lack of meaningful involvement and transparency. Major challenges include the adequate consideration of local and indigenous knowledge and views and monitoring responses to cumulative effects of multiple stressors.

## ► **Research**

### **Some Concern**

The site has an excellent record of engaging scientists of both Parks Canada and numerous renowned universities and multiple other governmental agencies in major research efforts. There are well-documented concerns about the reduction of Parks Canada's science capacity and First Nations routinely criticize the still limited consideration of local and indigenous

knowledge.

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

### **Some Concern**

Overall, protection and management of the actual national park site is mostly effective. As acknowledged in the State of the Park Report (Parks Canada, 2009) there is considerable room for improvement in several areas of concern. With the exception of differing views on the role of First Nations and Métis in future governance none of such concerns is fundamental though. Despite recent budget and staff cuts, site management has the overall capacity to manage the property within the limits of its jurisdiction and responsibility. However, as noted above, the major threats to Wood Buffalo National Park neither originate in the park nor can they be solved in the there. Even leaving climate change aside, there are challenges in terms of integrating social and environmental considerations in the decision-making about upstream industrial development. To this day, there is not even a monitoring system of the oil sands which industry, First Nations and environmental NGOs could jointly agree on. This illustrates that mechanism to negotiate a more balanced approach to industrial development remain to be found.

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

#### **Serious Concern**

Climate change is an overarching concern known to disproportionately affect high latitude ecosystems. It is clear that site management has severely limited management options only in this regard. Other major threats to the property likewise stem from the outside. The two major external threats to the cultural and natural heritage values of the property are contamination and major modification of natural water regimes. Air and water quality impacts are associated with upstream industrial activity on both the Athabasca and the Peace Rivers, in particular oil sands development, agriculture and the pulp and paper industry. Dam construction starting on the Peace River in the late 1960s has substantially altered the natural flow of the Peace and further dam construction has since added complexity. Today, another major dam is under construction and there are plans for additional dams, including possibly on the Slave River. The mandate of Parks Canada as

the land manager of the national park are limited in terms of addressing threats outside of a federal protected area. The major economic and political importance of the oil sands puts further limits to conservation effectiveness. Finally, water governance across jurisdictional borders suffers from known but unresolved deficiencies. At the same time, the explicit “Ecological Integrity” tenet of Parks Canada provides a mandate and obligation to be involved in decision-making outside the national park when that decision-making can impact on the property. Site management continues to work with external management authorities to prevent and mitigate threats. Also, First Nations, Métis and environmental NGO’s have been improving their effectiveness to exert some influence. Nevertheless, major and recent decision-making as regards the oil sands and dam construction has largely ignored conservation concerns.

### ► **Best practice examples**

As noted, there are serious challenges to agree on monitoring protocols, which are accepted by all stakeholders and rights-holders as adequate and transparent. The Peace-Athabasca Delta Ecological Monitoring Program (PADEMP) stands out as a promising attempt to address key shortcomings of past monitoring. Unlike other monitoring approaches to the Alberta oil sands, PADEMP is designed to take advantage of both local and indigenous knowledge and western science. PADEMP is based on a partnership between indigenous, federal, provincial, and territorial governments which grew out of concerns over the health of the PAD. Even though the scope of PADEMP is limited and there are concerns about a perceived disconnect between monitoring results and policy development and decision-making, it may well be the most credible and promising monitoring effort taking place today.

## **State and trend of values**

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

#### **World Heritage values**



## **Irreplaceable example of a large Great Plains-Boreal Grasslands Ecosystem**

**Low Concern**

**Trend:Stable**

Overall, the scale and location permit a management approach which accepts natural disturbance regimes. Over time, fire management has evolved to follow natural patterns to the degree possible besides asset protection. The main concerns are related to the observable change in the Peace-Athabasca Delta, which also leads to vegetation changes. Should a decision be taken to proceed with construction of a dam on the Slave River, this conclusion would need to be re-assessed (Parks Canada, 2009). Finally, it can be argued that indigenous management, including the use of fire, has long been an integral element of the landscape dynamics and that the establishment of the park has interrupted the corresponding interaction between the land and its inhabitants.

### **► Extraordinary concentrations of migratory waterfowl and other wildlife**

**Low Concern**

**Trend:Data Deficient**

Migratory waterfowl populations and the populations of other wildlife remain significant. There are concerns about the impacts of the Alberta oil sands, which are along a major bird migration route. Besides well-documented incidents of mass mortality in tailings ponds, information seems severely limited. Among the mammal species, both western science and local and indigenous knowledge suggest a major decline of muskrat (Jaeger et al. 2016, Timoney, 2013).

### **► Only summer range and breeding ground of wild Whooping Crane (*Grus americana*)**

**Low Concern**

**Trend:Improving**

The Aransas-Wood Buffalo flock is of critical conservation importance for the very survival of the iconic Whooping Crane. The summer range and nesting grounds in the property are well-protected so Wood Buffalo National Park is a stronghold rather than a bottleneck in the complex conservation equation.

Main concerns relate to the long migration route and its winter range in Texas. It is clear that the management of Whooping Crane requires a coordinated binational effort, which has proven highly effective for many decades (see for example Gil-Weir, 2012; Parks Canada, 2009).

► **Massive and complex inland delta**

**High Concern**

**Trend:Deteriorating**

The Peace-Athabasca Delta is extremely large, dynamic and complex. While the exact relative importance of industrial development impacts versus natural dynamics and climate change are contested, it is clear that massive modification of the timing and intensity of water flows and contamination from various industries have increasingly been affecting the delta and its traditional users, including as regards food safety and navigability (Report of the Commissioner of the Environment and Sustainable Development, 2010, Parks Canada, 2009).

► **Unique salt plains and gypsum karst landscape**

**Good**

**Trend:Stable**

The salt plains and gypsum karst land remain in a good and stable state of conservation stable. No concerns are known from governmental reporting, the scientific literature or by independent observers.

► **Mosaic of mostly intact ecosystems permitting processes with a high degree of naturalness at a large scale**

**Low Concern**

**Trend:Stable**

At some 4.5 m hectares, the property is vast and continues to permit large scale processes with a high degree of naturalness in a still comparatively remote location. The privileged overall situation is increasingly compromised by clear evidence of anthropogenic deterioration of the Peace-Athabasca Delta, one of the most extraordinary areas within the property.

► **Globally largest population of free-ranging Wood Bison**

**Low Concern**

**Trend:Stable**

The wood bison population does not appear to be threatened and remains one cornerstone in the overall recovery efforts (Environment and Climate Change Canada, 2016, COSEWIC, 2013, Parks Canada, 2009). Nevertheless, there are concerns about several diseases, in particular brucellosis and tuberculosis, which infected wood bison as a result of poor management decisions in the past. The apparently disease-free and genetically important Ronald Lake herd is thus of even higher importance than previously understood. It is also clear that the overall recovery remains challenging due to "unsuitable habitat, road mortality, disease management associated with livestock and commercial bison operations, and disease outbreaks" (COSEWIC, 2013).

## Summary of the Values

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

#### **High Concern**

#### **Trend: Deteriorating**

Many of the World Heritage values are stable due to the vast scale and remote location of the property. Compared to ill-advised commercial logging and bison management in the past, it can be argued that there are some important positive trends in the management. Likewise, the rights of First Nations and Métis are starting to be taken more seriously than they have been in the past. The alarming exception is the Peace-Athabasca Delta which is a critical lynchpin to both many of the World Heritage values and cultural and socio-economic values. The combination of climate change and upstream dam construction has been changing the processes, vegetation and navigability of the delta. Upstream industrial development on both main rivers and in particular in the Alberta oil sands comes with impacts and risks. Despite considerable efforts, the monitoring and governance in place does not do justice to the scale and complexity of the challenges.

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

#### **High Concern**

### **Trend: Deteriorating**

Freshwater biodiversity is undoubtedly influenced by changing water flow and quality as a result of ever increasing industrial development along the Peace and Athabasca Rivers. Declines in fish abundance and health for example have been documented (Schwalb et al., 2014). The caribou population is facing a steep downward trend, and could be extirpated from the area.

## **Additional information**

### **Benefits**

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#### **Understanding Benefits**

► **Legal subsistence hunting of wild game, Collection of wild plants and mushrooms, Fishing areas and conservation of fish stocks**

Traditional hunting, trapping, fishing and harvesting continue to be economically and culturally important activities.

► **Outdoor recreation and tourism, Natural beauty and scenery**

Due to the remote location and costly access WBNP receives a comparatively modest number of visitor. Nevertheless, the tourism potential is above the current visitor numbers and actively promoted.

► **Importance for research, Contribution to education**

The large and complex mosaic of boreal ecosystems with a high degree of naturalness offers unique research opportunities. The Peace-Athabasca Delta stand out as an extraordinary freshwater system of unique scientific value.

► **Carbon sequestration**

The vast wetlands, peat soils and forests across roughly the size of the

Netherlands store considerable amounts of carbon.

► **Collection of timber, e.g. fuelwood**

Firewood is traditionally the only source of energy. While complemented to with fossil fuels it continues to play a role, including culturally and for smoking fish and meat.

► **Access to drinking water**

Local residents rely on water from the national park.

Upstream water contamination raises concerns about the safety of water for human consumption.

► **Collection of medicinal resources for local use**

First Nations and Métis have traditionally relied upon local biodiversity products as their "pharmacy". To this day, the collection of wild biodiversity for medicinal purposes is being practiced.

► **History and tradition, Wilderness and iconic features, Sacred natural sites or landscapes, Sacred or symbolic plants or animals, Cultural identity and sense of belonging**

Despite social change, a strong indigenous attachment to the land continues underpinned by important rights at various levels, including the Constitution, Treaty Eight and court decisions. While park management restricted access and traditional resource use for many decades, the area continues to harbor major cultural and spiritual values for many First Nations and Métis.

The establishment and management of the national park for many years contributed to the separation of the landscape and its traditional inhabitants through access restrictions. The increasing recognition of rights and an emerging conceptual reorientation in terms of the involvement of indigenous peoples and local communities bears the potential to re-strengthen the relationship with the land. Given that large landscapes with a high degree of naturalness are vanishing across the planet, the importance of Wood Buffalo National Park as an iconic place and destination is ever more important.

### ► 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.

Industrial development along both the Peace and Athabasca River; contamination sources include agriculture, pulp and paper production and resource extraction, in particular the Alberta oil sands.

### Summary of benefits

At the global level, WBNP stores significant amounts of carbon due to its sheer scale. The high degree of naturalness makes the property an extraordinary reference area for a broad range of terrestrial and aquatic boreal ecosystems. First Nations and Métis are major beneficiaries who traditionally relied on the benefits of what is today the national park for literally all aspects of their livelihoods and cultural and spiritual life.

### Projects

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#### Compilation of active conservation projects

No	Organization/individuals	Project	Brief description of Active Projects
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.

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№	Organization/ Individuals	Project duration	Brief description of Active Projects
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.
4	Parks Canada - Wood Buffalo National Park, Governm ent of the NWT, Governm ent 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, Environ ment Canada, Alberta, Saskatch ewan, Yukon, NWT, British Columbi a, 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.

№	Organization/ Individuals	Project duration	Brief description of Active Projects
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.
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.

№	Organization/ Individuals	Project duration	Brief description of Active Projects
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.
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.

№	Organization/ Individuals	Project duration	Brief description of Active Projects
13	Environment Canada / Parks Canada / Mikisew Cree Community- Based Monitoring 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.
14	Keyano College, Environment Canada and Parks Canada - Wood Buffalo National Park		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.
15	Environment Canada		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.

№	Organization/ Individuals	Project duration	Brief description of Active Projects
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.</p> <p>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>
17	Environment Canada, Parks Canada, Aurora Research Institute, Ontario Genomic s Institute, and other partners.		<p>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.</p>
18	Peace- Athabasc a Delta Ecologic al Monitori ng Program (PADEMP )		<p>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.</p>

№	Organization/ Individuals	Project duration	Brief description of Active Projects
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
21	Mikisew Cree First Nation and Athabasc a Chipewy an 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.
22	Parks Canada - Wood Buffalo National Park	Fr o m: 20 17 To : 20 18	Strategic Environmental Assessment: to assess the cumulative impacts of all industrial developments on the Outstanding Universal Value (OUV) of the property for completion by the end of March 2018 as requested by the World Heritage Committee in 2015. This will include a full and effective involvement of First Nations in the process.

## 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	Caribou population recovery plan	Recovery plan for caribou population in and around WBNP	
2	Parks Canada, federal, provincial and territorial wildlife authorities, research institutions and First Nations	Better understanding of the population dynamics of the wood bison as a basis to enhance management.	
3	Understanding the Ronald Lake bison herd	Confirming longstanding indigenous claims, the Ronald Lake bison herd appears to be disease-free and genetically distinct from the main Wood Buffalo National Park herd despite its proximity. This relatively new discovery is of high conservation significance and needs to be addressed at a time when the proposed Teck Frontier oil sands project calls the future of the herd into question.	
4	Policy development to establish a more meaningful involvement of and role for First Nations and Métis	The current Canadian government has made unprecedented commitments to reconciliation with First Nations and Métis, including concretely in the mandate letters for federal ministers. Efforts are needed to translate this commitment into real change, including as regards the management and governance of national parks.	

No	Site need title	Brief description of potential site needs	Support needed for following years
5	Environmental flows assessment	The W.A.C. Bennett Dam on the upper Peace River is a fact. It is also a fact that the dam has generated ongoing consequences for the entire river system. Flow regulation has been repeatedly discussed and it is clear that it would have the potential to enhance the balance between power generation and other legitimate societal objectives. State of the art environmental flows assessments would provide the basis for informed and responsible decision-making beyond the narrow perspective of a single actor and perspective.	
6	Systematic risk assessment of the tailings ponds of the Alberta oil sands region	The large tailings ponds of the oil sands constitute severe risks to the property, namely the to the Peace-Athabasca Delta. Leakages and breaches could have devastating effects as they have had in many regions of the world, including in Spain's renowned Doñana National Park, likewise a World Heritage property.	
7	Towards a functional buffer zone	Wood Buffalo National Park is lacking an effective buffer zone, today a World Heritage expectation. While acceptable in the past due to the scale and remoteness, the development frontier has since been moving ever closer to the property. Commercial forestry operations and increasing road access require a re-evaluation of the national park and its interlinkages with its surroundings. A systematic assessment would shed light on the options, which may include a better integration of conservation into land use planning schemes, the establishment of a formal buffer zone or better coordination with adjacent or nearby subnational or community-based protected area efforts.	

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