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POUR L'EDUCATION, LA SCIENCE ET LA CULTURE

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Point 7 de l'Ordre du jour provisoire: Etat de conservation de biens inscrits sur la Liste du patrimoine mondial et/ou sur la Liste du patrimoine mondial en péril

MISSION REPORT / RAPPORT DE MISSION

Wood Buffalo National Park (Canada) (N 256)
Parc national Wood Buffalo (Canada) (N 256)

24 September – 4 October 2016

**UNESCO World Heritage Centre - WHC
International Union for Conservation of Nature - IUCN**

**Reactive Monitoring Mission to
Wood Buffalo National Park, Canada
25 September - 4 October 2016**



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Mission Report, March 2017

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The mission furthermore owes a debt of gratitude to the representatives of numerous federal, provincial and territorial governmental institutions, non-governmental organizations, universities, consulting companies, law firms and the private sector for sharing their views. All people consulted during the mission in person or by phone are listed in Annex 5; possible omissions are unintentional and exclusively the authors' responsibility.

Last but not least, the mission owes a debt of gratitude to the World Heritage Centre and IUCN for their full support throughout the mission and helpful comments on draft versions of this report.

The mission would like to recall that the issues discussed in this report are part of much larger societal debates and decision-making. The mission has neither a mandate nor any intention to position itself in these debates. The mission's hope and ambition is to provide a balanced and independent technical contribution from the perspective of the World Heritage Convention in line with its transparent Terms of Reference, which are documented in full text as Annex 2. The mission hopes that the touching mutual respect and solidarity all actors displayed in response to the devastating Fort McMurray fires earlier in 2016 will be reflected in decision-making affecting the future of the Peace-Athabasca Delta, Wood Buffalo National Park and its inhabitants and users.

ABBREVIATIONS AND ACRONYMS

ACFN	Athabasca Chipewyan First Nation
AZE	Alliance for Zero Extinction
CAPP	Canadian Association of Petroleum Producers
CCME	Canadian Council of Ministers of the Environment
CEA	Cumulative Effects Assessment
CEAA	Canadian Environmental Assessment Agency
CFIA	Canadian Food Inspection Agency
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species
CNPA	Canada National Parks Act
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSIA	Canada's Oil Sands Innovation Alliance
CPAWS	Canadian Parks and Wilderness Society
CWS	Canadian Wildlife Service
DKFN	Deninu K'ue First Nation
ECCC	Environment and Climate Change Canada
EIA	Environmental Impact Assessment
EIMP	(National) Ecological Integrity Monitoring Program
ESA	Endangered Species Act (U.S.A.)
FPIC	Free, Prior and Informed Consent
FWS	Fish and Wildlife Service (U.S.A.)
GHG	Greenhouse Gases
GPOP	Parks Canada Guiding Principles and Operational Policies
GWBNPE	Greater WBNP Ecosystem
IAS	Invasive Alien Species
INAC	Indigenous and Northern Affairs Canada
IUCN	International Union for Conservation of Nature
JOSM	Joint Canada-Alberta Implementation Plan for Oil Sands Monitoring
JRP	Joint Review Panel
KFN	K'at'l'odeeche First Nation
LARP	Lower Athabasca Regional Plan
LRRCN	Little Red River Cree Nation
MBM	Minor Boundary Modification
MCFN	Mikisew Cree First Nation
MRBTWMA	Mackenzie River Basin Transboundary Waters Master Agreement
NGO	Non-governmental Organisation
NRBS	Northern River Basins Study
NREI	Northern Rivers Ecosystem Initiative
OG	Operational Guidelines
OUV	Outstanding Universal Value
PAD	Peace-Athabasca Delta
PADEMP	Peace-Athabasca Delta Ecological Monitoring Program

PADTS	Peace-Athabasca Delta Technical Studies
PAH(s)	Polycyclic Aromatic Hydrocarbons
PC(A)	Parks Canada (Agency)
RAMP	Regional Aquatic Monitoring Program
SARA	Species at Risk Act
SEA	Strategic Environmental Assessment
SLFN	Smith Landing First Nation
SOC	State of Conservation
SRFN	Salt River First Nation
TC	Transport Canada
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNESCO	United Nations Educational, Scientific and Cultural Organization
WBNP	Wood Buffalo National Park
WHC	World Heritage Centre
WCD	World Commission on Dams

EXECUTIVE SUMMARY

Exceeding the size of the Netherlands, Wood Buffalo National Park (WBNP) encompasses approximately 4.5 million hectares of Canada's boreal plains in northern Alberta and the southern Northwest Territories. WBNP is comprised of a vast mosaic of boreal grasslands, wetlands and forests, with numerous rivers, creeks, lakes and ponds. What is today WBNP has been the traditional territory of indigenous peoples long before European arrival and continues to be to this day. The land in the park and its surroundings is an integral part of indigenous and local culture, spirituality and livelihoods, including of the Métis. WBNP's impressive natural heritage includes the world's largest herd of free-ranging Wood Bison (*Bison bison athabasca*) and the breeding ground for the only wild, self-sustaining migratory flock of Whooping Cranes (*Grus americana*). In recognition of its global significance and intactness, WBNP was inscribed on the World Heritage List under natural World Heritage criteria (vii), (ix) and (x) in 1983. Two Ramsar sites are located within WBNP.

The vast Peace-Athabasca Delta (PAD) is widely recognized as the particularly valuable and vulnerable heart of the park and World Heritage property. Supported by ample and consistent evidence from both western science and indigenous knowledge, the majority of local Aboriginal Peoples, scientists, Parks Canada (PCA) staff, and conservation NGOs argue that the integrity of the PAD has been affected by decades of massive industrial development along the critically important Peace and Athabasca Rivers without prompting adequate management responses. The Mikisew Cree First Nation therefore submitted a petition to the World Heritage Committee in late 2014, which was considered in a formal Committee Decision (**39 COM 7B.18**, Bonn, 2015) requesting the State Party of Canada to invite a joint World Heritage Centre/IUCN reactive monitoring mission to assess the state of conservation of the property and potential threats to its Outstanding Universal Value (OUV). The mission took place from 25 September to 04 October 2016 and as per its terms of reference assessed the current effects of flow regulation on the Peace River; the potential (cumulative) impacts of the planned Site C Hydroelectric Dam on the PAD; the impacts of existing and proposed oil sands projects in the Alberta Oil Sands region, including as the various projects relate to Aboriginal Peoples; and "any other relevant issues that may negatively impact the OUV of the property".

Overarching concerns identified by the mission are (i) longstanding and unresolved conflicts and tensions between Aboriginal Peoples and governmental and private sector actors which call for a coherent management response in line with the legal framework and unambiguous political commitments to reconciliation; (ii) governance deficiencies, including but not limited to water management across jurisdictions, impact assessment and environmental monitoring; and (iii) the effects of observable and anticipated climate change affecting the property's high-latitude ecosystems. The scale, pace and complexity of industrial development along the critical corridors of the Peace and Athabasca Rivers is exceptional and does not appear to be subject to adequate analysis to underpin informed-decision-making and the development of matching policy, governance and management responses.

The concerns shared by Aboriginal Peoples and many respected senior scientists crystalize in the PAD. Climate change interacts with and adds complexity to the permanent change induced by natural factors and decades of multiple human-induced stressors. As a high latitude wetland-dominated landscape, the PAD is disproportionately vulnerable to climate change, and evidence is mounting that climate change has already had a significant effect on the hydrology and ecology of the PAD. Hydropower development along the upper Peace River, has been a growing concern for around half a century. The construction of the Bennett Dam in British Columbia in the late 1960's set in motion an array of hydrological and ecological impacts altering the entire Peace-Athabasca-Slave system by a combination of flow regulation and climate change. Among other effects, flow regulation for hydropower directly influences the timing and magnitude of flows that can translate to a reduction in recharge through extreme high water events that block outflows from the PAD or create ice jams that contribute to flooding of the PAD and hydration of its perched basins. Hydration of the PAD

affects its biodiversity, productivity and navigability in many ways. The Site C and the proposed Amisk hydropower projects have so far not been assessed in terms of their impacts on the already altered PAD even though the latter is both a fundamental contributor to the justification of World Heritage and Ramsar status and home to several Aboriginal Peoples. The mission strongly recommends that all projects proposing further flow modification of the Peace River - and of the directly linked Athabasca and Slave Rivers - consider cumulative impacts on the PAD as part of their assessment and that the best available environmental flow assessments be conducted for all three rivers as a means of identifying environmental flow needs for the PAD.

The vast Alberta Oil Sands are located immediately to the south of the PAD along the lower Athabasca River. Mounting evidence suggests oil sands impacts are related to atmospheric deposition of contaminants (e.g. sulphate) in the PAD and adjacent WBNP lands, transport of water-borne contaminants such as mercury and even incorporation into the food web via bird eggs and fish, and fatal exposure to toxic tailings ponds, yet governments and industry seem to be unwilling to adequately monitor or accept these claims. Severe human health concerns related to exposure of these contaminants whether through water, food or air require investigation. The area is also centred on a major migratory bird flyway that includes passage of countless migratory waterfowl and songbirds, including the endangered Whooping Crane. The proposed Teck Frontier project would place the oil sands development ever closer to the southern boundary of WBNP and thereby the threats and risks originating from leaks and spills from tailings ponds; additional water withdrawal; and atmospheric deposition of particles containing contaminants such as polycyclic aromatic hydrocarbons (PAHs), nitrogen oxides, and sulphate.. The proposed Teck Frontier project would also result in direct encroachment into the documented habitat of the disease-free Ronald Lake Wood Bison Herd, which is of major conservation importance.

Change in the PAD as such is undisputed and there are clear, consistent and conceivable hints at causal relationships with industrial development, confirmed by western science and local and indigenous knowledge. The limitations of existing monitoring in place and the exemption of the Site C project from in-depth assessment make conclusive judgments difficult. The absence of proof is not proof of absence though and the differing opinions should primarily be seen as an indicator for the need to generate better information to enable informed decision-making.

While the mission focused its efforts on understanding impacts on the OUV of WBNP from the aforementioned threats, there are other threats to the property that should be acknowledged, studied and monitored. Forestry is a major industry and land use in the region with multiple direct and indirect environmental impacts. Commercial logging was conducted even within WBNP into the early 1990s, i.e. including after its World Heritage inscription. The related pulp and paper industry has resulted in well-documented air and water contamination. Further risks stem from past uranium mining near the shores of Lake Athabasca, the expanding agricultural region to the south and the increasingly intense resource development in the upper Peace River watershed. All of the aforementioned stressors should be fully considered as part of the strategic environmental assessment (SEA) for WBNP and include changes both inside and outside the property that are deemed potentially important with respect to its Ecological Integrity under the overall lens of climate change. One key finding of the mission with respect to the cumulative impacts of the threats to the OUV of the property is that they are far more complex and severe than previously thought. The mission therefore strongly recommends a reconsideration of the scope and depth of the SEA study, and consequently the resource allocation.

The mission identified a number of additional concerns. First, the boundary configuration and the absence of a buffer zone leave much room for improvement. There are several options to enhance coordination and cooperation between the federal land management of WBNP and

neighbouring provincial and territorial jurisdictions. All should be discussed, including in order to comply with World Heritage buffer zone requirements as defined in paragraphs 103 to 107 of the *Operational Guidelines for the Implementation of the World Heritage Convention*. Second, the property would benefit from a renewed focus on and investment in the scientific capacity of Parks Canada Agency to meet the various challenges to the Ecological Integrity of the WBNP. The property's modest staffing and resourcing deserves re-consideration in the view of the mission. Third, the long-term future of the property's two most iconic species, Wood Bison and Whooping Crane, remains uncertain and requires permanent attention.

At the time of its initial establishment and subsequent expansion, WBNP was located within a vast intact and remote landscape, which for the most part was very difficult to access. While WBNP continues to be a comparatively remote protected area, the mission fully agrees with most observers that continuation of the development approach of the last decades renders the future of WBNP uncertain at the very best, in particular as regards the PAD. Several current project proposals add severity and urgency to this message.

After careful consideration, the mission concluded that the State Party should be given one opportunity under the World Heritage Convention to immediately develop a structured and adequately funded response guided by the below recommendations, in effect amounting to "major operations" in the sense of Paragraph 177 of the *Operational Guidelines for the Implementation of the World Heritage Convention*. The mission is of the opinion that an absence of a major and timely response would constitute a case for recommending inscription of WBNP on the List of World Heritage in Danger due to the combination of credible and severe concerns combined with inadequate State Party response to existing and expected Committee requests. The State Party of Canada certainly has the scientific capacity to analyse the situation like few others to inform a more balanced decision-making. Doing so will respect its longstanding involvement in and commitment to the *World Heritage Convention*.

The following list provides an overview of all individual recommendations to the State Party offered in chapter 3. All recommendations are explained in detail in the corresponding sub-chapters.

Recommendation 1

Adopt a clear and coherent policy and guidance to enable the transition to a genuine partnership with First Nations and Métis communities in the governance and management of the property.

Recommendation 2

Considering the increasing pressures on the property at this time, prioritise conservation and ensure that the State Party's science capacity enables Parks Canada's legal obligation to maintain and restore the Ecological Integrity of the property.

Recommendation 3

To enable informed decision-making, conduct environmental flows assessments to the highest international standards for the Peace, Athabasca and Slave Rivers as they pertain to the health of the Peace-Athabasca Delta (PAD), in order to identify water flows needed to sustain the ecological functioning of the PAD under the circumstances of existing and planned future dams and water withdrawals. These assessments should incorporate projections of climate change and should determine the cumulative effects on the PAD and the property of flow regulation of all existing and proposed dams on all three rivers.

Recommendation 4

Conduct, in line with the IUCN World Heritage Advice Note on Environmental Assessment, an environmental and social impact assessment of the Site C project and, if moved forward, any other hydropower projects potentially affecting the Outstanding Universal Value of the property.

Recommendation 5

Conduct an environmental and social impact assessment of the proposed Teck Frontier oil sands mine project in line with the IUCN World Heritage Advice Note on Environmental Assessment, fully taking into account the Outstanding Universal Value of the property, including the Peace-Athabasca Delta.

Recommendation 6

Conduct a systematic risk assessment of the tailings ponds of the Alberta Oil Sands region with a focus on risks to the Peace-Athabasca Delta, and submit the report of this assessment to the World Heritage Centre, for review by IUCN, in accordance with Paragraph 172 of the *Operational Guidelines*.

Recommendation 7

Establish adequate baseline hydrological information of the Peace and Athabasca River Basins to enhance the reference for monitoring and assessing current and future hydrological conditions.

Recommendation 8

Expand the scope of the Strategic Environmental Assessment (SEA), which was requested by the Committee in its Decision **39 COM 7B.18**, so that it adequately reflects the scale, pace and complexity of industrial development, land use changes and river flow manipulations in the Peace and Athabasca River watersheds, both in terms of individual and cumulative impacts.

Recommendation 9

Expand the scope of monitoring and project assessments to encompass possible individual and cumulative impacts on the Outstanding Universal Value of the property and in particular the PAD.

Recommendation 10

Conduct a comprehensive assessment of options, in order to underpin decision-making to put in place an effective buffer zone, as defined in the *Operational Guidelines*. The Birch River deserves particular attention as the only relatively intact major watershed of the PAD.

Recommendation 11

Conduct a systematic assessment of options to better realize synergies between the property and land use planning in its immediate vicinity, including the existing and planned provincial protected areas.

Recommendation 12

Consolidate the management resources and capacity to a standard commensurate with World Heritage status and adequately respond to the challenges facing the property by:

- a) Reinstating a year round status and staffing of WBNP;
- b) Recruiting a full-time Superintendent exclusively in charge of WBNP;
- c) Ensuring an adequate Parks Canada presence in Fort Chipewyan, part of the critical Peace-Athabasca Delta area and a major ecological region of WBNP.

Recommendation 13

Further develop the existing Cooperative Management Committee established by the State Party, and consolidate a functional and effective mechanism to involve Aboriginal Peoples in the management of the property.

Recommendation 14

Ensure that the preparation and skills of involved governmental staff correspond to the requirements inherent in the evolving relationship with First Nations and Métis communities.

Recommendation 15

Further harmonize and adopt the Species Recovery Strategy for Wood Bison throughout its range, including but not limited to the Greater WBNP Ecosystem, and specifically:

- a) Urgently invest in comprehensive and independent analysis of the conservation importance and status of the Ronald Lake Bison Herd, including threats to it posed by proposed development, within a broader Species Recovery Strategy;
- b) Dedicate, in full cooperation with Aboriginal Peoples, adequate attention and funding to the management of Wood Bison, including as regards the development of disease management options other than culling.

Recommendation 16

Continue to closely monitor the entire used and potential nesting area of the Whooping Crane within the Greater WBNP Ecosystem so as to be able to respond to possibly changing management requirements.

Recommendation 17

Incorporate invasive alien species (IAS) into the overall monitoring of the property and the PAD based on science and local and indigenous knowledge, and based on monitoring results, develop an appropriate management response to control the spread of IAS.

1. BACKGROUND TO THE MISSION

Wood Buffalo National Park (WBNP) was established in 1922 with the objective to protect northern Canada's last remaining bison herd. Enlarged in 1926, WBNP is Canada's largest national park to this day at around 4.5 million hectares, a surface area exceeding the size of the Netherlands. WBNP is located in the boreal plains of northern Alberta and the southern Northwest Territories of north-central Canada. WBNP and the broader region, sometimes referred to as the Greater WBNP Ecosystem, are part of the Interior Plains of North America, which are characterized by poorly drained (hydric) lowlands underlain by sedimentary rock and karst topography, and in some southern areas by black spruce muskeg on flat land. The impressive landscape is a living and dynamic mosaic of vast wetlands, boreal forests and grasslands, intersected by numerous rivers and creeks and dotted with innumerable lakes and ponds. Underlain by permafrost, the grasslands are the largest intact grass and sedge meadows left in North America.

What is today WBNP has been the traditional territory of several First Nations long before European arrival and continues to be to this day. History changed course when the fur trade became a major economic activity in the area in the 18th century. Researchers, adventurers, missionaries, prospectors and subsequently governmental representatives followed the footsteps of the fur traders. Fort Smith and Fort Chipewyan were created, to this day major settlements of Dene and Cree First Nations and Métis communities. The land in the park and its surroundings is an integral part of indigenous and local culture, spirituality and livelihoods. There are far-reaching indigenous rights at various levels, only partially respected in the view of all First Nations and Métis representatives met and many other observers. The establishment of the national park itself resulted in conflicts and tensions. Despite increasing recognition and efforts, these conflicts and tensions have never been resolved.

WBNP is home to a broad range of very diverse natural features, several undoubtedly of global conservation significance. While a brief overview can hardly start to do justice to the natural wealth, a selection of conservation values of particular note are listed hereafter:

- Some of the largest relatively undisturbed and least fragmented forest, grassland and wetland ecosystems in North America;
- Increasingly rare ongoing large-scale ecosystem processes with limited human interference, including the comparatively natural fire regime;
- Extensive salt plains and gypsum karst with associated extraordinary plant communities;
- The world's largest herd of free-ranging Wood Bison (*Bison bison athabascae*) with a unique uninterrupted predator-prey relationship between this species and the Grey Wolf (*Canis lupus*);
- The summer range and breeding ground of the only wild, self-sustaining migratory flock of the endangered Whooping Crane (*Grus americana*);
- Significant populations of migrating, nesting, breeding and moulting waterfowl at an intersection of four major bird migration flyways - among many other significant wildlife populations.

Illustrating the global importance, two Wetlands of International Importance have been recognized within WBNP under the Ramsar Convention, the "Whooping Crane Summer Range" and the famous Peace-Athabasca Delta (PAD). The crane nesting area is also recognized as one of only two Alliance for Zero Extinction (AZE) sites in all of Canada. In addition to its cultural and socio-economic importance, the PAD is widely accepted to be the most complex, most fascinating and most vulnerable part of WBNP. Along with many smaller rivers and creeks, the Peace, Athabasca and Birch Rivers converge at the western end of Lake Athabasca to form one of the world's largest inland deltas, 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. As the heart of WBNP in the view of many, the PAD's enormous ecological, cultural and economic importance is indisputable. In addition to being the world's largest Dark Sky Preserve since 2013, WBNP in 1983 was inscribed on the World Heritage List according to natural World Heritage criteria (vii), (ix) and (x) in recognition of the broad and diverse range of irreplaceable conservation values of global significance.

Despite protection granted by longstanding national park status and multiple global recognitions, the notion of a remote place unaffected by human activities is not tenable anymore. Industrial development along the critically important Peace and Athabasca Rivers has led the majority of local First Nations and Métis communities, scientists, Parks Canada (PCA) staff, conservation NGOs and others to conclude that the integrity of the PAD and WBNP has continuously and increasingly been affected over the past decades. In the perception of all consulted local residents, the pressures have already resulted in tangible negative impacts on the PAD today and imply an uncertain future for the delta and its inhabitants and users.

From a World Heritage perspective, the severity of these concerns first drew major international attention when the Mikisew Cree First Nation (MCFN) submitted a detailed petition to the World Heritage Committee in December 2014. The petition received major support from numerous First Nations and Métis, environmental NGOs, scientists and retired PCA leadership, eventually resulting in a World Heritage Committee Decision requesting the State Party of Canada to invite a joint IUCN/World Heritage Centre reactive monitoring mission (hereafter "the mission") to better understand the situation (**39 COM 7B.18**, Bonn, 2015, see Annex 1 for full text). This background can be interpreted as a sign of increasing recognition of indigenous rights and perspectives in the World Heritage arena, in line with broader national and international processes.

As detailed in the Terms of Reference provided as Annex 2, the concrete objectives of the mission were to "assess the state of conservation of the property, as well as potential threats to its Outstanding Universal Value (OUV)". More specifically, the ToR required the mission to review and assess:

- "The current effects of Peace River flow regulation activities associated with operation of the W.A.C. Bennett Dam and Peace Canyon Dam, on the OUV of the property;
- The potential (cumulative) impacts of the planned Site C project on the hydrological regime of the PAD that could impact the OUV of the property, and the ecological processes as they relate to the OUV of the property, also taking into account the effects of climate change;
- The impacts of existing and planned oil sands projects in the Athabasca Oil Sands Region, as well as their associated tailings ponds, on the OUV of the property, including the impact on movement of migratory birds, and discuss the development and implementation of monitoring programs with the relevant authorities and stakeholders;
- The above-mentioned developments on the ecosystems that support some of the traditional ways of life of indigenous communities."

In line with paragraph 173 of the *Operational Guidelines*, the mission was further tasked and mandated to "review any other relevant issues that may negatively impact the OUV of the property, including its conditions of integrity and protection and management". The mission was conducted by Tilman Jaeger (representing the UNESCO World Heritage Centre) and Dr. Stephen Davis (representing IUCN) and took place from 25 September to 04 October 2016, postponed due to the devastating fires in and around Fort McMurray earlier in the year.

2. LEGAL AND MANAGEMENT FRAMEWORK

While a detailed account of the human history of this part of North America is beyond the scope of this report, it is important to reiterate that what is today the national park and World Heritage property has long been inhabited and used. What is called natural resource governance and management today has been an integral part of indigenous life in the region for a long time and in many ways continues to be. It can reasonably be argued that the natural environment has been shaping indigenous life while indigenous peoples simultaneously have been shaping the natural environment in many ways. The indigenous past, present and future is today reflected and considered in many facets of the legal and policy framework, including in Canada's Constitution, Treaty Eight and specific court decisions and it is essential to be aware of this backdrop. In the view of all indigenous representatives met by the mission, however, governmental decisions continue to routinely contradict or conflict with indigenous rights. Meetings and discussions during the mission made it very clear that many conflicts and tensions remain to be addressed. While numerous First Nations and Métis representatives acknowledged that PCA increasingly and credibly acknowledges and respects their rights, culture, knowledge and concerns, much remains to be done to make the legal obligations and strong political commitments to reconciliation a reality.

WBNP's formal conservation history, according to most sources, is related to the end of the federally promoted killings of bison in Canada in 1898. In 1922, some 2,600,000 ha of land were designated as a bison sanctuary under the then Forest Reserves and Parks Act. Four years later, WBNP was enlarged to its vast present surface area. From a contemporary understanding, the longstanding status as a national park is slightly misleading, as one explicit management priority between 1922 and 1964 was job creation through various forms of resource extraction and use. Far from contemporary connotations of the terms sanctuary and national park, commercial logging, fishing and bison meat production were explicitly promoted. Bison management involved massive operations, including habitat manipulations and intensive predator control, namely mass culling of wolves.

The federal authority over WBNP was shifted from the Northern Administration Branch of the Department of Northern Affairs and Natural Resources in 1964 to the National Parks Branch of the Department of the Interior (Olsen, 1992), a process completed only in 1969 according to Potyondi (1979). It is only since then that management has formally been focusing on nature conservation. WBNP is federal crown land almost in its entirety. The original land base of the park has decreased slightly with the excision of eight small areas for creation of indigenous reserve lands. A ninth is currently proposed. Total area excised or proposed to be excised is some 6,500 ha (around 0.15 % of the park).

Several small First Nations reserves are today situated inside WBNP's boundaries. The Government of Canada is the land manager of WBNP, which is administered by PCA, one of three departments/agencies under the responsibility of the Minister of Environment and Climate Change Canada (ECCC). PCA's mandate and obligation includes impact assessments of proposed activities within national parks. Assessments of proposed projects outside of national parks with potential impacts on national parks trigger PCA involvement, but are otherwise led by the Canadian Environmental Assessment Agency (CEAA). Examples of PCA involvement in assessments regarding WBNP include Site C, Glacier Power (Dunvegan) and Amisk hydroelectric project proposals, as well as the Teck Frontier and Joslyn North oil sands project proposals.

Central pieces of federal law and policy determining and guiding management include (i) the Canada National Parks Act (CNPA) and Regulations (2000); (ii) the Parks Canada Agency Act (1998); (iii) the WBNP Game Regulations (1978); and (iv) the Parks Canada Guiding Principles and Operational Policies (GPOP, signed in 1994). GPOP includes a short section on what is being referred to as "aboriginal interests". GPOP also contains explicit and

repeated reference to Canada's commitment to cultural and natural heritage under the World Heritage Convention and PCA's "leadership role" in this context.

The explicit recognition of the maintenance and restoration of "Ecological Integrity" as a "first priority" in Canada's National Parks Act is remarkable, both as a conceptual framework and as a legal obligation. The CNPA defines Ecological Integrity as "a condition that is determined to be characteristic of its natural region and likely to persist, including abiotic components and the composition and abundance of native species and biological communities, rates of change and supporting processes" (see chapter 7 for link to full text of the Act and other legislation). Ecological Integrity guides site level planning, monitoring and reporting, including to Parliament and the public. At the national level, the concept is reflected in an Ecological Integrity Monitoring Program (EIMP). While PCA has no mandate beyond federal crown land within parks, it is clear that Ecological Integrity necessarily implies interaction with land and resource use or any other development outside of the national parks, particularly when development results in, or can reasonably be expected to result in impacts on national parks. In this sense, Ecological Integrity can also be interpreted as a mandate and obligation to interact with other federal actors and adjacent jurisdictions, actors, stakeholders and rights-holders, such as provincial and territorial governments, First Nations, Métis, local communities, civil society, the scientific community and the private sector.

In no particular order, further directly relevant pieces of legislation and policy include the Canadian Environmental Protection Act (1999), Fisheries Act (1985), the Migratory Birds Convention Act (1994), the Species at Risk Act (2003), the Navigation Protection Act (1985), the Indian Act (first passed in 1876 with several amendments since), the Canadian Biodiversity Strategy (1995) and "Canada's Action on Climate Change", as the governmental websites put it at the time of writing. The more obvious federal counterparts of PCA include, but are not limited to, the Canadian Environmental Assessment Agency (CEAA), the Canadian Wildlife Service (CWS) and Transport Canada (TC). Coordination and cooperation is ever more essential with these and many other federal, provincial and territorial institutions, First Nations, Métis, civil society and the private sector.

At the operational level, WBNP belongs to PCA's Southwest Northwest Territories Field Unit, directed by the Field Unit Superintendent. The latter simultaneously serves as the Superintendent of WBNP and reports to PCA's Chief Executive Officer via the Executive Director, Prairies, Yukon and Northwest Territories and Senior Vice President of Operations. There are administrative PCA offices in Fort Smith and Fort Chipewyan, the two main settlements. The latter is accessible by air, water or winter road only. Since 1984 management plans guide operations. The latest and current plan was approved by Parliament in 2010 (Parks Canada Agency, 2010). Like the 2009 State of the Park Report (Parks Canada Agency, 2009), the current plan conceivably prioritizes cooperative management, bison management and the PAD. The current plan also provides direction in the form of zonation for protection of rare and endangered species, ecological maintenance and restoration and visitor experience and use. The next management plan is due in 2020, a substantial undertaking given the attempts to increase the involvement of stakeholders and rights-holders in a polarized setting.

3. IDENTIFICATION AND ASSESSMENT OF ISSUES

3.1 Governmental Relationships with First Nations and Métis

According to Indigenous and Northern Affairs Canada (INAC) the term “Aboriginal Peoples” encompasses First Nations, Inuit and Métis in Canada. The terms “First Nations” and “Inuit” are widely used, legally undefined terms comparable to internationally common definitions of “indigenous peoples”. The Métis, in INAC’s definition, are “people of mixed First Nation and European ancestry who identify themselves as Métis”. It is important to understand that a total of eleven First Nations and Métis live in and around WBNP and today have various and far-reaching rights, which national park establishment had historically restricted despite Treaty Eight (see below).

In alphabetical order, Métis in WBNP are organized as (i) Fort Chipewyan Métis Local 125; (ii) Fort Resolution Métis Council; and (iii) Fort Smith Métis Council and (iv) Hay River Métis Government Council. First Nations, likewise in alphabetical order, include the (i) Athabasca Chipewyan First Nation (ACFN); (ii) Deninu K’ue First Nation (DKFN); (iii) K’at’l’odeeche First Nation (KFN); (iv) Little Red River Cree Nation (LRRCN); (v) Mikisew Cree First Nation (MCFN); (vi) Salt River First Nation (SRFN); and (vii) Smith’s Landing First Nation (SLFN).

During the mission a “need for healing” was repeatedly suggested to describe the relationship between Aboriginal Peoples and governmental institutions, a clear indication of a troubled history. Concrete reasons for tensions and conflicts in WBNP were commonly related to (i) access restrictions to natural resources, including historic resettlement; (ii) limited or lacking consultation or other forms of involvement in decision-making directly or indirectly affecting First Nations and Métis; and (iii) limited or lacking linkages between consultation and decision-making when consultation does occur, leading to “consultation fatigue”.

As the federal land manager, PCA has a direct presence on the land and thus directly engages in local relationships. PCA has been and continues to be both a source and a target of tensions. Many First Nations representatives highlighted specific past incidents, often conflictive personal encounters or encounters of family members with PCA staff. One representative called the national park a “weapon against First Nations”. On a more optimistic note, PCA’s direct presence on the land comes with important new responsibilities and opportunities at a time of new commitments to reconciliation. Numerous aboriginal representatives acknowledged important and credible efforts to improve relationships on the part of PCA.

Park management prides itself on WBNP being the first national park in Canada to allow traditional harvesting. Decades of a controversial past permitting system put the claim in perspective though. Today, following court cases in 2003 and 2005, permits to hunt, fish and trap for personal use are no longer required. Formally, much more meaningful rights have been granted over time. Section 35 of Canada’s Constitution Act (1982) recognizes and affirms existing aboriginal rights. Furthermore, WBNP is located within the vast area covered by Treaty Eight (1899, see map 6 in Annex 6). One of eleven numbered treaties across Canada, Treaty Eight in principle has far-reaching implications, including but not limited to natural resource use. However, the terms of Treaty Eight have been “subject to different interpretations regarding the nature and fulfilment of the obligations incurred by the federal government” ever since (Madill, 1986).

More recently, Canada has made a strong commitment to the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) after years of being one of its most visible opponents. UNDRIP encompasses the concept of Free, Prior and Informed Consent (FPIC) in many of its articles. At the national level, concrete commitments to reconciliation are contained in public mandate letters, which determine ministerial priorities. The public mandate letter addressed to the current ECCC Minister calls for a “renewed, nation-to-nation relationship with Indigenous Peoples, based on recognition of rights, respect, co-operation, and partnership”.

Testing the above framework against opinions expressed to the mission, a deep gap emerges. In the view of all First Nations and Métis representatives met, there is an enormous lack of clarity, as well as a mismatch between political commitments and their lived reality. As the various layers granting rights overlap and are rooted in differing governmental responsibilities and institutions, First Nations perceive it as next-to-impossible to enhance clarity and move towards a more level playing field, which was described as extraordinarily frustrating.

At the more tangible level of WBNP, the exact nature of rights is likewise not entirely clear. According to PCA's GPOP "people and the environment are inseparable." More specifically, GPOP states that "where aboriginal interests have not been previously dealt with by treaty or other means, it is the Government of Canada's policy to negotiate comprehensive claims based on traditional and continuing use and occupancy of land." At the same time, the current legal, policy and management guidance for WBNP does not amount to a clear and coherent framework reflecting existing laws, Treaty Eight, court decisions and commitments. For example, while court decisions granting harvesting rights are respected, they remain to be clearly reflected and defined in applicable guidance and planning documents.

The Aboriginal Committee for the Cooperative Management of WBNP is a promising vehicle and step towards a better relationship between governmental park management and First Nations and Métis. Established in 2014, the Committee represents a good beginning even though apparently not all of the eleven Aboriginal Peoples participate. Based on discussions during the mission, it appears to enable a partially effective form of consultation rather than full cooperation at this stage.

Several First Nations representatives expressed dissatisfaction with WBNP's World Heritage status; a national and intergovernmental decision they say they never had any part in. Many First Nations explicitly called for inscription of WBNP on the List of World Heritage in Danger in line with the MCFN Petition (MCFN, 2014; see also MCFN, 2016), also as a means to draw attention to indigenous concerns. At the same time, a smaller number of First Nations representatives positioned themselves against such a recommendation, fearing that such status might restrict their harvesting rights. The mission wishes to put on record that the latter thinking appears to be based on a misconception. While the mission sees a fundamental and urgent need to enhance clarity with regard to indigenous rights and their relationship with national park objectives, it does not consider indigenous resource use to be a threat to the property's OUV at this stage.

At a time when First Nations and Métis unanimously call the adequacy of current consultation practices into question, it is a long way to collaboration and an even longer way to shared decision-making. The scale of this shift implies a coherent long-term vision and approach, as well as considerably strengthened efforts. Drawing on several discussions during the mission, cooperation between PCA and Aboriginal Peoples based on common interests, as opposed to common values, might be the most promising avenue to explore. It is a misconception to expect governmental conservation and Aboriginal Peoples to have the same objectives for the same reasons. Common interests, however, certainly exist in terms of better understanding and reducing external pressures on WBNP's cultural and natural resources. Despite a difficult history and relationship, it should be recalled in this context that PCA has successfully protected WBNP from major industrial development within its boundaries, which in all likelihood would have occurred without national park status.

In summary, national park status has long been conflicting with interests, rights and aspirations of First Nations and Métis. WBNP is in a transition towards more meaningful realization of indigenous rights, which comes with opportunities and risks. If the legal framework and political commitments are to be taken seriously, a fundamental shift seems indispensable and clear rights will have to be coupled with clear responsibilities. A step-wise

approach is encouraged so as not to dismantle the current governance and management before a functional alternative is in place. There is a need to improve clarity and coherence of the applicable legal and policy framework comprised of various bits and pieces of very different eras. Some indigenous representatives suggested dual naming of the park and property, i.e. the parallel use of English and indigenous names as a gesture and symbol of a new beginning. The idea deserves to be discussed in the view of the mission.

Recommendation 1

Adopt a clear and coherent policy and guidance to enable the transition to a genuine partnership with First Nations and Métis communities in the governance and management of the property.

3.2 Overarching Concerns about Governance

3.2.1 Governance of Impact Assessment and Environmental Monitoring

Severe concerns about both regulatory failure and regulatory capture were consistently brought forward in writing and in personal communication during the mission. Current efforts “to restore trust in environmental assessment”, in the wording of a federal governmental press release and other official websites online at the time of writing, suggest a political recognition of such concerns. Even if one does not accept the notion of a “regulatory crisis” which was repeatedly communicated to the mission, one still has to accept the widespread perception of such a crisis. It is undoubtedly one factor compromising the relationships between different stakeholders and rights-holders.

Written submissions and personal communication during the mission consistently suggested limited effectiveness of governance in terms of balancing competing public interests and consideration of Aboriginal Peoples. Such concerns often referred to impact assessments and environmental monitoring. Deficiencies in both areas were described to affect directly and indirectly WBNP and in particular the PAD. Specific concerns communicated to the mission included, but were not limited to:

- Severe deficiencies in meaningful involvement of Aboriginal Peoples;
- Lack of meaningful consideration of the perspectives and knowledge of Aboriginal Peoples in decision-making when consultation does take place;
- Lack of coherence and clarity in terms of respecting indigenous rights granted at various levels, including the Constitution, Treaties and specific court decisions;
- Severe deficiencies in functional mechanisms to plan land and resource use across jurisdictional boundaries;
- Particularly severe deficiencies in functional mechanisms to manage water across jurisdictional boundaries despite longstanding efforts and a wealth of existing information, including specific recommendations for enhancing governance, for example under the Mackenzie River Basin Transboundary Waters Master Agreement (MRTWMA);
- Time and resource constraints, as well as limited mandates of panels set up to review proposals of very large and complex projects;
- Exemption of proposals for very large and complex projects from fundamental components of established, and in principle legally required review process as a function of political decisions;
- Scientifically questionable definitions of potential impact areas or zones associated with major development projects;
- Limitations in coherent, adequate and independent monitoring;
- Absence of adequate assessment and management of cumulative effects;
- Absence of adequate bridges linking monitoring results with policy and decision-making.

A robust and coordinated monitoring program is essential to managing and detecting changes in the vital signs of any large ecosystem. As mentioned earlier, one priority and Parks Canada obligation, through the CNPA, is the protection or restoration of Ecological Integrity as it pertains to natural resources and processes in Canada's national parks. Therefore, ecosystem monitoring is a critical tool and obligation in both detecting change and in tracking recovery following restoration or other management actions whether construction of physical features such as weirs, or wildlife corridors or fire management. While there are several governmental, quasi-governmental monitoring programs and relevant research projects focused on WBNP, and specifically the PAD, in general these programs appear to be loosely coordinated with one another at best. In some instances, programs appear to be entirely independent of one another with no coordination or communication of findings.

The Regional Aquatic Monitoring Program (RAMP) began in the late 1990s as a small program amongst a few companies to coordinate their monitoring and reporting obligations under regulatory approvals; however, its ability to detect changes in response to development has been questioned (see Timoney 2013). The Peace-Athabasca Delta Ecological Monitoring Program (PADEMP) is a partnership between indigenous, federal, provincial, and territorial governments and grew out of concerns over the health of the PAD. As such, it merges western science with local and indigenous knowledge to understand specific problems such as the declining population of muskrats. Despite undisputed merits of its approach, this community and communications-based program seems limited in its capacity to understanding and addressing the full range of threats to the PAD. It also appears to be disconnected from policy development and decision-making.

The Joint Canada-Alberta Implementation Plan for Oil Sands Monitoring (JOSM) is a well-funded (roughly CAD 50 million/year) program that grew out of recommendations by federal and provincial panels in 2010 and 2011, respectively, stressing the need to have world-class, coordinated and question-driven monitoring in the Alberta Oil Sands region that could address indigenous and stakeholder concerns about cumulative impacts. PADEMP and JOSM, both with strong focus on the PAD, are potentially compatible efforts, yet there seems to be little coordination between these monitoring programs. First Nations have withdrawn their initial involvement in JOSM, the last First Nation having left JOSM in 2014 "due to concerns about the engagement process, limited incorporation of traditional ecological knowledge, and lack of transparency" (2015 State of Conservation Report, see <http://whc.unesco.org/en/soc/3318>).

From a technical perspective, the mission notes a number of important question marks with regard to these monitoring programs. JOSM currently lacks the ability to differentiate natural weathering sources of contaminants from impacts caused by bitumen mining and upgrading, in aquatic systems downstream of the mineable oil sands region. This could be addressed through focused laboratory or mesocosm experiments to understand changing ratios in conservative tracers relative to bitumen-associated indicators. This focused experimental approach should be coupled with field-scale monitoring using control watersheds that are high in bitumen reserves but without oil sands development (e.g. Birch River or even Peace River) compared to the lower Athabasca River. More effort in tracking atmospheric versus terrestrial or aquatic sources of oil sands-derived pollutants (as suggested in Kelly et al. 2010) would also help to establish the contribution from this type of pollution. In addition, techniques looking at compound-specific markers in isotopic tracers in oil sands-derived contaminants or their degradation products should be advanced as a means to provide a more robust detection of impacts. Evidence from Jautzy et al. (2015; as cited in Schindler 2015) suggests this may be a reliable means for differentiating natural from industrial sources.

The conclusion of little or no impact of contaminant loading from the Alberta Oil Sands region to the PAD that was communicated to the mission by representatives of the Government of Alberta relied heavily on JOSM's results showing signal attenuation from its origin to the PAD.

This, they concluded, was sufficient evidence of no impact. However, declining concentrations of a contaminant with distance from a source is not evidence in support of such a conclusion. Rather, it is merely an indication that air and water are dispersing contaminants over some distance. A conclusion about the degree of contamination should be unique to each contaminant and based on its accumulation rate (even if at a low level), its residence time within a system, and duration of exposure. Mass balance studies integrating exposure over longer periods of time to attenuated or low levels of different contaminants would provide more resolution as to potential impacts from the Alberta Oil Sands region.

Besides technical question marks, JOSM has been accused of limited transparency and insufficient consideration of aboriginal perspectives, resulting in the aforementioned departure of all aboriginal JOSM partners. For all its merits and investment, it seems unlikely that JOSM can meet its ambitious objectives in a very polarized setting of openly stated mistrust. The existing governance of JOSM and impact assessment and environmental monitoring, analysis, policy and management responses regarding WBNP, and the PAD more broadly, are widely seen to be incompatible with the pace, scale and complexity of industrial development and to suffer from deficiencies in design and governance. Perhaps the most important question mark, there is an absence of a meaningful consideration of cumulative impacts, as discussed in chapter 3.4.3 in more detail. Current efforts are not accepted by key rights-holders and stakeholders and do not constitute an adequate basis for informed decision-making. Recommendations are offered in related sections under subchapter 3.3.

3.2.2 Changes in Capacity and Focus of Parks Canada Agency

Parks Canada Agency (PCA) is a well-established and highly professional protected areas agency with a longstanding institutional history. Besides the past inability to effectively respond to commercial logging within WBNP for more than two decades and past and current tensions with First Nations and Métis, most consulted by the mission expressed appreciation of the performance of WBNP staff. The PCA submissions contributing to environmental assessments are constructive, respectful of PCA's mandate and of high technical quality.

PCA's Ecological Integrity tenet is an exemplary orientation of a protected areas agency by implicitly and explicitly highlighting the need to manage protected areas within their broader context. In line with the conclusions of a distinguished Panel on Ecological Integrity (Parks Canada Agency, 2000), environmental NGOs consulted by the mission consistently raised serious concerns about PCA's current ability to live up to the high standards inherent to the Ecological Integrity approach. These concerns were underpinned by what was described as (i) a considerably reduced science capacity and (ii) a shifting from a conservation focus as part of broader governmental efforts to maximize the generation of "re-spendable revenues", namely through tourism promotion. Written submissions in support of the MCFN petition, including by retired PCA leaders, consistently make reference to one or both of the above concerns. In the wording of a comprehensive NGO report, there has been "a significant shift in Parks Canada's approach to managing our national parks, away from their legislative first priority of protecting nature, towards a more tourism and marketing focused agenda which is putting wildlife and wilderness in our national parks at risk", while suggesting that decision-making may be at odds with "existing policies and legislation specifically designed to limit development and protect ecological integrity in our national parks" (CPAWS, 2016). The concerns are in line with an open letter from a large number of former PCA staff calling for the Canadian Government to "restore science capacity in Canada's national parks and national historic sites" (see chapter 7 for link to full text).

In its Fall 2013 report, the Commissioner of Environment and Sustainable Development (Office of the Auditor General of Canada, 2013) noted "intensifying challenges" for PCA to maintain Ecological Integrity, coinciding with reduced resources. The report concludes that PCA "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. Consequently, there is a significant risk that the Agency could fall further behind in its efforts to maintain or restore ecological integrity in Canada's national parks." This remarkable conclusion adds validity to consistent concerns expressed to the mission in writing and in personal communication, which some might judge as biased. While it is clear that PCA has an important role and obligation to enable visitor experiences, an excessive focus on tourism promotion and a reduced science capacity indeed appear to be incompatible with its core mandate and legal obligations.

Recommendation 2

Considering the increasing pressures on the property at this time, prioritise conservation and ensure that the State Party's science capacity enables Parks Canada's legal obligation to maintain and restore the Ecological Integrity of the property.

3.3 Overarching Concerns about Climate Change

Climate change is a pervasive, global threat to the integrity of the entire boreal region. As an overarching threat, it interacts with and adds complexity to the permanent change induced by natural factors and decades of multiple human-induced stressors. Climate has co-shaped the natural environment and existing and future impacts of climate change will have direct and lasting effects on WBNP's conservation values, including those identified as contributing to its Outstanding Universal Value. Such effects can broadly be categorized as top-down and bottom-up effects, respectively, and both can be expected to occur. From a bottom-up perspective, climate change can affect the fundamental drivers of an ecosystem such as water and nutrient availability, which affects processes regulated by microbial communities and primary producers. These changes at the bottom of the food web have continued impacts across the entire food web. From a top-down perspective, climate drivers may have direct impacts on organisms at the top of the food web through thermal tolerance (affecting aspects such as metabolism, growth, competition, and geographic range) and disease prevalence, which can have cascading effects from higher trophic levels to herbivores, plants, etc.

As part of a high latitude wetland-dominated landscape, WBNP - and particularly the PAD - are highly vulnerable to climate change. Evidence is mounting that climate change has already had a significant effect on the hydrology and ecology of the PAD, along with other natural and anthropogenic factors. However, climate change impacts involve more than just warming, which through a series of complex interactions, may also affect precipitation patterns and the overall water balance of the region. Timoney (2013) provides a useful overview of this, noting changes in everything from water quality to biodiversity in the PAD. Climate change is affecting WBNP directly through warming, drying and altered precipitation patterns. Evidence shows a substantial warming of at least 2.5°C over the past century and a clear trend in the reduction of snow pack in the Canadian Rocky Mountains where the headwaters of both the Peace and Athabasca Rivers are situated. Schindler (2015) estimated a 50% decline in runoff from the lower reach of the Athabasca River due to climate change and references studies suggesting that declines will continue throughout the century as glaciers continue to melt (Schindler et al. 2007). There is also mounting evidence of an increasingly negative water budget for the region, with evapotranspiration exceeding precipitation and an increasing trend in drought severity (Timoney 2013).

Beltaos (2014) estimated that about 1/3 of the changes in Peace River ice-jam flood frequency in the PAD has been directly attributable to climate change, while the other approximate 2/3 of change is attributable to river regulation. To add complexity, the effect of climate change induced warming on glaciers and snowpack will translate to reduced spring flows from snowmelt needed to mechanically break up ice, which is essential to the development of an ice-jam flood. Projections of future climate using the ECCC's Canadian Climate Centre General Circulation Model reveal a 3-week shortening of the ice season by the end of this century compared to the 1961-1990 period (Prowse et al. 2004). The projected warming of about 4°C would lead to further increased evaporative losses of about 35% over a roughly 30-

year period. Despite projections of increased precipitation of about 11%, this would still dramatically tip the water balance of the region toward a drier state (Prowse et al. 2006). The combination of warming, a shifting water budget and river regulation will undoubtedly put the PAD on a trajectory for drier conditions. Combined with changes in the frequency of ice-jam flooding, existing and future development projects involving water abstraction and/or additional flow regulation should be heavily scrutinized for their impacts in flow impedance.

While differing views exist, the above example – and mounting evidence of change – illustrates the need to invest in better understanding the interactions between this naturally dynamic high latitude ecosystem and climate change. As an overarching threat, climate change adds urgency and severity to the need to better understand and address the many stressors affecting WBNP and in particular the PAD. More concretely, there is a wealth of evidence of climate change impacts speaking to the importance of protecting river flows into WBNP and specifically the PAD and the importance of these flows in sustaining the highly organic peat deposits across the WBNP but also the health of the PAD. In short, with warming and drying, climate change will also continue to tip the carbon balance of WBNP towards net carbon emission rather than being a carbon sink. Considering the collective boreal peatland region, this could have a dramatic positive feedback on atmospheric greenhouse gases (GHG) and further warming of the atmosphere (Goulden et al. 1998; Davidson et al. 2006). The mission offers no specific recommendation other than fully considering climate change as a highly relevant and overarching concern in decision-making and as a potential synergistic driver of change when paired with other threats described below.

3.4 Pressures and Risks from Industrial Development

3.4.1 Existing and planned Hydropower Development

Hydropower development is experiencing a renaissance in many parts of the world, partially justified on the grounds of claimed environmental friendliness. This “clean energy” claim neglects that the scientific and technical discussion of hydropower development and its multiple environmental impacts today is much more nuanced. Besides obvious concerns related to the modification of entire river systems, the debate has moved on even in strict terms of GHG emissions from reservoirs and degraded downstream wetland areas. International initiatives, such as the World Commission on Dams (WCD) provide useful guidance on the complexity of social and environmental costs inevitably accompanying large-scale dam development. It is clear that decision-making involves extraordinarily difficult trade-offs and should therefore be based on the best possible information.

In the 1960s British Columbia (BC) took the political decision to maximise the hydropower potential of the Columbia and Peace Rivers (“Two Rivers Policy”). On the Peace River this resulted most notably in the construction of the W.A.C. Bennett Dam (hereafter Bennett Dam), a 163-meter high earth-fill dam built throughout the 1960s and beginning operation in the early 1970s. The dam created Williston Lake, the third largest reservoir in North America. The Bennett and Peace Canyon Dams capture about 53% of the runoff of the entire Peace River, from only 24% of the entire 293,000 km² Peace River drainage basin. This results in modified water and sediment deliveries to a substantial part of the basin. Drying conditions into the 1990s prompted a series of major hydro-ecological assessments under the Northern River Basins Study (NRBS) and the Peace-Athabasca Delta Technical Studies (PADTS). The studies found that the entire Peace-Athabasca-Slave system was influenced by the flow regulation, while also indicating influence from climate (Prowse et al. 2006, see also Peters et al. 2010 and 2001). While there are differing opinions as regards the exact relative importance of flow regulation as a contributor to change, several important effects are nevertheless well documented and widely accepted and in line with the scientific understanding of the impacts of flow regulation. The Bennett Dam set in motion an array of hydrological and ecological impacts to the Peace River and downstream ecosystems in WBNP that continue to threaten the OUV of these areas today. The Bennett Dam was followed a decade later by the Peace Canyon Dam, a run-of-river project with a 50-meter high concrete dam constructed about 23

km downstream near Hudson's Hope, BC in 1980. Regulation of the Peace River through the construction of hydropower projects along the upper reaches in British Columbia is widely accepted as a continual and significant threat to the PAD and thus to a particularly valuable and integral part of WBNP for around half a century. Ecological impacts cannot be separated from impacts on the inhabitants and users of the PAD (see for example Indian Claims Commission, 1998).

Both projects predate WBNP's World Heritage inscription in 1983 and failed to attract attention at that time. In this sense the two existing dams have to be accepted as facts. The decisive questions from the World Heritage perspective today at a time when additional dams are being considered are therefore (i) what the exact effects of the river regulation are and (ii) what the options are to adapt dam operations in order to mitigate impacts to satisfy societal demands and objectives beyond energy. There is a wealth of analysis and literature about the effects of river regulation and options to regulate flows, both generally and specifically referring to the Peace River. As an example of major past efforts, the comprehensive Northern River Basins Study (NRBS), formulated the following recommendation in 1996: "As a principle for any future negotiations on mitigation of the impacts of the Bennett Dam, that the dam's operating regime be modified to help rehabilitate the Peace-Athabasca Delta and the riparian and aquatic conditions of the Peace River system. Further, that economic considerations of power production from this industry should not take precedence over the environmental stability and natural ecosystem of the Peace River, Peace-Athabasca Delta, Slave River and Delta and the Mackenzie River system." Twenty years later, the recommendation continues to be a valid framework deserving detailed analysis based on today's much improved understanding of environmental flows, especially in light of proposed additional hydropower development.

The Governments of Canada and British Columbia have granted most of the approvals for construction of the Site C project, another very large-scale hydropower project that will entail construction of a 60-meter high earthen dam located downstream of Peace Canyon near Fort St. John in Northeast British Columbia. Construction of the Site C project is currently underway. Although this project is still more than 1,000 km upstream of the PAD, many expect the project to contribute to further flow impedance down the Peace River on top of impacts from the existing Bennett and Peace Canyon dams. Surprisingly, the Joint Review Panel (JRP) established to shed light on the massive and controversial project concluded that "the Project would not have any measureable effect on the Peace-Athabasca Delta" (JRP, 2014), without providing a conceivable technical rationale for this conclusion. As an explanation for the lack of consideration of the PAD it is stated elsewhere in the report that it "was not within the spatial boundaries of the environmental assessment because the proponent calculated that there would be no detectable project effects at the PAD" (JRP, 2014). Given the enormous complexity of both the effects of river regulation and the PAD itself, the mission respectfully disagrees with this simplistic approach. From a technical perspective, it is clear that there are important effects which should be understood to inform decision-making, including as regards mitigation options.

In general, dams such as those associated with the aforementioned hydropower projects affect rivers by truncating high flow pulses (usually a result of structural outflow capacity or operational range) and extending the duration of flow associated with a high flow event over a longer period of time. The resulting effect on the river's hydrography is best described as a flattening or a "shaving-off" of peaks. From a hydrological perspective, this reduces the frequency of downstream flood events, oftentimes cutting off the river's floodplain from the main channel.

Over a timescale of years to decades, flow impedance decreases the capacity for sediment transport and alters patterns of downstream erosion and sediment deposition - not only in the channel but across the entire floodplain and into deltaic environments such as the PAD. Over longer periods of time of decades to centuries, a reduction in flow peaks (i.e. flood events) can

diminish important riparian processes such as channel maintenance, oxbow formation and channel shifting. These changes are known to have significant consequences for navigation and commerce along rivers.

From an ecological perspective, one obvious impact of dams is that they prevent the movement and migration of fish between upstream and downstream reaches (see review of literature in Winemiller et al. 2016). Hydropower projects are usually constructed along river reaches that are highly incised or exhibit relatively large drops in elevation, thus allowing for substantial head differences between headwater (above dam) and tail-water (downstream of dam) to drive energy-producing turbines. Therefore, high-energy riparian habitats associated with these areas such as riffles and rapids are at risk of being lost, as are the species that most depend on these high-energy environments. This can lead to dramatic changes in the fish community and biodiversity across a given watershed, in part because fish passages have been proven to be ineffective at maintaining corridors of migration (see Winemiller et al. 2016).

With the aforementioned loss of high flow pulses and the reduced connectivity with the floodplain, floodplain wetland area is also impacted. The fisheries that depend on connections between the main channel and floodplain habitats (oxbows, channel scars, sloughs, etc.) for foraging, refuge, or spawning are greatly impacted as a result of channel confinement and limited access. Further, with the cutting-off of the Peace River from tributaries upstream of these hydropower projects, the combined impacts to spawning fish requiring backwater, shallow water and lower order tributaries could be dramatic. This could be particularly important for economically important species such as Walleye and even Goldeye, whose eggs float and can be carried great distances downriver. As Timoney (2013) and Schindler (2015) point out, more study is needed in the area of dam effects on fish.

Throughout the 10-day trip, the mission saw and heard compelling evidence of dam impacts along the Peace River, most notably the changes in both the timing and magnitude of seasonal flows measured at Peace Point. It was accepted by many that the construction of hydropower dams in the upper Peace River has had significant impacts on the hydrology and ecology of the PAD, as reflected in a wealth of scientific and governmental analysis over the last decades. Flow regulation impacts in the upper Peace River have been so pervasive that they have even been documented further downstream of the PAD and WBNP in connected ecosystems such as the Slave River and Great Slave Lake - more than 1,100 km downstream (Gibson et al. 2006; Prowse et al. 2006).

While Timoney (2013) concludes that river regulation has not had a significant ecological effect on the PAD, Beltaos (2014), Environment and Climate Change Canada Research Scientist and Study Leader of Ecosystem and Climate Impacts of Extreme River Ice Jams and Floods, estimates that about 2/3 of the changes in Peace River ice-jam flood frequency in the PAD has been attributable to river regulation, mainly by the Bennett Dam.

A recent petition signed by more than 370 academic scientists at the time of the mission, in an unprecedented step endorsed by the Royal Society of Canada, attested to several major concerns during the permitting process for the Site C project. A public "Statement by Concerned Scholars" on the Site C project notes that "our assessment is that this process did not accord with the commitments of both the provincial and federal governments to reconciliation with and legal obligations to First Nations, protection of the environment, and evidence-based decision-making with scientific integrity".

Not only have operating hydropower projects altered the magnitude of natural flow variations along the Peace River, they have also changed the seasonality of flows - largely based on releases needed for and exclusively determined by power generation. More specifically, it has been estimated that the Bennett Dam has reduced flows in the Peace River (near Peace Point) in spring and summer (when natural peaks in flow would normally occur) by about 50%.

This is presumably due to decreased demand for power during the milder months of the year resulting in less release, but also due to impounding flow pulses related to snow melt originating in the mountains. On the contrary, fall and winter flows near Peace Point (when they would naturally be at lower levels) have been increased by as much as 300%, from an average of $500 \text{ m}^3 \text{ second}^{-1}$ to $1,500 \text{ m}^3 \text{ second}^{-1}$. This is the result of increased power demand (and the subsequent need for releases to generate power) in the colder months of the year (Leconte et al. 2006).

Overall, Peace River flows measured at Peace Point have been significantly reduced as a result of flow regulation. In fact, studies have estimated that mean high flows have been modified by as much as 50% or about $3,000\text{-}4,000 \text{ m}^3 \text{ second}^{-1}$ as a result of flow regulation (Leconte et al. 2006; Pietroniro et al. 2006; Prowse et al. 2006). Prowse et al. (2006) also concluded that sustained high flows over a 30-day period, which are important in generating flow reversals and allow water to back up into the PAD, have also been reduced due to river regulation. The other key mechanisms for controlling water in the PAD by the Peace River are through high-water damming - when high Peace River stages can spill into the PAD or prevent the drainage of water out of the PAD - and ice-jam flooding along the PAD reach of the Peace River (see for example Beltaos 2014 and 2008; Beltaos et al. 2006; Andrishak et al. 2011). Both of these mechanisms may also be affected by river regulation that reduces high pulse flows or changes the timing or seasonality of flows.

Ice-jam floods along the Peace River are critical in hydrating the PAD and re-connecting the perched basins throughout it. They are caused by low-stage winter freezing of the river, which is then followed by a mechanical breakup of the ice as spring meltwater increases flows downriver. When this mechanical breakup leads to the development of an ice jam along the PAD-reach of the Peace River (i.e. downstream of Peace Point), the river will backup, spill over its banks, and flood the perched basins and delta. Once flooded, these perched basins can retain water for 5 to 9 years depending on climatic conditions (Peters et al. 2006).

Ice-jam flooding is the primary hydrological mechanism for flooding the delta and getting water into the perched basins of the PAD and is an important ecological driver of the PAD. Therefore, the frequency of flooding of the PAD and hydrating perched basins is essential to understand. Prowse et al. (2006) reviewed cases of ice-jam flooding and how river regulation and climate change are reducing the frequency of these important PAD drivers. Owing to increased power demand in winter months, high releases from the Bennett Dam have resulted in a 200% increase in winter discharges and river stages, resulting in increased freeze-up stages in the Peace River. In follow-up comments prepared by Beltaos (2016), this author claims that “factual evidence indicates that increased freeze-up levels [caused by hydropower projects] lead to more frequent thermal breakups, and thence to less frequent formation of major ice jams”. Over time, this side-effect of river regulation for hydropower translates to reduced flood frequency of the PAD.

Manipulated pulsing and timing of discharges from dams seems to have affected muskrat populations, although Timoney (2013) points out the climate may have played some role in population decline. More research is needed to address the connection between flow regulation, climate change, and the frequency of ice-jam flooding especially as it pertains to important indicator species such as the muskrat. The muskrat was consistently mentioned by First Nations and Métis representatives as a species of major economic and cultural importance and an indicator of change, and Schindler (2015) described the muskrat as a “staple of subsistence living” in the PAD.

A major, landscape-level consideration that has received little attention to this point is the effect that a reduced frequency and duration of flooding from these current and future hydropower projects will have on the release of carbon stored in wetlands and peat soils across the PAD. These soils are high in carbon (i.e. organic matter) content and are formed

and sustained by the high production of plants relative to the low rates of decomposition from soil saturation/flooding conditions and cool temperatures. At the same time, these soils that are the platform on which many habitats across WBNP exist, are susceptible to degradation and loss from drying and oxidation. This concept was described to the mission through personal communication with Dr Schindler, a senior scientist with longstanding experience in the PAD. It has obvious links to climate change-induced warming and drying of the region. More attention should be given to understanding the implications of these interacting stressors on ecological processes throughout the region.

Sophisticated state-of-the-art environmental flows assessments are sorely needed for both the Peace and the Athabasca Rivers as they pertain to the health of the PAD. These types of modelling exercises will identify water flows needed for the environment under the circumstances of existing dams, thus also allowing for an understanding as to whether there is any additional capacity for flow regulation.

In their assessment of environmental impacts, planners for the Site C project and the proposed Amisk Projects concluded that Peace Point, upstream of the PAD, was the furthest reach of any potential impact of these projects. While it is widely accepted that the Bennett Dam has impacted the PAD and areas beyond (e.g. Great Slave Lake), these projects did not even assess the potential for any impacts to the PAD as a function of setting untenable downstream boundaries for impact areas. This is scientifically indefensible given that existing large hydropower projects along the upper Peace River appear to have effects on the PAD and given the high likelihood of cumulative impacts of additional flow regulation on Peace River flow and altered timing of delivery as mentioned earlier. All of this should be analysed as a basis for informed decision-making. IUCN (2013) offers guidance for assessments in a World Heritage context.

Water management is a responsibility shared by the federal, provincial, territorial and municipal governments in Canada. Despite detailed legal stipulations, in practice there is a seeming disconnect between water management decisions made at the provincial level and the management of federal resources such as WBNP. In addition, there are question marks about the effectiveness of existing attempts to enhance the coordination of water management across provincial and/or territorial boundaries. In this case, water management decisions were made in BC, affecting a riparian and inland deltaic system in Alberta that happens to be largely located within a national park and World Heritage property, overlapping with rights on the part of several First Nations and Métis. At a time when the construction of a major dam has started, another one is being proposed and the Peace River is under pressure from many other developments, an effective bilateral water management agreement between the provinces of BC and Alberta may help to alleviate some of the trans-boundary water management challenges. However, unless there is more authority at the level of PCA to ensure that the scoping and assessment process are inclusive of all potential direct and cumulative impacts, it seems highly unlikely that they can sufficiently protect the OUV of WBNP from the threat caused by flow regulation.

While the status of a proposed project named Glacier Power or Dunvegan could not be conclusively verified, an additional hydropower project could be touched upon by the mission, including in a meeting with the proponent. The meeting and written information (AHP Development Corporation, 2015) revealed that the Amisk Hydroelectric Project, proposed on the Peace River in Alberta, so far appears to have given no consideration at all to the World Heritage status of WBNP. For the reasons outlined above, the mission wishes to highlight that such consideration, in adequate detail, is essential to inform decision-making. The mission learned about further interests in dam construction in several locations, including on the Slave River on the eastern boundary of WBNP and on the Athabasca River. Remarkably, the original World Heritage nomination refers to hydropower plans on the Slave River, which “would affect some park lands if developed”. At the time of inscription, the Committee recognized and drew

attention to the harmful consequences that the eventual construction of a dam on the Slave River could have on the property's OUV (**CONF 009 VIII**), illustrating that hydropower has long been a relevant factor for WBNP also on the Slave River. The current status of these project ideas is unknown and could not be verified within the scope of this report. It is clear that development of such projects would raise similar questions in terms of their relationship with the PAD, WBNP and its World Heritage status and therefore require similar attention and assessment, including in regards to cumulative impacts. The mission endorses the technical points and recommendations made in PCA's submission to the JRP established for the Site C project (Parks Canada Agency, 2013) and considers them a useful source of guidance, some of which would in principle also be applicable to projects other than Site C. The mission also notes the availability of useful guidance for cumulative effects assessments (CEA) developed by CEEA.

To the knowledge of the mission, there are currently no active plans for hydropower development on the Athabasca River. Public media reports suggest concrete and recent interest though. Even in the absence of dam regulation there are other and important concerns about a changing flow regime of the Athabasca River, which likewise is an essential component of the PAD. A state-of-the-art environmental flow assessment is therefore recommended for key rivers of the PAD system. Flow regulation may well be the best possible adaptation strategy given that irreversible change has already occurred.

Recommendation 3

To enable informed decision-making, conduct environmental flows assessments to the highest international standards for the Peace, Athabasca and Slave Rivers as they pertain to the health of the Peace-Athabasca Delta (PAD), in order to identify water flows needed to sustain the ecological functioning of the PAD under the circumstances of existing and planned future dams and water withdrawals. These assessments should incorporate projections of climate change and should determine the cumulative effects on the PAD and the property of flow regulation of all existing and proposed dams on all three rivers.

Recommendation 4

Conduct, in line with the IUCN World Heritage Advice Note on Environmental Assessment, an environmental and social impact assessment of the Site C project and, if moved forward, any other hydropower projects potentially affecting the Outstanding Universal Value of the property.

3.4.2 Industrial Resource Extraction

3.4.2.1 Alberta Oil Sands Region

The Alberta Oil Sands are a globally significant deposit, which has been estimated to contain 168.6 billion barrels of recoverable bitumen (ERCB, 2012). The rapid expansion of oil sands projects along the lower Athabasca River since the mid 1960s has brought this highly industrialized zone within proximity of WBNP's boundary. This region lies directly south of WBNP borders and is centred on a major migratory bird flyway. With potential resources covering an area of about 142,000 km², the Athabasca Oil Sands region in northeast Alberta is likely to see continued expansion well into the future.

Surface mining and in situ approaches are used to extract bitumen from the sands, depending on the depth and thickness of the reserve. Both approaches have the potential for significant environmental impacts, including on the OUV of WBNP (for useful overviews see Hodson, 2013; Kurek et al. 2013; Weinhold, 2011). Surface mining involves removal of the resource from the surface or near surface, transport of material, processing and extraction, water use, and tailings water management. Tailings water is considered toxic and is typically contained in large, pond-like impoundments where water can evaporate and contaminants can accumulate over time on the bottom. In situ approaches mainly involve injection of steam below ground to aid in the extraction of bitumen and would be necessary to extract the vast majority of Alberta's known reserves (Timoney, 2013). Given that the separation occurs belowground,

these approaches involve less activity on the surface, and impacts from in situ extraction of resources on the integrity of WBNP and, more specifically, the PAD is less overt. However, there are direct impacts to resident and migratory species as a result of pads, roads, seismic lines, traffic, and other surface activities associated with in situ mining, in addition to indirect impacts associated with in situ approaches such as the emission, chemical transformation, and downwind deposition of air pollutants from these sources.

As per the ToR, the mission considered the impacts of the proposed Teck Frontier Project. The project would move the development frontier significantly closer to the southern boundary of WBNP than any other project, thereby also much closer to the PAD. There are major indigenous concerns about the project. As with any oil sands development, potential future impacts to the PAD and WBNP arise from five major areas and are reviewed and described in great detail in both Timoney (2013) and Schindler (2015). Adapted to the Teck Frontier project, potential impacts can be summarized as follows:

- 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 PAD;
- Water withdrawals by oil sands operators from the Athabasca River that may be affecting in-stream flows towards the PAD;
- Atmospheric deposition of particles containing contaminants such as polycyclic aromatic hydrocarbons (PAHs), nitrogen oxides, and sulphate;
- Avoidance of this highly industrialized region by migratory birds en route to WBNP or on their way south, including the endangered Whooping Crane;
- 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.

As of 2013, the total tailings pond water area was about 8,800 ha, and the total active tailings area including all tailings structures was about 22,000 ha (Alberta Environment and Parks, 2017), increasing several-fold just over the past few decades. Fully developed, the proposed Teck Frontier project would add approximately 6,000 hectares to that. Tailings water is toxic and direct exposure to fish and wildlife often produces fatal results. The migration corridor for waterfowl and the endangered Whooping Crane goes directly over the oil sands region. Preliminary results of a major monitoring study presented to the mission (Bidwell et al. 2015) showed that, on average, 98% of the marked (satellite-tracked) population flew over this region on their return flight in the spring, and just over 81% of marked birds flew over this area on their departure to the south in the fall. The percentages of birds migrating over the minable oil sands area were 72% in spring and 90% in fall. The proportion of birds landing in the minable oil sands was found to be 18% in spring and 15% in fall. These birds stopped in the minable oil sands area for 1-2 nights when flying north or south. Little is known about the health of these birds and whether chronic exposure to these toxic water bodies from year-to-year may increase mortality.

Leakage from tailings ponds and failures of tailings dams (coal, copper/gold mines) have occurred in the recent past in Canada, resulting in documented impacts to wildlife and even the 2-year closure of a fishery in Lake Athabasca. Recent examples include major spills at the Mt. Polley Mine (BC) in 2014 and at the Obed Coal Mine on the Athabasca River in 2013 which resulted in a downstream flow of fine coal tailings in the Athabasca River that was measurable until downstream of Fort McMurray. There are also instances of mortality caused by wildlife contact with tailings ponds. In 2008, about 1,600 bird mortalities were directly caused by contact with bitumen in tailings ponds. Another 500 occurred in 2010 and 111 in 2014 (Bidwell et al. 2015). While fines were assessed for these overt instances of impact, little is known about chronic low-level dosing impacts to species of fish and wildlife. Human health

impacts related to contaminants derived from this region are a serious and plausible concern but were not within the scope of this mission.

In an attempt to prevent direct exposure-related mortality to wildlife (mainly birds), the industry has adopted a series of audible and visual deterrents to prevent landings of Whooping Cranes and other migratory birds as well as visitation by large herbivores. While these techniques seem to be somewhat effective in deterring bird landings, they must certainly induce a level of stress that could affect the fitness of organisms that approach or fly through these areas. St. Clair et al. (2011) provide a useful report on mass bird mortality in oil sands tailings ponds, illustrating that the current understanding and management response is severely limited. The multiple risks from tailings ponds, including leakages and dam failures, constitute a concrete threat to the PAD, which should receive systematic analysis considering the World Heritage values of the PAD.

The Canadian Air and Precipitation Monitoring Network (CAPMoN) recently established a site in WBNP to address data gaps in air quality and atmospheric deposition in Western Canada. Drawing upon ECCC's atmospheric modelling, results from this effort and data visualization suggest current and future impacts of the oil sands region on nitrogen and sulphur deposition over southern and eastern WBNP. There is also modelled deposition of sulphate in the southern region/PAD area of WBNP. Over time, this sulphate deposition may lead to acidification of soils or possibly affect microbial respiration through an increasing shift towards sulphate reduction in anaerobic wetland soils. Model simulations from this effort predict that critical load exceedances may already be occurring for both sulphate and nitrogen oxides in the southern and eastern borders of WBNP.

Threats related to the deposition of these elements would have bottom-up implications on the ecology of the PAD region of WBNP. First, nitrogen oxides represent an indirect greenhouse gas in the atmosphere, they influence acid deposition, and they also provide a source of a potentially limiting nutrient (Nitrogen) if deposited in this system. This may shift the balance of primary production and respiration in this wetland-dominated landscape. Sulphate can also have significant implications on soil metabolism in this large, shallow freshwater environment. Sulphate is an important terminal electron acceptor in anaerobic microbial respiration, but it is often low or lacking in freshwater environments. Addition of sulphate can have implications on soil respiration and the stability of soil carbon across this highly organic peat-dominated landscape. Evidence from coastal wetlands experiencing increased sulphate delivery from saltwater intrusion suggests that this may be an important contributor to peat collapse (Weston et al. 2006; Chambers et al. 2015). Combined with warming and drying of the PAD, these types of cumulative or even synergistic systems-level impacts must be elucidated.

As mentioned previously, Kelly et al. (2010), Timoney (2013) and Schindler (2015) provide reviews of air and water quality contaminants derived from this region. They also describe the potential for transport of these toxins (e.g. mercury and PAHs) to downstream sites within the PAD and the impacts observed in fish and wildlife. In meetings during the mission, one senior scientist noted a high frequency of fish deformations (2-5%) in the PAD, suggesting a relationship to increased toxicity of areas immediately downstream of the oil sands region. The mission also heard accounts of increasing levels of sulphate, phosphate, aluminium, arsenic and selenium in Athabasca River, evidence of white sucker contaminants, high PAH and mercury levels in snow as well as high levels of mercury/methyl Hg in water and sediments downstream of the oil sands region as well as in fish such as walleye. Schindler (2015) linked this to a 7-fold increase in mercury emissions from the oil sands region in the past decade. It all points to a growing environmental contamination problem downstream of this highly industrialized region, including the PAD.

In addition to concerns about the environmental impacts of oil sands applicable to the entire Alberta Oil Sands region, the proposed Teck Frontier project, if fully-developed, would clear

about 30,000 ha south of WBNP. Thus it would diminish the existing de facto “buffer zone” between the Alberta Oil Sands region and WBNP to less than 30 km within a high-use area for wildlife. The proposed footprint would overlap with a substantial area of the Ronald Lake Bison Herd range, a disease-free herd of about 200 Wood Bison. Compared to the current bison population in WBNP, the Ronald Lake bison is also genetically distinct and has likely been in that location since before WBNP was established. Impacts to this herd from the proposed Teck Frontier project seem unavoidable. The Teck Frontier project would also create an industrial divide between caribou herds that exist to the east and the west.

Recommendation 5

Conduct an environmental and social impact assessment of the proposed Teck Frontier oil sands mine project in line with the IUCN World Heritage Advice Note on Environmental Assessment, fully taking into account the Outstanding Universal Value of the property, including the Peace-Athabasca Delta.

Recommendation 6

Conduct a systematic risk assessment of the tailings ponds of the Alberta Oil Sands region with a focus on risks to the Peace-Athabasca Delta, and submit the report of this assessment to the World Heritage Centre, for review by IUCN, in accordance with Paragraph 172 of the *Operational Guidelines*.

3.4.2.3 Forestry and Pulp and Paper

Forestry is a major industry and land use in Alberta and some parts of the Northwest Territories. The environmental impacts include the direct impacts of logging of primary forests and modification of water regimes and characteristics, as well as the indirect consequences of facilitating mechanized land access to remote wilderness by truck, car, ATV and snowmobile. Logging is widely recognized as a major driver of landscape change in Alberta, as reflected for example in analysis underpinning the status of Wood Bison and Woodland Caribou (COSEWIC, 2013 and 2002).

Despite WBNP’s large size, important wildlife populations are not restricted to the park in their ranges. For example, Wood Bison and Whooping Crane use habitat both within and outside the property. Logging thus poses potential risks for the two main flagship species of the property, illustrating the need to manage wildlife beyond WBNP’s boundaries. Noting the absence of a formal buffer zone discussed in more detail in chapter 3.5, the mission considers forestry to be one of several industries potentially conflicting with conservation values of WBNP, including values justifying its World Heritage status. Corresponding recommendations are covered by the sub-chapters on land-use planning (3.5.3) and the management of Wood Bison (3.6.2) and Whooping Crane (3.6.3), respectively.

Longstanding related concerns are air pollution and solid and liquid waste from the pulp and paper industry along the Peace and Athabasca Rivers. The mission learned that concerns about pulp mill expansion were a major factor in the design of the Northern River Basins Study (NRBS), indicating the high relevance of an industry that currently attracts little attention compared to the oil sands and hydropower development. Five mills are operating on each river upstream of the PAD and WBNP (Glozier et al. 2009). Chambers (1996) notes four effects of mill effluents: (i) organic inputs; (ii) colour and turbidity; (iii) toxic effects; and (iv) nutrient addition (eutrophication). Reviewing the literature on pulp and paper mill effluents in the Peace and Athabasca River basins, McCubbin et al. (1993) noted “gross pollution” being “common in the 1960s”, with technological improvements since. Despite improvements, the pulp and paper mills have been point source stressors to WBNP’s main rivers and the PAD for decades Glozier et al. (2009). The industry is thus one element of the cumulative effects of industrial activities discussed in chapter 3.4.3.

As mentioned in chapter 2, the longstanding national park status since the 1920s does not amount to a conservation focus of WBNP management since that time. Commercial logging

was conducted in the property from 1951 to 1991. Drawing on overviews by Timoney (1996), Timoney et al (1996), Struzik (1992) and Western Canadian Wilderness Committee (1992), the logging history is summarized hereafter:

- Commercial logging first began in 1951 along the Peace River north to supply the Eldorado Uranium Mine on the north shore of Lake Athabasca;
- Commercial logging was subsequently extended along the Peace and Athabasca Rivers;
- Expired in 1981, the logging agreement was renewed in 1983, the year of World Heritage inscription;
- For 23 years commercial logging coinciding with PCA being the land manager;
- A challenge by the Sierra Legal Defence Fund on behalf of the Canadian Parks and Wilderness Society (CPAWS) eventually resulted in a federal court decision ending commercial logging in WBNP in 1992;
- Legal post-logging requirements, such as restoration, regeneration monitoring, bridge removal, restoration of selected stream channels, clean-up etc. were not respected.

Citing the Canada National Parks Act (CNPA), Timoney (1996) suggests that logging was illegal at all times, besides being accompanied by further irregularities, such as exceptionally low crown timber fees. This author describes the logging history as a result of “government mismanagement and industrial malpractice”. Boyd (2011) notes that national park policy since 1964 made industrial activities “no longer acceptable in national parks”. As of 1979, according to Boyd (2011), policy protected national parks “from all forms of extractive resource use such as mining, forestry, agriculture, oil, gas and hydroelectric development, and sport hunting”. While the latter policy is not binding, it confirms that logging, at the very minimum constituted a breach of policy over decades. The current management plan refers to the end of commercial logging as a “milestone” in WBNP’s history (Parks Canada, 2010).

For obvious reasons commercial logging targeted the most attractive accessible forests, which are the riparian White Spruce (*Picea glauca*) forests of the Peace and Athabasca Rivers, occurring in association with Balsam Poplar (*Populus balsamifera*). Restricted to alluvial lowlands, these forests are rare flood-driven boreal ecosystems with fires playing a much smaller role than in common boreal uplands. White Spruce therefore reaches exceptional tree ages exceeding 160 years, tree heights exceeding 45 meters, and much higher structural, functional and biological diversity compared to common boreal forests (Timoney, 1996). This author calculated that only an estimated 330 km² of these old-growth forests naturally occurred in WBNP and that of these some 70% were clear-cut logged. Consequently, judging the impacts of commercial logging as a function of the logged area in relation to the overall forest area is grossly misleading. Not only did commercial logging occur over decades, it resulted in the loss of the majority of a rare and disproportionately valuable forest type.

A review of the formal World Heritage documentation reveals a lack of appreciation of such considerations. The nomination suggests “mostly unmodified wilderness”, while referring to 560 km² of “pre-existing timber lease” to be “honoured but not renewed until 2002”. While the IUCN evaluation makes no reference to logging, the World Heritage Committee is on record for expressing “serious concerns regarding (...) logging operations” (Decision CONF001 VI.31-34, Carthage, 1991), and for expressing satisfaction that forestry regulations were “more strictly enforced”, noting “negotiations (...) underway to terminate logging rights before their official expiry in the year 2002” (Decision CONF002 VIII, Carthage 1991).

In hindsight, this unexpected logging history, including over almost a decade after World Heritage inscription, should probably have triggered a much stronger formal response due to its striking incompatibility with basic requirements under the Convention. While it is futile to retrospectively speculate about the formal implications commercial logging should have

triggered, it is certainly useful to be aware of this history. PCA colleagues consulted during the mission considered it unthinkable that any form of commercial logging could return to WBNP today.

3.4.3 Cumulative Effects and Impacts

While the mission focused its efforts on understanding impacts to the OUV of WBNP from the aforementioned threats, it must also be acknowledged that there are other threats to the region, including the property and its OUV, that should continue to be studied and monitored. For example, it is important to be aware that industrial development affecting or potentially affecting WBNP and the PAD is not restricted to existing and future hydropower development and the expanding Alberta Oils Sands region. While exploration and extraction of minerals other than oil sands, including uranium mining, have attracted comparatively limited attention, it is clear that all mineral exploration and extraction potentially adds individual and cumulative impacts to an already complex setting, which requires adequate assessment and management responses. Another example is large-scale industrial development on the Peace River other than hydropower development, which is somewhat overshadowed by the current focus on the debate on the Site C project.

All of these existing stressors should be fully considered as part of the strategic environmental assessment (SEA) for WBNP (requested by the World Heritage Committee in its Decision **39 COM 7B.18**) and include changes outside the park in addition to river regulation and oil sands activity, such as the rapidly expanding agricultural region along the mid-Athabasca River, uranium mining along Lake Athabasca, and the growing urban/industrialized centers such as Fort McMurray. There should also be a consideration of other forces of change from within the PAD, which are generally described below and in more detail by Timoney (2013). While the SEA has already been requested by the World Heritage Committee (Bonn, 2015), the mission identified the cumulative impacts of the threats to the property to be far more complex and severe than previously understood. The mission therefore wishes to emphasize that the scale and depth of the SEA study required is considerable and that therefore the scope and resourcing should be reconsidered and expanded.

Inside the PAD, land-use and management decisions have had varying degrees of impact on the system. As the Mackenzie River Basin Board (2012) stated that the PAD is “a clear example where cumulative effects have generated ecological change on a landscape level”. Quite possibly the most significant land management decision within the PAD region was a decision to dredge a cut-off channel to prevent avulsion of the lower Athabasca into the Embarras River. While this benefitted navigation, it directed sediment away from Lake Mamawi / Lake Claire and may have led to accelerated drying of some areas of the PAD (Timoney 2013). Similarly, the installation of weirs along the Roches and Revillon Coupé seem to have benefitted PAD water levels since the construction of the Bennett Dam, but unintended consequences on fish migration (e.g. Goldeye) and waterfowl staging have yet to be fully understood. Other local pressures such as commercial fishing and past logging are recognized as contributing to change; however, there is insufficient information available to ascertain impact.

Outside the PAD, Timoney (2013) describes documented and potential sources of agricultural, industrial, and municipal sources of contaminants to the Peace and Athabasca Rivers that may be affecting the health of the PAD. These contaminants include various organic contaminants (e.g. dioxin), pesticides, and fertilizers such as phosphorus that may be contributing to more frequent incidents of algal blooms. Finally, uranium mining near the shores of Lake Athabasca in places like Uranium City have produced several tons of radioactive mine tailings and mobilized metal contaminants (e.g. arsenic, zinc, lead, etc.) that may be affecting the environmental health of an area much greater than the footprint of the mines. Timoney (2013) describes the evidence on bioaccumulation in whitefish and sediments near mined areas and the need for more information with respect to this threat.

Cumulative impacts are well defined as a concept, including in Canada (see for example Canadian Council of Ministers of the Environment, 2014). Having said that, it is challenging to effectively conduct a cumulative impacts assessment. In their review of Canada's Cumulative Effects Assessment process, Duinker et al. (2006) point out a number of problem areas including a lack of understanding with regard to ecological thresholds and the difficulty in separating project-specific impacts from cumulative impacts, both of which are necessary to determine how a specific project will affect a system long-term. Schindler (2015) makes clear that the combined effect of flow regulation and climate change poses the most imminent threat to WBNP and the PAD. He also concludes that airborne and waterborne pollutants from the oil sands mining region poses a "serious and increasing threat". However, it is unclear as to whether there is a sufficient understanding of cumulative impacts from these and other threats to the PAD or the greater WBNP region.

In order to understand cumulative impacts of hydropower projects, there needs to be an established baseline condition that considers both a pre-regulation state as well as an incremental analysis of subsequent projects. A systematic analysis of a pre-regulation condition (historic or reference condition), an existing base condition (with current projects and operations), a future without project (to include projects that have been authorized but have yet to be constructed), and a future with project conditions is fundamental to understanding cumulative impacts. Further, if the focus is on the PAD, there must also be incorporation of other competing water uses and impacts within the basin as well as climatic drivers and climate change that may affect the net availability of water and the timing of that water in the basin. Added to that, impacts from the oil sands region and other potential threats should also be considered as a means to fully understand cumulative impacts.

It is clear that the Bennett Dam has had a substantial impact on the hydrology and ecology of the Peace River as well as on the PAD. Now, as an in-line series of hydropower projects, it is essential to understand the impacts of each before a satisfactory cumulative impacts analysis can be conducted for the Amisk Project, but a true cumulative impacts assessment must also consider the increasing importance of climate change and other PAD-specific impacts. Unfortunately, there does not seem to be the political will to expand the scope of these hydropower-related analyses beyond Peace Point - a seemingly arbitrary location along the Peace River beyond which no impacts are believed to occur.

From a baseline perspective, there is also a need for hydrological model development that would aid in forecasting change under future scenarios as well as hindcasting historical/baseline conditions. There is an insufficient understanding of what baseline conditions were along the entire Peace River and including the PAD prior to construction of the Bennett Dam. This is essential in understanding change as well as assessing cumulative impacts from the construction of dams subsequent to Bennett (e.g. Peace Canyon) as well as forecasting changes from projects such as the Site C project and proposed projects like Amisk.

Finally, it is worth noting that a cumulative impacts analysis does not fully address the scale of impacts from the threats considered. In some cases, synergistic effects, in which the net effect is greater than the observed or predicted additive effect of each threat, may arise from interacting threats. For example, the combination of river regulation and climate change, both of which affect the timing and amount of water on the landscape, could have catastrophic impacts on the PAD – ultimately leading to a drier carbon-emitting ecosystem state.

Based on the evidence, the mission concludes that more scrutiny is warranted with each new project. While Bennett brought the biggest impact to the system in terms of converting a natural river to a modified and regulated system, each subsequent even marginal change in

the hydrology could have potentially magnified effects on the ecology of an already impacted system.

Recommendation 7

Establish adequate baseline hydrological information of the Peace and Athabasca River Basins to enhance the reference for monitoring and assessing current and future hydrological conditions.

Recommendation 8

Expand the scope of the Strategic Environmental Assessment (SEA), which was requested by the Committee in its Decision **39 COM 7B.18**, so that it adequately reflects the scale, pace and complexity of industrial development, land use changes and river flow manipulations in the Peace and Athabasca River watersheds, both in terms of individual and cumulative impacts.

Recommendation 9

Expand the scope of monitoring and project assessments to encompass possible individual and cumulative impacts on the Outstanding Universal Value of the property and in particular the PAD.

3.5 Boundary Configuration, Neighbouring Areas and Land Use Planning

The boundaries of protected areas rarely - if ever - reflect the best-case scenario from a conservation planning perspective due to competing land or resource use interests or limited information. Water, air, wildlife movements, habitat, ecological processes and human history etc. do not abruptly stop at a park boundary, as is fully reflected in PCA's Ecological Integrity approach and GPOP. Despite its vast scale, WBNP is no exception to this rule. The term Greater WBNP Ecosystem (GWBNPE) reflects the need to consider WBNP jointly with its surroundings. Even a superficial glance reveals that the boundaries of WBNP are for the most part straight lines, visibly not following any ecological or geomorphological boundaries, and that only some 80% of the critically important PAD lies within the park boundaries. Even though WBNP is very large, direct and indirect "modern" anthropogenic impacts have been quickly and strongly increasing over time. As this happens, the question of linkages between WBNP and the broader landscape become ever more important. One obvious need is to consider the impacts of development outside of WBNP which are likely to impact on the national park and World Heritage property in decision-making informed by adequate assessment. At least three additional and overlapping implications deserve consideration, which are briefly discussed hereafter.

3.5.1 Adapting the Boundaries

The original World Heritage nomination notes "a range of proposals for boundary changes (...) intended to strengthen the park by including adjacent resource values". Despite obvious conservation benefits, the feasibility of such changes would also depend on the results of discussions and negotiations between the federal, provincial and territorial levels, as well as with First Nations and Métis. It is beyond the scope of this mission to speculate on the possible outcomes of such discussions and negotiations. The idea of adapting the boundaries based on the wealth of information generated since they were decided in the 1920s remains valid though and deserves to be discussed.

A possible way to achieve a de facto "adaptation" of WBNP boundaries would be enhanced harmonization of WBNP management with existing or planned contiguous provincial and/or territorial protected areas. In fact, there already are contiguous provincial protected areas and concrete proposals to establish more. As an example, Caribou Mountains Wildland Provincial Park, Alberta's largest Wildland Provincial Park at almost 600,000 ha, is contiguous with WBNP. Another example includes the existing and proposed protected areas in the Birch River watershed, which would add a layer of protection to this relatively intact important river and part of the PAD. As the Province of Alberta intends to establish new provincial protected

areas, some of them large and in the immediate vicinity of or even contiguous with WBNP, there could be tangible conservation opportunities partially addressing the imperfect boundary configuration and the absence of a buffer zone by coordinating management. Coordinated management of contiguous provincial protected areas would be one step towards a de facto adaptation of the boundaries of WBNP and a partial “buffering” of the property.

Such opportunities appear to receive limited systematic attention today. From a World Heritage perspective, the example of the Canadian Rocky Mountain Parks comes to mind, a World Heritage property since 1984, which was extended in 1990. Originally comprised of four contiguous national parks (Banff, Jasper, Kootenay, Yoho), several provincial parks were subsequently added as a boundary modification (Mount Robson, Hamber, Mount Assiniboine, Kananskis), in line with IUCN recommendation and a corresponding World Heritage Committee decision (CONF 004 IX.A, Buenos Aires). In principle a comparable “conservation complex” under a World Heritage umbrella could be feasible and beneficial for WBNP; it deserves to be discussed in the view of the mission.

3.5.2 Buffer Zone

PCA can influence decision-making in neighbouring jurisdictions; it can be argued that it is obliged to do so in order to meet its institutional objectives and legal obligations. However, PCA has no regulating authority and there is no legal basis for a formal “buffer zone” in Canada. In the wording of the *Operational Guidelines* (OG) guiding the implementation of the World Heritage Convention (UNESCO / Intergovernmental Committee for the Protection of the World Cultural and Natural Heritage, 2015), “a buffer zone is an area surrounding the nominated property which has complementary legal and/or customary restrictions placed on its use and development to give an added layer of protection to the property” (paragraph 104). According to the OG, buffer zones should be established “wherever necessary for the proper protection of the property” (paragraph 103). In the absence of a buffer zone, nominations are to include an explanation (paragraph 106).

While it is conceivable that no need for a buffer zone was perceived at the time of nomination and inscription, the luxury of being embedded in a sea of seemingly endless forests and wetlands has since come to an end. The most striking example is the southern boundary of WBNP, which faces a quickly advancing development frontier. The window to establish a buffer functional zone in this critical area is closing. The proposed Teck Frontier mining project, for example, would significantly move the development frontier towards WBNP. This requires careful consideration at the project impact assessment level in terms of environmental impacts and indigenous rights, while also raising the much broader question of the relationship between WBNP and a rapidly moving development frontier. The logical consequence of an absence of any response would be an eventual direct encounter of the development frontier and WBNP, thereby potentially increasing the threat to the OUV of the property including its conditions of integrity. As a result, there is an urgent need to find solutions in the sense of a “functional” - as opposed to a legal - buffer zone. The lack of a corresponding legal figure in Canada, conflicting industrial interests and predictable concerns about harvesting restrictions on the part of indigenous users adds complexity to the establishment of a “functional” buffer zone. This should not constrain the search for urgently needed solutions.

3.5.3 Land use planning

Land use planning in place appears to be in its infancy around WBNP, in all likelihood a function of the “frontier” character of the park. Existing efforts appear to (i) fail to balance competing public interests by prioritizing industrial development and (ii) largely ignore consideration of cumulative effects in the view of most people met by the mission, with the exception of representatives of the Government of Alberta and the private sector.

The Lower Athabasca Regional Plan (LARP) was the first regional plan to be approved by the Government of Alberta. LARP applies to the area between the Alberta Oil Sands and WBNP and as such is highly relevant to the future of WBNP. Adopted in 2012, several First Nations challenged the LARP as being incompatible with their treaty rights. Six First Nations submitted Applications for Review under a provision in Albertan law. A government-appointed panel set up in response to the Applications published its findings in 2015 (LARP Review Panel, 2015). The report notes that the Government of Alberta “frequently disputed the jurisdiction of the Panel to address First Nations concerns” underlying the Applications for Review, thereby failing to “specifically address the arguments of the First Nations or their written evidence”. This resulted in a deadlock, which the Review Panel addressed by issuing an Information Request on this jurisdictional matter to all parties, triggering written arguments from all parties.

Put simply, in the wording of the report, the Review Panel “respectfully disagreed” with the governmental assertion that First Nations were “not affected by the LARP”, citing a multitude of specific evidence to support that “the LARP engages Aboriginal interests”. The Panel concluded that, “as reflected in the Alberta Land Stewardship Act, it is anticipated that a revised LARP will meet the needs of future generations of Albertans residing in this region, including Aboriginal Peoples”.

From a conservation planning perspective, it is further noteworthy that scientists and conservation NGOs consulted by the mission consistently described the identification of potential protected areas within LARP as a by-product rather than the result of systematic conservation assessment and planning. The area covered by LARP is a critical area for the World Heritage values of the WBNP, including the PAD. Much can be learned from, and can be built upon, existing work carried out under the LARP. However, the many shortcomings of the process and its results suggest that a revision might be the only recommendable way forward, involving Aboriginal Peoples and conservation concerns in more meaningful and balanced fashion. Such a revision and consolidation should pay particular attention to the Birch River watershed, the last relatively intact remaining large river flowing into the PAD.

Recommendation 10

Conduct a comprehensive assessment of options, in order to underpin decision-making to put in place an effective buffer zone, as defined in the *Operational Guidelines*. The Birch River deserves particular attention as the only relatively intact major watershed of the PAD.

Recommendation 11

Conduct a systematic assessment of options to better realize synergies between the property and land use planning in its immediate vicinity, including the existing and planned provincial protected areas.

3.6 Further Management Considerations

3.6.1 Park Management Capacity and Office Presence

The mission found PCA leadership and staff in WBNP to be fully committed to the institutional mandate, highly motivated, experienced and skilled. Given the vast size of the property and the scale and complexity of the challenges, it is regrettable that the property’s already modest staffing and resourcing apparently suffered cuts in 2012. The restriction to a seasonal operations status, apparently justified on the grounds of low visitor numbers, appears to be incompatible with the main challenges WBNP faces, none of which is seasonal. Seasonal staffing also comes with obvious challenges in terms of staff retention and motivation, especially in remote duty stations. The mission was surprised to learn that there is no full-time Superintendent dedicated to WBNP. Management responsibility for Canada’s largest national park, one of the largest worldwide and exceeding the size of some entire countries like Switzerland or the Netherlands, is an extremely demanding task which would appear to require the permanent presence of a Superintendent in the view of the mission. A return to all-year status and the consideration of a full-time Superintendent with exclusive responsibility for WBNP is therefore recommended to ensure that the primary land manager is in an adequate

position to meet its legal mandate and obligation. The status quo cannot be considered to meet the protection and management requirements of a World Heritage property, as laid out in the *Operational Guidelines*.

The limited PCA presence in Fort Chipewyan is a further and conceivable challenge consistently echoed by numerous stakeholders and rights-holders consulted by the mission. There is no adequate and permanent go-to place in this main settlement near the PAD where pressures on WBNP and tensions with First Nations and Métis crystalize. A strengthened office presence, including the permanent presence of senior staff in a position to serve as a primary contact for First Nations, Métis and other community members would constitute a humble yet helpful step to live up to the commitment to collaborative management and broader governmental commitments to reconciliation.

Recommendation 12

Consolidate the management resources and capacity to a standard commensurate with World Heritage status and adequately respond to the challenges facing the property by:

- a) Reinstating a year round status and staffing of WBNP;
- b) Recruiting a full-time Superintendent exclusively in charge of WBNP;
- c) Ensuring an adequate Parks Canada presence in Fort Chipewyan, part of the critical Peace-Athabasca Delta area and a major ecological region of WBNP.

In line with the current management plan, and PCA analysis underpinning it, the mission considers that the management of WBNP does not adequately reflect the far-reaching rights and governmental commitments to First Nations and Métis. In the wording of the State of the Park report (Parks Canada Agency, 2009), WBNP “lacks an Aboriginal governance structure” and “more is needed to create a successful relationship that will allow the park to move fully into working with Aboriginal peoples”. The establishment of a Cooperative Management Committee is a positive follow-up and step in this regard. However, there continues to be very limited involvement in management, let alone governance in the sense of direct involvement in decision-making. In the view of the mission, the evolving relationship between the federal land manager and aboriginal partners requires a consolidation of existing mechanisms and implies a changing role of governmental staff. In addition to the excellent technical qualifications, it is highly recommended to ensure adequate qualifications in areas such as facilitation, negotiation and conflict management. Whereas governance is addressed in chapters 3.1 and 3.2, the mission offers the following recommendations in terms of management.

Recommendation 13

Further develop the existing Cooperative Management Committee established by the State Party, and consolidate a functional and effective mechanism to involve Aboriginal Peoples in the management of the property.

Recommendation 14

Ensure that the preparation and skills of involved governmental staff correspond to the requirements inherent in the evolving relationship with First Nations and Métis communities.

3.6.2 Management of Wood Bison

The American Bison (*Bison bison*) is North America’s largest land mammal. The vast Pre-Columbian range of the species extended from Northern Mexico to interior Alaska. On the brink of extinction by overhunting in the 19th Century, bison is today believed to inhabit less than one per cent of its historic range (Sanderson et al. 2008). At one point, bison had almost been extirpated from the wild in Canada, with only one small population of an estimated 250 Wood Bison remaining in what is now Wood Buffalo National Park and adjacent areas (COSEWIC, 2013). Bison is both an ecological and a cultural keystone species due to its disproportionate influence on ecological processes and its material, cultural and spiritual significance to indigenous peoples.

Two subspecies of American Bison are commonly distinguished (Ball et al. 2016; COSEWIC, 2013; Gates et al. 2008). Plains Bison (*Bison bison bison*) historically occurred from Northern Mexico to central Alberta. Wood Bison (*Bison bison athabasca*) used to occur from central Alberta to Alaska but is today restricted to Canada in the wild. The Wood Bison undertakes no large-scale migration comparable to the historic migrations of its cousin further south. Both subspecies today seasonally aggregate in suitable calving grounds, which have important conservation implications.

The IUCN Red List describes the global status of the American bison collectively as “Near-Threatened”; *Bison bison athabasca* is listed in CITES Appendix II. In Canada, Wood Bison are currently listed as threatened under the federal Species at Risk Act, although COSEWIC, the authority for assessing the conservation status of wildlife species in Canada, recently recommended re-classifying Wood Bison as a species of special concern (COSEWIC 2013). Summarizing the status COSEWIC (2013) reports around 5,000 to 7,000 mature individuals in nine isolated wild subpopulations with an overall steady population increase since 1987, attributed to the establishment of additional wild subpopulations within the original range. A reminder of the vulnerability of small and isolated populations, the same source highlights recent and significant mortality events in two wild subpopulations caused by starvation and anthrax, respectively.

Despite encouraging recovery of wild and captive “conservation herds”, fundamental conservation concerns remain. COSEWIC (2013) concludes that “further increases to the population size or the addition of new wild subpopulations is not likely, as recovery is constrained by fragmented or unsuitable habitat, road mortality, disease management associated with livestock and commercial bison operations, and disease outbreaks”. The proposed Recovery Strategy for the species in Canada (Environment and Climate Change Canada, 2016, note Map 8 in Annex 6) lists a somewhat overwhelming mix of threats as follows: “agriculture; energy production and mining; transportation and service corridors; hunting and collecting; logging and wood harvesting; human intrusions and disturbance; fires and fire suppression; dams and water management; invasive thistle species; severe anthrax outbreaks; increased predation; hybridization with Plains Bison, domestic bison, or cattle; pollution; climate change and severe weather; and loss of genetic diversity”. Most observers seem to agree that the most complex, controversial and emotionally charged debate was generated by the infection of the last wild population with (today) reportable bovine diseases brucellosis and tuberculosis. Views about the implications and possible solutions differ fundamentally, as detailed below.

More than half of all wild Wood Bison belong to the meta-population in the Greater WBNP Ecosystem, the largest and most genetically diverse Wood Bison population in the world (Environment and Climate Change Canada, 2016). Two translocations from WBNP occurred during the 1960s to establish a disease-free population and eventually others elsewhere. WBNP is thus both home of a historically decisive and still critically important population and directly or indirectly the source of all living Wood Bison. At the time of the mission, PCA colleagues reported the WBNP population to amount to around 4,000 animals. Wood Bison roams throughout most of WBNP and its vicinity. The range coincides with the range of Grey Wolf, which is a primary predator. The wolves of WBNP have been referred to as the “largest canids in the world” (Struzik, 1992), most probably an adaptation to preying on North America’s largest land mammal. The predator-prey relationship is widely recognized as a particularity and conservation value of WBNP, including explicitly in its Statement of Outstanding Universal Value (OUV) justifying World Heritage inscription.

Tragically, throughout the 1920s more than 6,000 Plains Bison were introduced and subsequently interbred with the then last Wood Bison population in the wild. All Wood Bison today are therefore influenced by this genetic legacy, although Wood Bison continues to be genetically and morphologically distinct from Plains Bison. To add severity to the poor

decision-making resulting in irreversible hybridization, the introduced Plains Bison had been exposed to tuberculosis and brucellosis, a major challenge and controversy ever since. Reflecting growing commercial importance since the 1970s, about 97% of the continental bison population is today managed for private commercial purposes (COSEWIC 2013), even though meat production may not be a primary objective in all cases. These commercial interests result in pressure to address tuberculosis and brucellosis of Wood Bison due to feared disease transmission to both cattle and farmed bison. Transmission could of course also affect disease-free conservation herds.

The most controversial response proposed was an advanced plan to eradicate the entire Greater WBNP Ecosystem meta-population prior to repopulating the area with individuals from disease-free conservation herds. Predictably, this raised many question marks, primarily on the grounds of (i) ethical considerations; (ii) technical feasibility; (iii) cost-benefit considerations; (iv) effectiveness due to limited understanding of possible disease transmission risks posed by other mammal species; and (v) questionable likelihood of sustaining momentum, political support and funding over the time periods required for such a massive and unprecedented operation.

In light of the grave concerns, it seems surprising that a governmental Environmental Assessment Review Panel even gave the idea the green light at some point. However, as Shury et al. (2015) note, the proposal “was rejected in 1990 because of significant public concern”. Political appetite for re-opening the debate seems unrealistic today, given that First Nations and Métis, conservation NGOs, animal rights groups and many scientists can be predicted to vehemently oppose; a “social license” seems unconceivable. First Nations and Métis representatives met by the mission unanimously expressed perplexity about the idea, recalling that they regard the translocation of diseased Plains Bison as one important example of poor governmental decision-making directly affecting them without any prior consultation.

More recent governmental analysis (CFIA, 2016) concluded that transmission is “highly unlikely”, while the economic impact of an outbreak would be “moderate” (bovine brucellosis) or “low” (bovine tuberculosis), respectively. These results appear to further put the debate in perspective and make it even more unlikely that the shelved “depopulation – repopulation” option will ever be implemented. Given that the meta-population of the GWBNPE has been steadily growing despite a century of exposure to bovine brucellosis and tuberculosis, it could also be argued that the diseases may not pose a decisive risk from a species conservation perspective. However, nobody knows what exactly the effects of the diseases are and how they interact with the many other factors determining population dynamics. This implies a need to better understand the population dynamics.

The fact remains, however, that both diseases amount to a sort of “reputational risk” of Wood Bison. The diseases also limit the options to naturally or artificially extend the geographic range of the largest wild herd. Likewise, the diseases constrain managed gene flows from the genetically most diverse herd to other conservation herds, all of which are assumed to be disease-free. Therefore, active management seems needed, with the eventual long-term objective of disease eradication, if possible. In a recent contribution, Shury et al. (2015) remind us of important technical advances over the last years and decades, for example in vaccine technology and diagnostic test development, which the authors argue has increased the management options. Pointing to successful management of wildlife disease reservoirs elsewhere, the authors make the case for containment strategies as “a necessary first step” to be combined with vaccination, improved diagnostic tests, genetic salvage techniques, and selective culling, while fully acknowledging the need for careful stakeholder involvement.

Given the ongoing conservation challenges and uncertain overall future of the species, the Ronald Lake Bison Herd to the southeast of WBNP is of major conservation interest. The range of this herd is located between the Athabasca River and the Birch Mountains, extending

to the south towards the active oil sands extraction areas. As long claimed by local First Nations, the herd was recently confirmed to be genetically distinct from the WBNP subpopulation and disease-free, a tangible example of the value of local and indigenous knowledge (Candler et al. 2015). COSEWIC (2013) acknowledges that local and indigenous knowledge even suggests the Ronald Lake Bison Herd might be pure Wood Bison. If confirmed, this would be a spectacular discovery with major conservation implications.

Despite its importance, the herd has not been well studied and had no particular protection status into the recent past. More recently, some efforts have been directed at protecting the herd and gaining knowledge to facilitate herd management. Much of its range extends into the exploration and extraction footprint of the proposed Teck Frontier Oil Sands project and apparently overlaps with areas legally allocated to logging. The herd is therefore most vulnerable to range reduction or movement of the herd into closer contact with diseased bison in the park. It appears that areas of unsuitable bison habitat (including abundant thistle) may currently be limiting its northward expansion, serving as a physical and genetic barrier, but additional information is required to understand factors affecting or limiting herd distribution and movement.

In summary, Wood Bison is the main flagship species and an ecologically, culturally, socially and economically keystone species of the GWNPE. It is beyond debate that this ecosystem has played a critical role in securing the very survival of Wood Bison and that it will continue to play a major role in the species' conservation. The PAD provides particularly interesting habitat, and changes to the PAD are thus also important from the perspective of Wood Bison conservation. There are many constraints to a desirable natural recovery of Wood Bison, leaving little choice but active future management. Past decision-making has genetically altered Wood Bison and exposed the species to several livestock diseases. It is hoped that the future of Wood Bison will be guided by wiser decision-making. While there are no simple solutions, some ingredients of the current situation are well understood as a foundation of future management. They include the following:

- The management of the Wood Bison population must occur within a coordinated framework of the overall recovery strategy;
- As the range of the Wood Bison population is not reflected in the boundaries of WBNP, management inevitably needs to consider areas outside of WBNP;
- The genetically distinct Ronald Lake Wood Bison Herd is of extraordinary importance for conservation and Aboriginal Peoples and at the same time threatened without any coherent and operational management response at this stage;
- The continued existence of reportable cattle diseases represents a complex conservation challenge to which functional, feasible and ethically, culturally and socially acceptable solutions remain to be found and agreed;
- Active management could benefit from technological advances and experience elsewhere;
- Meaningful First Nations involvement is strongly recommended in any decision-making due to the significance of the species, including as a symbol of the confrontational encounter of different cultures in North America. In the wording of a key action noted in the current management plan, there is an opportunity to “bridge traditional knowledge with western science in wood bison management”.

In light of the above considerations, the mission offers the following recommendation.

Recommendation 15

Further harmonize and adopt the Species Recovery Strategy for Wood Bison throughout its range, including but not limited to the Greater WBNP Ecosystem, and specifically:

- a) Urgently invest in comprehensive and independent analysis of the conservation importance and status of the Ronald Lake Bison Herd, including threats to it posed by proposed development, within a broader Species Recovery Strategy;
- b) Dedicate, in full cooperation with Aboriginal Peoples, adequate attention and funding to the management of Wood Bison, including as regards the development of disease management options other than culling.

3.6.3 Management of Whooping Crane

The iconic Whooping Crane (*Grus americana*) is North America's tallest bird. By the late 1930s the species had gone extinct in Mexico and acutely faced extinction elsewhere due to over-hunting, habitat conversion and human disturbance. According to slightly varying estimates the overall population was down to only 15 to 21 individuals at that point in time. To this day, the species is reduced to a single self-sustaining wild population, commonly referred to as the Aransas-Wood Buffalo population or flock. This wild population migrates between its only nesting sites in the north-eastern part of WBNP and adjacent areas (see Map 9 in Annex 6) and the coastal marshes of the Gulf Coast of Texas in and near Aransas National Wildlife Refuge, its only winter range. The population shows an overall positive trend of slow but steady increase. Slightly differing data sources suggest some 70 breeding pairs and 250-300 individuals in 2015. The most recent, publicly available FWS data suggest 310 individuals in 2015, compared to 270 birds in 2008 (Parks Canada Agency, 2010). Personal communication during the mission suggests a further increase to currently 329 individuals.

The IUCN Red List notes the species as globally Endangered. According to Canada's Species at Risk Public Registry, the species has been listed as endangered since 1978 (COSEWIC, 2010). The Whooping Crane is internationally protected under CITES, CMS and the Migratory Birds Convention Act, 1994. In its two only range countries, the species is federally protected under the Canadian Species at Risk Act (SARA) and the U.S. Endangered Species Act (ESA). Within WBNP, the Canada National Parks Act is applicable, complemented by provincial and territorial legislation elsewhere in Canada. Significant resources are being allocated to monitor and conserve the summer and winter ranges as well as some of the critical habitats along the migration corridor. In other words, the Whooping Crane is exceptionally well monitored and protected by several layers of strict legislation throughout its range.

Despite the undisputed critical importance of WBNP for the species, it played no role in the establishment of the park and its subsequent enlargement. While local First Nations certainly were aware of the presence of the species, including its nesting sites, governmental conservation actors accidentally "discovered" the nesting grounds within WBNP in 1954 only. Since "discovery", the critical importance of the nesting sites has been fully recognized as a major conservation value and management consideration in WBNP. The crane summer range has triggered recognition of the area as one of only two Alliance for Zero Extinction (AZE) sites in all of Canada and a Ramsar site within WBNP, aptly named "Whooping Crane Summer Range". The formal World Heritage documentation makes consistent reference to the species as an integral component of its Outstanding Universal Value (OUV).

The nesting area is zoned as one of several "special preservation areas" within WBNP, a zone that can be adapted in response to changing use of nesting habitat with the park. Visitor access is strictly controlled. A recent attempt to commercialize a Wood Buffalo Whooping Crane Experience has been halted. According to the brochure still online at the time of writing, various packages alternatively were to offer fixed wing flyovers, heli-flight tours and heli-hike tours (Parks Canada Agency, n.d.). The mission finds it incomprehensible that the business idea of flying tourists over or to the sensitive nesting sites of one of the rarest birds in the world

within a publicly inaccessible special preservation zone of a national park, Ramsar site and World Heritage property, was even considered.

Several concerns identified in the literature are potential threats to the Whooping Crane summer range. One is nest predation, as eggs and pre-fledged chicks are subject to predation by various mammalian and avian predators. More pronounced droughts in the breeding grounds are expected to increase nest predation and decrease chick production and survival (CWS et al. 2007). The combination of the small population size and multiple threats elsewhere make the species vulnerable to such threats, which requires the continuation of permanent monitoring. Given the growing population, nest predation and droughts do not appear to be a major bottleneck at this stage though.

Nesting habitat availability and food resources within WBNP do not appear to be limiting factors either in the complex Whooping Crane conservation equation. All consulted specialists were of the opinion that there is more suitable nesting habitat in and around WBNP than currently occupied. Most sources of information concur that key concerns today are migration mortality and the more vulnerable winter range in Texas (for useful overviews, see for example COSEWIC, 2010 and 2000, CWS et al. 2007, Meine et al. 1996). As for migration mortality, it is important to understand that the entire Aransas-Wood Buffalo flock uses a migration corridor of around 4,000 km twice every single year. Mortality along this route is caused by collisions with power lines, decreasing stopover habitat and illegal shooting. Risks associated with land use change and disturbance include the large area of active oil sands extraction and processing south of WBNP, part of the migration corridor. As discussed in chapter 3.4.2, existing information on the impacts of oil sands development on bird migration is limited. Current management responses are restricted to simplistic deterrence and some habitat management (e.g. removal of vegetated islands on tailings ponds), but the overall efficacy and consequences of deterrent systems are not well understood.

In summary, the survival of the Whooping Crane against all odds is a story of remarkable resilience and one of the most remarkable transboundary species conservation successes anywhere. Massive dedication and investment made it possible. The species is a flagship and symbol of WBNP for good reasons, has triggered the designation of a Ramsar site within WBNP and is adequately recognized as an integral part of the property's OUV. The property has been playing and continues to play an irreplaceable role in securing species survival and recovery. The majority of the summer range is effectively monitored and protected within WBNP. For obvious reasons, the survival of *Grus americana* remains a fragile success story. With expected further population growth, the challenge of habitat limitation is likely to arise in both the wintering and nesting grounds. Jointly with the trend of warming climate this could lead to expansion into less well-protected habitat in Texas, northern Canada and along the migration corridor. This might eventually trigger consideration of additional protected areas or boundary adaptations of the existing ones, including perhaps of WBNP, as a shifting and/or expanding summer range is likely to conflict with mining and forestry outside of the park boundaries.

The mission considers the management within WBNP fully adequate while strongly recommending that tourism to the nesting site, as recently proposed, be abandoned for good. However, there might be less risky alternatives to benefit from the attractiveness of the Whooping Crane with potential benefits for visitor experience and education, conservation financing and the local economy. While logistically challenging due to the remote location, remote cameras with combined use for monitoring and non-intrusive tourism might deserve to be considered.

Recommendation 16

Continue to closely monitor the entire used and potential nesting area of the Whooping Crane within the Greater WBNP Ecosystem so as to be able to respond to possibly changing management requirements.

3.6.4 Invasive Alien Species

Invasive alien species (IAS) are among the major concerns in global biodiversity conservation. While the implications, including enormous current and future economic costs, may not receive adequate public attention, they are increasingly well documented and understood.

Unlike in many protected areas across the world, faunal IAS do not appear to be a documented concern at this stage in WBNP. There are, however, concerns about floral IAS. Vegetation monitoring has shown “an abundance of non-native plants occupying large areas of the delta meadows” (Parks Canada Agency, 2009), singling out two species of thistle (Canada Thistle, *Cirsium arvense* and Perennial Sow-thistle, *Sonchus arvensis*). The reference further notes a relatively stable abundance of non-native species within the Athabasca River and Mid-delta sectors. Presence of IAS plants in the Peace River sector was significantly higher and increasing over time. Consistent with the above results, First Nations representatives expressed concerns about a number of introduced plant species in the PAD, including specifically thistle, pointing out that IAS in many areas appear to outcompete native plants. The conceivable perception is that the observed changes in vegetation are detrimental to wildlife, including Wood Bison, which apparently avoids areas dominated by thistle. PCA staff speculated that thistle might have been accidentally introduced with imported hay during the decades of active management of Wood Bison for meat production. It is likely that some IAS benefit from ongoing habitat changes and climate change.

The mission concludes that IAS plants require management attention. Scientific and traditional knowledge evidence consistently suggests that the PAD, and the main river corridors feeding it, are the main areas of concern. In other words, IAS add complexity to the exact area under pressure from a multitude of other threats and risks. Given that the current management plan (Parks Canada Agency, 2010) makes no reference to IAS, the mission recommends increased attention to IAS as an integral part of the overall monitoring of the PAD based on science and local knowledge.

Recommendation 17

Incorporate invasive alien species (IAS) into the overall monitoring of the property and the PAD based on science and local and indigenous knowledge, and based on monitoring results, develop an appropriate management response to control the spread of IAS.

4. ASSESSMENT OF THE STATE OF CONSERVATION

WBNP is a large, still comparatively remote and actively managed protected area. Past commercial logging, fishing, manipulation of bison, wolf culling and harvesting of muskrat and beaver have certainly influenced the state of conservation but they have not induced change at a systemic level. The WBNP State of the Park Report (Parks Canada, 2009), elaborated to inform the current management plan, provides a valuable backdrop for this chapter. From a World Heritage perspective, key results can be summarized - and interpreted - as follows:

- The report is presented as the first of its kind for WBNP, suggesting the absence of a systematic predecessor document elaborated according to a comparable methodology and thus a limited foundation for specific trend detection;
- Overall, the state of forests and wildlife is rated as “good and stable”;
- The hydrology, flood frequency and plant community measures of the PAD are rated as “fair and declining”. The PAD is subsequently identified as one of the “park’s most significant ecosystems” and “a significant cultural landscape”. The report also refers to the PAD as a “key issue”, as “Peace River flow regulation is impacting delta hydrology and ecology and declining Athabasca River flows and increasing trends in nutrient levels are a concern”. It is further emphasized that “ecological changes in turn impact the delta’s cultural landscape and cultural heritage”;
- Water quality of Pine Lake is rated as “good” with the important caveat that lake water quality data are limited to Pine Lake, suggesting a major paucity of data;
- The hydrology of the Peace and Slave Rivers are rated as “poor and stable”, whereas water quality measures for the Peace and Athabasca Rivers are rated as “fair and declining”;
- Limited information about the threats to cultural resources is acknowledged.

Noting the governmental acknowledgement of important data gaps, the mission concurs with the above overall trends suggested in the governmental report. Despite credible and severe concerns detailed earlier and further discussed below and in chapter 5, large parts of WBNP continue to be in an overall good state of conservation according to information accessible to the mission and personal impressions from flying over large parts of WBNP. By the standards of most protected areas in the world, WBNP thereby continues to be in a privileged overall position.

At the same time, the mission fully agrees with most observers that the state and future of the PAD is uncertain at the very best. There is longstanding, conceivable and consistent evidence of severe environmental and human health concerns based on both western science and local and indigenous knowledge. The concerns coincide with the absence of effective and independent mechanisms to analyse and address these concerns at an adequate scale. As acknowledged in the above cited report, the impacts of industrial development along two main river corridors crystallize in the PAD, an area of extraordinary cultural, social, economic and ecological significance. The measurable changes and anticipated future changes are not only critical for the inhabitants and users of the PAD, they are also critical for the entire national park and World Heritage property. This is because the PAD constitutes the disproportionately valuable heart of the national park and the World Heritage property and its Outstanding Universal Value; as a freshwater system of globally rare scale and complexity, as prime habitat of the Wood Bison and its main predator Grey Wolf, countless resident and migratory birds, and as an essential basis of local indigenous life, livelihoods and culture.

While the overall state of conservation of large parts of WBNP is currently not concerning, the state of the PAD and the lack of clarity and functional mechanisms to analyse the situation as a basis for informed decision-making clearly is extremely concerning in the view of the mission, including from a specific World Heritage perspective. Far from halting or slowing down the trends and filling important information gaps identified in the 2009 State of the Park

Report, current governance mechanisms, recent decision-making and a pipeline of proposed development projects have further added to the complexity of the challenges and further deteriorated relationships between key stakeholders and rights-holders. Along with an urgent need to translate far-reaching aboriginal rights into the governance and management of WBNP, the view of the mission, its main conclusions and all recommendations are discussed in the subsequent chapter.

5. CONCLUSIONS AND RECOMMENDATIONS

It is recognized that these places are not islands, but are part of larger ecosystems and cultural landscapes. Therefore, decision-making must be based on an understanding of surrounding environments and their management.

Source: Guiding Principles and Operational Policies (GPOP), Parks Canada Agency

At the time of its initial establishment and subsequent extension, WBNP was located within a vast intact and remote landscape, which for the most part was very difficult to access. The scale and pace of industrial resource development over the last decades were impossible to imagine at the time. For all the shortcomings during decades of commercial activities, it can reasonably be argued that WBNP has protected a large area of global conservation significance from direct impacts of industrial development, which has changed nearby areas. As stated in the previous chapter, WBNP continues to be a globally exceptional protected area with a wealth and diversity of cultural and natural values. Large areas of the property continue to be in a good state of conservation, as far as can be judged by the mission. However, the mission agrees with the vast majority of observers that documented changes can be linked to decades of massive industrial development along the Peace and Athabasca river corridors. The concerns of the mission crystallize in the PAD, recognized as a major feature, and in the view of many, the heart of WBNP. Individual and cumulative effects of numerous projects of various industries have been impacting the natural, cultural and economic values of WBNP, and in particular of the PAD for decades. The severe concerns about the PAD are not overstated in the view of the mission and consistent with the views of a wide range of informed and credible actors, many living in or near the delta. Additional current project proposals add severity and urgency.

The PAD is a globally outstanding and extremely large and complex freshwater ecosystem. Equally important, the PAD is the home and source of life for First Nations and Métis. From a specific World Heritage perspective, it deserves to be noted that many of the values justifying the status are concentrated in the PAD. Any impacts on the PAD directly impact on local residents and conservation values, including the OUV of the property. The mission wishes to highlight once more that the PAD is both disproportionately important and disproportionately vulnerable in several ways. Western science and local and indigenous knowledge confirm beyond doubt that the PAD has significantly changed over the last decades. The PAD and its inhabitants and users are exposed to multiple, major and complex challenges, stressors and threats at very different scales. To illustrate the severity, it is important to understand that residents of Fort Chipewyan, the main settlement in the PAD, have come to question the suitability of water, fish and game for human consumption and are extremely concerned about what they and many external observers describe as an environmental and human health crisis.

Challenges facing the property include overarching questions on governance arrangements and effectiveness, in particular regarding aboriginal involvement in the park management and decision-making; land-use planning; regulatory frameworks; coordination across jurisdictional boundaries; and the balancing of diverse and competing public interests in assessment and monitoring of industrial development. The multiple stressors stemming from industrial development are of exceptional scale, pace and complexity. While located outside of WBNP's boundaries, in some cases at large distance, it is undeniable that industrial development has changed the quality, quantity and flow of water of the two major rivers feeding the PAD with additional concerns about air quality. New threats stem from recent approval and multiple proposals for additional and major projects joining an ever more intense and quickly advancing development frontier, including the Site C project and Teck Frontier projects. Despite uncertainty, insufficient information and differing opinions, evidence from available monitoring of hydrological and ecological indicators suggests that existing and planned projects, including Site C and Teck Frontier, are certain to further impact the PAD in many ways. As for Site C project, the mission notes that the JRP conclusion that project impacts on the PAD would be

“negligible” is not substantiated by any information presented in its report and appears to be based exclusively on the proponent’s definition of downstream impact area.

While there is no consensus about the relative importance of direct human-induced change by industrial development versus the effects of climate change and natural changes occurring in a highly dynamic system, there is unanimous agreement that important changes have taken place and are readily observable. Further to a limited understanding of the impacts of individual development projects, existing analysis fails to address, let alone understand, cumulative effects and largely fails to provide channels for indigenous and local knowledge to find its way into governmental decision-making. Whatever the exact relative importance of industrial impacts versus climate and other changes, such as the spreading of invasive alien species, and the nature of cumulative impacts, climate change undoubtedly adds further weight and complexity to the challenges, stressors and threats facing WBNP - chief among them is the long-term availability of water.

Despite differing, and at times opposing views about the underlying causes of observable changes, it is undisputable that industrial development along the Peace and Athabasca River corridors has massively and steadily increased over several decades. Rather than being matched by adequate governance and management responses, the recent years have unfortunately coincided with a well-documented weakening of Canada’s environmental regulatory framework, and a weakening of PCA in terms of conservation focus and scientific capacity. While the various past and current attempts to monitor the PAD and to assess projects have generated a wealth of information and contain many valuable elements, existing monitoring, analysis, policy, governance and management responses have yet to catch up with the pace, scale and complexity of industrial development impacting such a large and dynamic ecosystem subject to the effects of climate change.

Both the natural and cultural heritage of the PAD, and the threats to them, are of exceptional scale in many ways. It is obvious that a brief mission cannot do justice to their extraordinary complexity. In several instances, the mission heard accusations of “cherry-picking” of information to substantiate opinions, positions and interests. “Cherry-picking” is a legitimate concern given that many important questions indeed require much better understanding. Such caveats go both ways though. For example, it can certainly be argued that it is very difficult to tell apart some forms of “natural” from industrial water and air contamination. Similarly, there are many dynamic factors shaping the hydrology of the PAD besides hydropower development, which deserves full consideration. However, it is illogical that the same individuals accusing concerned observers of “cherry-picking” appear to base their own positions on selective aspects and studies. Given the complexity and limited information, the mission respectfully rejects the notion of a paradigm shift as regards the drivers of change in the PAD, as proposed by some researchers to the mission based on selected studies. There are differing views but there is certainly no consistent and coherent body of information and knowledge to suggest a paradigm shift in the sense of any foundation to justify a fundamental re-thinking of the multiple effects of almost half a century of flow regulation.

Change in the PAD as such is undisputed and there are clear, consistent and conceivable hints at causal relationships with industrial development, both from the perspectives of western science and local and indigenous knowledge. The limitations of existing monitoring in place and the exemption of Site C project from in-depth assessment make conclusive judgments difficult. The absence of proof is not proof of absence though and the differing opinions should primarily be seen as an indicator for the need to generate better information to enable informed decision-making. Given the lack of adequate monitoring and assessment and severe broader concerns about environmental governance, existing efforts should be re-considered in order to be both effective and credible. Future efforts can take advantage of a wealth of existing information, which can and should inform decision-making. There is a

growing body of sophisticated studies on the impacts of hydropower development and possible mitigation options.

The mission further concludes that the governance and management of WBNP does not adequately reflect far-reaching aboriginal rights, including under the Constitution and Treaty Eight. The Cooperative Management Committee is a positive step in this regard. However, it became clear during the mission that this can only constitute a beginning of an evolving situation and relationship. While Canada has recently expressed strong commitment to the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), there appears to be no aboriginal involvement in actual decision-making at this stage.

Supported by several First Nations and Métis, scientists, environmental NGOs, former leaders and staff of PCA, the 2014 MCFN Petition explicitly called for inscription of WBNP on the List of World Heritage in Danger. In the view of the mission, the Petition and subsequent information accurately identified observable changes and mounting pressures on and risks to WBNP, including specifically the PAD. The Petition likewise accurately identified the absence of adequate management responses despite a multitude of consistent and credible evidence of environmental degradation from multiple sources. Furthermore, the Petition reflected a deep frustration about what is described as a fundamental mismatch between concerns and responses. In the view of the mission, the Petition constitutes a legitimate, well-reasoned and technically strong contribution. The mission carefully considered the many calls to recommend the inscription of WBNP on the List of World Heritage in Danger.

The mission admittedly found it challenging to interpret and apply the *Operational Guidelines* (OGs) to the given situation. Paragraph 177 of the OGs lists several requirements to be met so that the World Heritage Committee “may inscribe a property on the List of World Heritage in Danger”. One requirement stipulates that “major operations are necessary for the conservation of the property”. In the view of the mission, this is clearly applicable and fully reflected in the technical recommendations. The second main notion of paragraph 177 is that “the property is threatened by serious and specific danger”. In the view of the mission, this requirement is not applicable to vast areas of WBNP and cannot schematically be applied to the PAD despite strong indications that it could be applicable to the PAD.

The mission acknowledges that a case for inscription of WBNP on the List of World Heritage in Danger could be made according to paragraph 180b referring to “potential danger”. The challenge here is that the changes induced by major industrial development are systemic and have been “baked-in” for several decades. As for hydropower development, the main ecological change was no doubt the construction of the W.A.C. Bennett Dam. The many drivers of change contribute to an overall setting that plain language could certainly describe as a potential danger. However, applied to the Convention, the baseline predates the World Heritage inscription and the World Heritage system so far appears to have underestimated the scale, pace and complexity of change. There is every reason to better understand the situation and to develop better responses to maintain and restore the Ecological Integrity of the PAD to the degree possible but there is no way back to the time before the Bennett Dam was built and before the extraction of the Alberta Oil Sands began half a century ago. It would therefore be very challenging to define an exact threshold for the inscription of WBNP on the List of World Heritage in Danger and similarly challenging to define a desired state of conservation for the eventual removal of WBNP from the List of World Heritage in Danger.

While fully respecting legitimate concerns about individual projects, such as Site C and Teck Frontier and while strongly recommending that both receive the assessments that their scale and impacts dictate from a technical perspective, the mission does not regard these projects as possible triggers of danger listing. This is because the Site C project consolidates a major question mark for the PAD and thus WBNP, rather than creating it. The time is now to finally give this project the scrutiny it deserves and to establish a basis for informed and balanced

decision-making still currently lacking. To suggest that the construction of the Site C project per se could trigger danger listing would be analogous to the reverse conclusion that stopping the project would make the challenges to the PAD and its World Heritage values go away. Unfortunately, this is not the case.

Teck Frontier is only one of a large number of comparable oil sands projects. Its particularity, including from a World Heritage perspective, is that it would move the development frontier into the last remaining de facto “buffer zone” to the vulnerable south of WBNP, as detailed in the corresponding subchapters. It is clear that this requires World Heritage attention. As a trigger for danger listing, it would distract from a much larger and systemic challenge, which has been accumulating over some 50 years and seems here to stay for the foreseeable future.

After careful consideration, the mission concluded that the State Party should be given one opportunity under the World Heritage Convention to immediately develop a structured and adequately funded Action Plan guided by the below recommendations, in effect amounting to “major operations” in the sense of paragraph 177. The mission is of the opinion that an absence of a major and coherent response would constitute a case for recommending inscription of WBNP on the List of World Heritage in Danger due to the then combination of credible and major concerns combined with an inadequate State Party response to World Heritage Committee existing and recommended requests. The State Party of Canada certainly has the scientific capacity to analyse the situation like few others to inform a more balanced decision-making. Doing so will respect its longstanding involvement in and commitment to the World Heritage Convention.

The following list provides an overview of all individual recommendations to the State Party offered in chapter 3. All recommendations are explained in detail in the corresponding sub-chapters.

Recommendation 1

Adopt a clear and coherent policy and guidance to enable the transition to a genuine partnership with First Nations and Métis communities in the governance and management of the property.

Recommendation 2

Considering the increasing pressures on the property at this time, prioritise conservation and ensure that the State Party’s science capacity enables Parks Canada’s legal obligation to maintain and restore the Ecological Integrity of the property.

Recommendation 3

To enable informed decision-making, conduct environmental flows assessments to the highest international standards for the Peace, Athabasca and Slave Rivers as they pertain to the health of the Peace-Athabasca Delta (PAD), in order to identify water flows needed to sustain the ecological functioning of the PAD under the circumstances of existing and planned future dams and water withdrawals. These assessments should incorporate projections of climate change and should determine the cumulative effects on the PAD and the property of flow regulation of all existing and proposed dams on all three rivers.

Recommendation 4

Conduct, in line with the IUCN World Heritage Advice Note on Environmental Assessment, an environmental and social impact assessment of the Site C project and, if moved forward, any other hydropower projects potentially affecting the Outstanding Universal Value of the property.

Recommendation 5

Conduct an environmental and social impact assessment of the proposed Teck Frontier oil sands mine project in line with the IUCN World Heritage Advice Note on Environmental Assessment, fully taking into account the Outstanding Universal Value of the property, including the Peace-Athabasca Delta.

Recommendation 6

Conduct a systematic risk assessment of the tailings ponds of the Alberta Oil Sands region with a focus on risks to the Peace-Athabasca Delta, and submit the report of this assessment to the World Heritage Centre, for review by IUCN, in accordance with Paragraph 172 of the *Operational Guidelines*.

Recommendation 7

Establish adequate baseline hydrological information of the Peace and Athabasca River Basins to enhance the reference for monitoring and assessing current and future hydrological conditions.

Recommendation 8

Expand the scope of the Strategic Environmental Assessment (SEA), which was requested by the Committee in its Decision **39 COM 7B.18**, so that it adequately reflects the scale, pace and complexity of industrial development, land use changes and river flow manipulations in the Peace and Athabasca River watersheds, both in terms of individual and cumulative impacts.

Recommendation 9

Expand the scope of monitoring and project assessments to encompass possible individual and cumulative impacts on the Outstanding Universal Value of the property and in particular the PAD.

Recommendation 10

Conduct a comprehensive assessment of options, in order to underpin decision-making to put in place an effective buffer zone, as defined in the *Operational Guidelines*. The Birch River deserves particular attention as the only relatively intact major watershed of the PAD.

Recommendation 11

Conduct a systematic assessment of options to better realize synergies between the property and land use planning in its immediate vicinity, including the existing and planned provincial protected areas.

Recommendation 12

Consolidate the management resources and capacity to a standard commensurate with World Heritage status and adequately respond to the challenges facing the property by:

- a) Reinstating a year round status and staffing of WBNP;
- b) Recruiting a full-time Superintendent exclusively in charge of WBNP;
- c) Ensuring an adequate Parks Canada presence in Fort Chipewyan, part of the critical Peace-Athabasca Delta area and a major ecological region of WBNP.

Recommendation 13

Further develop the existing Cooperative Management Committee established by the State Party, and consolidate a functional and effective mechanism to involve Aboriginal Peoples in the management of the property.

Recommendation 14

Ensure that the preparation and skills of involved governmental staff correspond to the requirements inherent in the evolving relationship with First Nations and Métis communities.

Recommendation 15

Further harmonize and adopt the Species Recovery Strategy for Wood Bison throughout its range, including but not limited to the Greater WBNP Ecosystem, and specifically:

- a) Urgently invest in comprehensive and independent analysis of the conservation importance and status of the Ronald Lake Bison Herd, including threats to it posed by proposed development, within a broader Species Recovery Strategy;
- b) Dedicate, in full cooperation with Aboriginal Peoples, adequate attention and funding to the management of Wood Bison, including as regards the development of disease management options other than culling.

Recommendation 16

Continue to closely monitor the entire used and potential nesting area of the Whooping Crane within the Greater WBNP Ecosystem so as to be able to respond to possibly changing management requirements.

Recommendation 17

Incorporate invasive alien species (IAS) into the overall monitoring of the property and the PAD based on science and local and indigenous knowledge, and based on monitoring results, develop an appropriate management response to control the spread of IAS.

6. REFERENCES

The mission was able to take advantage of a wealth of well-structured information prepared and/or compiled by the State Party. This included thematic backgrounders, scientific publications, presentations, information packages and letters by First Nations, provincial governments, non-governmental organizations, scientists and former civil servants. In alphabetical order, specific submissions were received from Alberta Government, Amisk Development Corporation, Aqua Environmental Associates, Assembly Of First Nations, Athabasca Chipewyan First Nation, BC Hydro, CPAWS, EEEEC, Fort McMurray #468 First Nation, Friends of the Wild Whoopers, International Boreal Conservation Science Panel, Kapawe'no First Nation, Keepers of the Water, Little Red River Cree Nation, Management and Solutions in Environmental Science, Athabasca Watershed Council, Alberta Native Plant Council, MCFN, Nature Canada, PCA, Peace Valley Landowner Association, Sierra Club BC, Smith's Landing First Nation, Teck Resources, Treaty Eight First Nations of Alberta, University of Victoria/Environmental Law Club, Yellowstone to Yukon among others.

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7. USEFUL LINKS

URL active at the time of writing, listed in alphabetical order

<http://aep.alberta.ca/>, Alberta Environment and Parks

http://ecos.fws.gov/tess_public/profile/speciesProfile?spcode=B003, US-FWS information on *Grus Americana*

<http://jointoilsandsmonitoring.ca/default.asp?Lang=En&n=6F6D1EBC-1>, JOSM External Expert Peer Review of Scientific Integrity – Executive Summary

<http://laws-lois.justice.gc.ca>, official information on Canadian legislation

<http://mikisewcree.ca>, Mikisew Cree First Nation

<http://news.gc.ca/web/article-en.do?nid=1029999>, 2016 governmental press release (“Government of Canada Moves to Restore Trust in Environmental Assessment”)

<http://pademp.com/>, Peace-Athabasca Delta Ecological Monitoring Program

<http://pm.gc.ca/eng/minister-environment-and-climate-change-mandate-letter>, PM mandate letter to ECCC

<https://sitecstatement.org>, Site C: Statement by Concerned Scholars

<http://whc.unesco.org>, UNESCO World Heritage Centre (WHC)

<http://whc.unesco.org/en/list/256>, UNESCO WHC information on WBNP

<https://sitecstatement.org>, “Site C: Statement by Concerned Scholars”

www.aadnc-aandc.gc.ca, Indigenous and Northern Affairs Canada

www.aer.ca, Alberta Energy Regulator

www.aer.ca/applications-and-notice/heardings/transcripts-of-the-peace-river-proceeding, transcripts of proceedings on emissions and odours in the Peace River area

www.aer.ca/about-aer/spotlight-on-taking-action-in-peace-river, AER information on emissions and odours in the Peace River area

www.amiskhydro.com, company information on Amisk hydropower project

www.biodivcanada.ca, federal, provincial and territorial information on biodiversity in Canada

www.capp.ca, Canadian Association of Petroleum Producers (CAPP)

<http://www.cbc.ca/news/canada/calgary/open-letter-from-former-parks-canada-employees-1.3242812>, open letter by former PCA staff

www.ccme.ca, Canadian Council of Ministers of the Environment (CCME)

www.ccme.ca/files/Resources/enviro_assessment/rsea_principles_guidance_e.pdf, CCME Regional SEA Principles and Guidance

www.ceaa.gc.ca, Canadian Environmental Assessment Agency

www.climatechange.gc.ca, governmental information on climate change

www.cosewic.gc.ca, Committee on the Status of Endangered Wildlife in Canada

www.cosia.ca, Canada’s Oil Sands Innovation Alliance (COSIA)

www.ec.gc.ca, Environment and Climate Change Canada

www.env.gov.bc.ca/wld/, BC Ministry of Environment

www.enr.gov.nt.ca/node/2984, NWT Environment and Natural Resources

www.enr.gov.nt.ca/programs/wood-bison, NWT information on *Bison bison*

www.globalforestwatch.ca/publications, Global Forest Watch Canada

www.iucn.org/worldheritage, IUCN World Heritage Programme

www.iucnredlist.org, IUCN Red List

www.iucnredlist.org/details/22692156/0, Red List information on *Grus americana*

www.iucnredlist.org/details/2815/0, Red List information on *Bison bison*

www.jointoilsandsmonitoring.ca/, governmental information on Joint Oil Sand Monitoring

www.keepersofthewater.ca/athabasca/people, Athabasca chapter of Keepers of the River

www.nwt-species-at-risk.ca/content/nwt-whooping-crane, NWT species at risk: *Grus americana*

www.oag-bvg.gc.ca, Office of the Auditor General of Canada, see in particular the Commissioner of Environment and Sustainable Development

www.pc.gc.ca, Parks Canada Agency

www.pc.gc.ca/eng/docs/pc/poli/princip/index.aspx, PCA Guiding Principles and Operational Policies

www.pc.gc.ca/eng/docs/pc/rpts/ie-ei/report-rapport_1.aspx, PCA's Ecological Integrity approach

www.pc.gc.ca/eng/pn-np/nt/woodbuffalo/index.aspx, PCA information on WBNP

www.pc.gc.ca/eng/pn-np/nt/woodbuffalo/plan/plan1.aspx, WBNP management plan

www.pc.gc.ca/pn-np/nt/woodbuffalo/ne/~/_media/pn-np/nt/woodbuffalo/2015%20programs/WBNP_InfoSheet_EN_2015_02_03.ashx, pdf leaflet on a suspended Whooping Crane Tour

www.registrelp-sararegistry.gc.ca, Species at Risk Public Registry

www.rsc-src.ca/en/about-us/our-people/our-priorities/over-200-leading-scholars-call-government-to-suspend-site-c-dam, Royal Society of Canada information on Site C project

www.sitecproject.com, BC Hydro information on Site C project

www.suncor.com, Suncor Energy

www.teck.com/operations/canada/projects/frontier-project, information on Teck's frontier project

8. ANNEXES

Annex 1: World Heritage Committee Decision 39COM 7B.18 (Bonn, 2015)

The World Heritage Committee,

1. Having examined Document WHC-15/39.COM/7B.Add,
2. Notes that the World Heritage Centre has received a petition submitted by the Mikisew Cree First Nation expressing their concern about the state of conservation of the property, as well as a response from the State Party;
3. Notes with concern the environmental impacts on the Peace-Athabasca Delta from hydro-electric dams, oil sands development, and proposed open-pit mining in the vicinity of the property, which could negatively impact its Outstanding Universal Value (OUV);
4. Also notes with concern the lack of engagement with indigenous communities in monitoring activities, as well as insufficient consideration of traditional ecological knowledge, and takes note of the State Party's three commitments to strengthen monitoring and management with a wide participatory approach in order to address the concerns raised by the Mikisew Cree First Nation;
4. Requests the State Party to undertake a Strategic Environmental Assessment (SEA) to assess the potential cumulative impacts of all developments on the OUV of the property, including hydroelectric dams, oil sands development, and mining, in line with IUCN's World Heritage Advice Note on Environmental Assessment;
5. Also requests the State Party not to take any decision related to any of these development projects that would be difficult to reverse, and to submit the SEA to the World Heritage Centre, for review by IUCN, in accordance with Paragraph 172 of the Operational Guidelines;
6. Further requests the State Party to invite a joint World Heritage Centre/IUCN Reactive Monitoring mission to review the impact of the developments on the property, to evaluate its state of conservation, and to exchange in more depth with the State Party, petitioning First Nation, and other stakeholders as appropriate;
7. Requests moreover the State Party to submit to the World Heritage Centre, by 1 December 2016, an updated report, including a 1-page executive summary, on the state of conservation of the property and the implementation of the above, for examination by the World Heritage Committee at its 41st session in 2017.

Annex 2: Terms of Reference of the 2016 Reactive Monitoring Mission

At its 39th session, the World Heritage Committee requested the State Party of Canada to invite a joint World Heritage Centre/IUCN reactive monitoring mission to Wood Buffalo National Park World Heritage Site (Decision **39 COM 7B.18**, Annex 1). The objective of the monitoring mission is to assess the state of conservation of the property, as well as potential threats to its Outstanding Universal Value (OUV). The mission will be conducted by Mr Tilman Jaeger, representing the World Heritage Centre, and Dr. Stephen Davis, representing IUCN.

In particular the mission should undertake the following:

1. Review and assess the impact using the current understanding of:
 - a. the current effects of Peace River flow regulation activities associated with operation of the W.A.C. Bennett Dam and Peace Canyon Dam, on the OUV of the property;
 - b. the potential (cumulative) impacts of the planned Site C Hydroelectric Dam on the hydrological regime of the PAD that could impact the OUV of the property, and the ecological processes as they relate to the OUV of the property, also taking into account the effects of climate change;
 - c. the impacts of existing and planned oil sands projects in the Athabasca oil sands region, as well as their associated tailings ponds, on the OUV of the property, including the impact on movement of migratory birds, and discuss the development and implementation of monitoring programs with the relevant authorities and stakeholders;
 - d. the above-mentioned developments on the ecosystems that support some of the traditional ways of life of indigenous communities; and
2. In line with paragraph 173 of the *Operational Guidelines*, review any other relevant issues that may negatively impact the OUV of the property, including its conditions of integrity and protection and management.

The State Party will facilitate necessary field visits to key locations (see Annex 2). In order to enable preparation for the mission, the State Party will provide the following items in appropriate format, including web links, to the World Heritage Centre as soon as possible and preferably no later than one month prior to the mission:

- a) A summary of the relevant planning documents for Site C Hydroelectric Dam on the Peace River, including the environmental assessment report;
- b) Information about the PAD Ecological Monitoring Program and its implementation;
- c) Relevant/available information on the impact of the W.A.C. Bennett Dam on the OUV of the property;
- d) Water quality and water flow data in the Peace River and the Athabasca River relevant to the OUV of the property;
- e) Athabasca River Water Management Framework, the Groundwater Management Framework and any additional relevant reports related to the OUV of the property;
- f) Planning documents and environmental assessments of the existing and proposed oil sands developments; and
- g) Retrospective Statement of Outstanding Universal Value for Wood Buffalo National Park adopted at 39COM (see Annex 3 below).

The mission will hold consultations with the relevant Canadian authorities at national and provincial levels, and indigenous people including the Mikisew Cree First Nations (MCFN). In addition, the mission will hold consultations with a range of relevant stakeholders, including: BC Hydro; non-governmental organizations (NGOs); and, relevant scientists, researchers and experts.

Based on the results of the above-mentioned reviews, assessments and discussions with the State Party representatives, authorities and stakeholders, the mission will prepare a concise report on the findings and recommendations within six weeks following the site visit, following the World Heritage Centre reactive monitoring mission report format. The mission's recommendations to the Government of Canada and the World Heritage Committee will have the objective of providing guidance to the State Party that will ensure the ongoing conservation of the property's OUV. It should be noted that recommendations will be provided within the mission report and not during the mission implementation.

Annex 3: Retrospective Statement of Outstanding Universal Value of WBNP

Brief synthesis

Wood Buffalo National Park is an outstanding example of ongoing ecological and biological processes encompassing some of the largest undisturbed grass and sedge meadows left in North America. It sustains the world's largest herd of wood bison, a threatened species. The park's huge tracts of boreal forest also provide crucial habitat for a diverse range of other species, including the endangered whooping crane. The continued evolution of a large inland delta, salt plains and gypsum karst add to the park's uniqueness.

Criterion (vii): The great concentrations of migratory wildlife are of world importance and the rare and superlative natural phenomena include a large inland delta, salt plains and gypsum karst that are equally internationally significant.

Criterion (ix): Wood Buffalo National Park is the most ecologically complete and largest example of the entire Great Plains-Boreal grassland ecosystem of North America, the only place where the predator-prey relationship between wolves and wood bison has continued, unbroken, over time.

Criterion (x): Wood Buffalo National Park contains the only breeding habitat in the world for the whooping crane, an endangered species brought back from the brink of extinction through careful management of the small number of breeding pairs in the park. The park's size (4.5 million ha), complete ecosystems and protection are essential for in-situ conservation of the whooping crane.

Integrity

Wood Buffalo National Park straddles the boundary between the province of Alberta and the Northwest Territories, and encompasses 4.5 million hectares of forest, wetland and prairie, including the majority of the Peace-Athabasca Delta. The size of the park allows for the protection of entire ecosystems and the ecosystem features that are the basis for the park's Outstanding Universal Value. The park's size, remoteness, very low human population density and the absence of resource extraction activities minimize human-related stress within the property, resulting in a high level of integrity. Bovine brucellosis and tuberculosis are present within the wood bison population in and around the park. The actual and potential impact on the delta from stressors originating outside the park, such as flow regulation, water withdrawals, industrial discharge and climate change, is monitored by the park and by working in collaboration with a network of partners to monitor and manage impacts from upstream development.

Protection and management requirements

The Canada National Parks Act provides effective legal protection for the park. Under the requirements of the legislation, a park management plan was approved in June 2010 and provides direction for protecting the features of the park that are the basis for its Outstanding Universal Value, and for providing opportunities for visitors to experience and learn about the park. The park's two largest wetlands (the Peace-Athabasca Delta and the whooping crane nesting area) have also been declared Wetlands of International Importance under the RAMSAR convention.

Park managers work with 11 Aboriginal groups for whom Wood Buffalo National Park is an area of significant cultural value to cooperatively manage the park, as each group carries out traditional harvesting and other cultural activities within the park boundaries. Endangered species and their critical habitat, including the breeding grounds of the whooping crane, are protected under provisions of Canada's Species at Risk Act. Park staff also work with Environment Canada, international crane preservation groups and U.S. government agencies to ensure the long term viability of the park's whooping crane flock.

Park staff closely monitors upstream development on the major rivers that flow into the park and work closely with local Aboriginal partners, other government agencies, stakeholders and industry to maintain the ecological integrity of Wood Buffalo National Park. The park management plan commits park managers to developing an Area Management Plan for the Peace-Athabasca Delta to address the challenges of managing the delta's ecological and cultural values in cooperation with partners and stakeholders. The Peace-Athabasca Delta Ecological Monitoring Program, a multi-stakeholder group made up of Aboriginal representatives, government and non-government organizations, is a cornerstone in developing and implementing this plan.

Special attention will be given over the long term to monitoring and taking appropriate actions related to a number of factors in or near the property. Specifically, attention will focus on the actual and potential impacts of upstream development and climate change. (Adopted in Bonn, 2015 (**39 COM 8E**))

Annex 4: Mission Agenda as conducted

Saturday, September 24 - EDMONTON

WHC/IUCN Mission members arrives in Canada; first informal meeting Tilman Jaeger with Ashley Campbell, George Green, Steve Oates (Parks Canada)

Sunday, September 25 – EDMONTON / FORT SMITH

10:00 Mission Welcome / Brunch, Renaissance Edmonton Airport Hotel

Parks Canada: Daniel Watson, CEO, George Green, VP Indigenous Affairs and Cultural Heritage, Gilles Seutin, Chief Ecosystem Scientist, Ashley Campbell, Manager, International and Intergovernmental Affairs, Steve Oates, EA Scientist, Protected Areas Establishment and Conservation.

Environment and Climate Change Canada: Cheryl Baraniecki, Associate Regional Director General, West and North, Strategic Policy Branch

13:00 Commercial flight to Fort Smith (Northwestern Air)

15:30 Welcome and Presentations by Parks Canada, Parks Canada Office, including additional colleagues by teleconference

Parks Canada: Jonah Mitchell, Field Unit Superintendent, Southwest Northwest Territories, Michael Keizer, External Relations Manager, Southwest Northwest Territories Field Unit; Stuart Macmillan, Resource Conservation Manager, Wood Buffalo National Park, George Green, VP Indigenous Affairs and Cultural Heritage, Gilles Seutin, Chief Ecosystem Scientist, Ashley Campbell, Manager, International and Intergovernmental Affairs, Steve Oates, Environmental Assessment Scientist

Alberta Environment and Parks: Wayne Crosby, Senior Systems Designer, Strategy Division, Alberta Environment and Parks

Environment and Climate Change Canada: Cheryl Baraniecki, Associate Regional Director General, West and North, Strategic Policy Branch

MCFN: Melody Lepine, Director, Government and Industry Relations, Carl Braun, Manager, Government Relations

IUCN: Dr. Stephen Davis, **WHC:** Tilman Jaeger

- Introductions and opening remarks (**Parks Canada**, WHC/IUCN representatives)
- Overview presentation of **Parks Canada's** mandate, roles and responsibilities: Gilles Seutin, Chief Ecosystem Scientist, Protected Areas Establishment and Conservation
- Presentation on WBNP Park Establishment, Management, Engagement, Monitoring and Reporting: Jonah Mitchell, Field Unit Superintendent, **SWNWT**; Stuart Macmillan, Regional Conservation Manager, **WBNP**

Monday, September 26 - FORT SMITH

08:30 Meeting with **WBNP Cooperative Management Committee**

First Nations and Métis Representatives: **Mikisew Cree FN:** Melody Lepine and Carl Braun, **Salt River FN:** Ken Laviolette and Colleen Verville, **Smith's Landing FN:** Cochise Paulette and Jacki Emile, **K'at'l'odeeche FN:** Chief Roy Fabian, **Deninu K'ue FN:** Laura Edjericon and Stanley Lourine, **Little Red River Cree Nation:** Sylvester Auger and Jim Webb, **Hay River Métis Government Council:** Trevor Beck and Dwayne Klause, **Fort Smith Métis Council:** Betty Villebrun, Ken Hudson and Earl Evans, **Fort Resolution Métis Council:** Arthur Beck and Raymond King, **Fort Chipewyan Métis Local #125:** Fred (Jumbo) Fraser

Parks Canada: Jonah Mitchell, Field Unit Superintendent, Southwest Northwest Territories, Stuart Macmillan, Resource Conservation Manager, Wood Buffalo National Park, Cam Zimmer, Project Manager, Wood Buffalo National Park, Don Aubrey, Senior Policy Advisor, Southwest Northwest Territories Field Unit, George Green, VP Indigenous Affairs and Cultural Heritage, Gilles Seutin, Chief Ecosystem Scientist, Ashley Campbell, Manager, International and Intergovernmental Affairs, Steve Oates, Environmental Assessment Scientist

15:30 Government Presentations, including by teleconference, Parks Canada Auditorium

Parks Canada: Jonah Mitchell, Field Unit Superintendent, Southwest Northwest Territories, Michael Keizer, External Relations Manager, Southwest Northwest Territories Field Unit, Stuart Macmillan, Resource Conservation Manager, Wood Buffalo National Park, Cam Zimmer, Project Manager, Wood Buffalo National Park, George Green, VP Indigenous Affairs and Cultural Heritage, Gilles Seutin, Chief Ecosystem Scientist, Ashley Campbell, Manager, International and Intergovernmental Affairs, Steve Oates, Environmental Assessment Scientist

Environment and Climate Change Canada: Cheryl Baraniecki, Associate Regional Director General, West and North, Strategic Policy Branch, Dr. Daniel Peters, Hydrologist, Watershed

Hydrology and Ecology Research Division, Science and Technology Branch, Dr. Donald Baird, Research Scientist, Cumulative Effects and Bioassessment, Watershed Hydrology and Ecology Research Division, Science and Technology Branch, Richard Wiacek, Manager, Regulatory Affairs Section, Prairie Region, Canadian Wildlife Service, Philippe Thomas, Wildlife Biologist, Ecosystem Health Research, Ecotoxicology and Wildlife Health Division, Wildlife and Landscape Science Directorate, S&T Branch, Bruce Pauli, Chief, Ecosystem Health Research, Ecotoxicology and Wildlife Health Division, Wildlife and Landscape Science Directorate, S&T Branch, Nancy Glozier, Physical Sciences Specialist, Fresh Water Quality Monitoring - Pacific Athabasca Arctic Watershed, Water Quality Monitoring and Surveillance, Science and Technology Branch (by teleconference)

Canadian Environmental Assessment Agency: Colette Spagnuolo, Associate Director, Review Panels Division, Operations

Transport Canada: Margaret Zellis-Skiba, Acting Regional Director, Programs, Prairie and Northern Region (by teleconference)

Indigenous and Northern Affairs Canada: Murray Heap, Sr. Environment Officer, Alberta Region (by teleconference)

BC Ministry of Environment: Lisa Paquin, Director of Intergovernmental Relations, Strategic Policy Branch, BC Ministry of Environment (by teleconference)

Alberta Environment and Parks: Dr. Fred Wrona, Chief Scientist, Environmental Monitoring and Science Division, Wayne Crosby, Senior Systems Designer, Innovation and intergovernmental Services Branch, Strategy Division, Andy Ridge, Executive Director, Water Policy Branch, Policy and Planning Division, Scott Duguid, Director, Consultation, Land Use Secretariat, Corinne Kristensen, Senior Manager, Environmental Assessment, Approvals and Dispositions, Policy and Planning Division, Cathy Maniego, Executive Director, Resilience and Mitigation, Strategy Division

Government of the Northwest Territories – Environment and Natural Resources: Dr. Erin Kelly, Assistant Deputy Minister

MCFN: Melody Lepine, Director, Government and Industry Relations, Carl Braun, Manager, Government Relations

15:30 Introductions / Opening Remarks: Moderator: Michael Keizer, External Relations Manager, **Southwest Northwest Territories Field Unit**

15:45 **Environmental Governance in Canada:** Cheryl Baraniecki, Associate Regional Director General, West & North, ECCC

16:45 Federal Environmental Assessment Process, overview presentation of the Canadian Environmental Assessment Act (2012) and its Application to Hydroelectric and Oil Sands Developments: Colette Spagnuolo, Associate Director, Review Panels Division, Operations, **CEAA**

19:00 **Open House (Community Meeting)** at Roaring Rapids Hall

- Introduction and Opening Remarks: Jonah Mitchell, Field Unit Superintendent, **SWNWT**
- Presentation by George Green, VP, Indigenous Affairs and Cultural Heritage, **Parks Canada** informing on World Heritage Committee follow-up for WBNP
- Overview of mission: Stephen Davis (IUCN) and Tilman Jaeger (WHC)

Approximately 60 community members attended the meeting (no formal attendance was taken) Questions were asked by Brad Laviolette, Fort Smith resident, **Salt River First Nation** member and park trapper; Roy Fabien, Hay River resident, Chief, **Klatlodeechee First Nation**; Melissa Daniels, Fort Smith resident, **Athabasca Chipewyan First Nation** member, former lawyer, former member of the **National Aboriginal Advisory Committee on Species at Risk**; Tim Heron, Fort Smith resident, Lands and Resources Coordinator, **Northwest Territories Métis Nation**; Matt Fraser, Fort Smith resident, Fort Smith Metis Local member

Tuesday, September 27 – FORT SMITH

08:00 Overview of Peace-Athabasca Delta Hydrology

- Presentation on Water Quantity Monitoring and Assessment in the Peace-Athabasca Delta: Dr. Daniel Peters, Hydrologist, **Watershed Hydrology and Ecology Research Division, Science and Technology Branch, ECCC**
- Presentation on Role of Flooding in the PAD: Stuart Macmillan, Resource Conservation Manager, WBNP, **Parks Canada**

10:15 Transboundary Water Management

- Presentation on Provincial/territorial water management agreements and the Mackenzie River Basin Board (Cathy Maniego, Executive Director, Resilience and Mitigation, Strategy

Division, Environment and Parks / Dr. Erin Kelly, ADM, **Environment and Natural Resources, Government of the Northwest Territories**

- 11:15** Alberta Overview
- Presentation on Alberta Context: Andy Ridge, Executive Director, **Water Policy Branch, Policy and Planning Division**
 - Presentation on Environmental Impact Assessment in Alberta: Corinne Kristensen, Senior Manager, Environmental Assessment, Approvals and Dispositions, Policy and Planning Division, **Alberta Environment and Parks**
- 13:15** Alberta Overview (cont'd)
- Presentation on Alberta's Integrated Resource Management System (including overview of Lower Athabasca Regional Plan): Andy Ridge, Executive Director, **Water Policy Branch, Policy and Planning Division, Alberta Environment and Parks** / Scott Duguid, Director, **Land Use Secretariat, Alberta Environment and Parks**
- 14:15** Oil Sands Monitoring (Overview)
- Presentation on Canada-Alberta Joint Oil Sands Monitoring Program: Dr. Fred Wrona, Chief Scientist, **Environmental Monitoring and Science Division, Alberta Environment and Parks**
- 15:00** Oil Sands Monitoring (Air)
- Dr. Stewart Cober, Manager, Air Quality Processes Research Section, Air Quality Research Division, Science and Technology Branch, Environment and Climate Change Canada (by teleconference)
- 15:45** Oil Sands Monitoring (Water)
- Presentation on Monitoring of Water Quality, Fish and Deltaic Wetland Ecosystem Health in Relation to Upstream Development in the Peace, Athabasca and Slave River Watersheds: Dr. Donald Baird, Research Scientist, Cumulative Effects and Bioassessment, **Watershed Hydrology and Ecology Research Division, Science and Technology Branch, ECCC**
- 16:45** Wrap-up Discussion
- Opportunity for open discussion / questions / clarifications
- Wednesday, September 28 – FORT SMITH / FORT CHIPEWYAN**
- 08:00** Oil Sands Monitoring (Wildlife)
- Presentation on Effects of oil sands development on migratory wildlife in Wood Buffalo National Park: Richard Wiacek, Manager, Regulatory Affairs Section, Prairie Region, **Canadian Wildlife Service, ECCC**
 - Presentation on Monitoring contaminants in delta wildlife: Philippe Thomas, **Wildlife Biologist, Ecotoxicology and Wildlife Health Division, Science and Technology Branch, ECCC**
- 10:15** Moving Forward
- Opportunity for open discussion / questions / clarifications (some participants unavailable to take part as commercial flights leave at 7:00 AM and 10:00 AM)
 - Discussion of existing and proposed initiatives of interest to the mission (e.g. related to EA processes environmental monitoring, flow regulation, engagement with Indigenous Peoples)
- 13:00** Travel to Fort Smith airport
- 13:30** Flight to Fort Chipewyan, including Aerial field trip over the World Heritage site and broader ecosystem
- Parks Canada:** Jonah Mitchell, Field Unit Superintendent, Southwest Northwest Territories, Stuart Macmillan, Resource Conservation Manager, Wood Buffalo National Park, George Green, VP Indigenous Affairs and Cultural Heritage, Gilles Seutin, Chief Ecosystem Scientist, Ashley Campbell, Manager, International and Intergovernmental Affairs.
- Environment and Climate Change Canada:** Philippe Thomas, Wildlife Biologist, Ecosystem Health Research, Ecotoxicology and Wildlife Health Division, Wildlife and Landscape Science Directorate, S&T Branch, Bruce Pauli, Chief, Ecosystem Health Research, Ecotoxicology and Wildlife Health Division, Wildlife and Landscape Science Directorate, S&T Branch
- MCFN:** Melody Lepine, Director, Government and Industry Relations, Carl Braun, Manager, Government Relations, Cory Nicotine, Videographer

Thursday, September 29 - FORT CHIPEWYAN

Mikisew Cree First Nation (MCFN) Presentations, Fort Chipewyan Community Hall

MCFN Participants: Chief Steve Courtoreille; Terry Marten, Councillor; Ronnie Campbell, Councillor; Melody Lepine, Director, Government and Industry Relations; Carl Braun, Manager, Government Relations; Russell Noseworthy, Manager, Industry Relations; Jocelyn Marten, Community Coordinator; Bruce MacLean, Community Based Monitoring Program; Kevin Courtoreille, Community Based Monitoring Program; Denise Holden, Project Advisor, Sheena Voyageur, Administrative Assistant; Ashley Jacobs, Executive Assistant; Ivy Wigmore, Finance Coordinator; Patricia Hardisty, Coordinator; Mark Gustafson, Legal Counsel

Parks Canada Participants: Jonah Mitchell, Field Unit Superintendent, Southwest Northwest Territories; Stuart Macmillan, Resource Conservation Manager, WBNP, George Green, VP Indigenous Affairs and Cultural Heritage; Gilles Seutin, Chief Ecosystem Scientist; Ashley Campbell, Manager, International and Intergovernmental Affairs

Environment and Climate Change Canada Participants: Philippe Thomas, Wildlife Biologist, Ecosystem Health Research, Ecotoxicology and Wildlife Health Division, Wildlife and Landscape Science Directorate, S&T Branch; Bruce Pauli, Chief, Ecosystem Health Research, Ecotoxicology and Wildlife Health Division, Wildlife and Landscape Science Directorate, S&T Branch

- 08:30** Opening Prayer by Elder
- 08:45** Introductions and opening remarks and presentation about Mikisew by Chief Courtoreille
- 09:30** **Land User Panel** Led by Melody Lepine and Mark Gustafson with participation of Larry Marten, George Marten, Sammy Marten, Billy Whiteknife, Sloan Whiteknife, Matthew Lepine, Fred Vermillion, Archie Antoine, Ronnie Campbell. Translation provided by Terry Marten
- 13:30** **Youth Panel** with Jocelyn Marten, Misty Marten, Kevin Courtoreille and children from local school: Helena Courtoreille and Billy Joe Courtoreille
- 14:15** **Western Science Presentations**
 - Human-caused ecological changes and threats to the Peace-Athabasca Delta and Wood Buffalo National Park: Dr. David Schindler, Killam Memorial Professor of Ecology Emeritus, **University of Alberta**
 - Restoring the Outstanding Universal Value of the Peace-Athabasca Delta by Reversing the Decline in its Hydrologic Recharge: Dr. Martin Carver, Principal, **Aqua Environmental Associates**
 - Mikisew Cree First Nation Community Based Monitoring Program: Bruce McLean, Community Based Monitoring Program, **MCFN**
 - Land Cover Disturbance Surrounding WBNO: Dr. Petr Komers, MSES Inc., President and Principal Consultant
 - Environmental and Human Health Implications of Athabasca Oil Sands: Dr. Stephane McLachlan, Professor, Department of Environment and Geography, **University of Manitoba**
 - Monitoring Contaminants in Wildlife in the Peace-Athabasca Delta: Philippe Thomas, Wildlife Biologist, **Ecosystem Health Research, Ecotoxicology and Wildlife Health Division, Wildlife and Landscape Science Directorate, S&T Branch**
- 17:45** Closing Comments: Chief Courtoreille
- 18:00** Community Supper: Opportunity for community members to express their views / ask questions to the mission (no formal attendance taken – **around 120 people took part**)

Friday, September 30 - FORT CHIPEWYAN

AM/PM Boat trip into the Peace-Athabasca Delta led by MCFN members.

MCFN Representatives: Melody Lepine, Director, Government and Industry Relations; Bruce MacLean, Community Based Monitoring Program; Ronnie Campbell, Councillor; Larry Marten, Land user and Elder; Sloan Whiteknife, Land user and Elder; George Marten, Land user and Elder; Kevin Courtoreille, Community Based Monitoring Program and Land user; Archie Antoine, Land user and Elder; Jocelyn Marten, Community Coordinator and Land user.

Parks Canada: Jonah Mitchell, Field Unit Superintendent, Southwest Northwest Territories; Stuart Macmillan, Resource Conservation Manager, WBNP Park; David Campbell, Resource Management Officer I, WBNP; Jessica Lankshear, Resource Management Technician II, WBNP; George Green, VP Indigenous Affairs and Cultural Heritage; Gilles Seutin, Chief Ecosystem Scientist; Ashley Campbell, Manager, International and Intergovernmental Affairs

Boat Trip route included visits to:

- Rocky headland on North shore of Lake Athabasca

- “Dog Camp” area on the Quatre Fourches River –Mikisew Cree harvesting cabins and temporary rock dam site from the early 1970s (emergency water retention structure established after Bennett dam filling and later removed)
- Mamawi Lake – inland delta lake that is a key access route to Lake Claire and the Birch River delta
- Harvester cabin on Prairie River and perched basin behind the cabin
- Riviere des Rochers – outflow river that connects Lake Athabasca and the Peace River and site of submerged rock weir
- Harvester cabin on Riviere des Rochers and second example of a perched basin filled in with grass and willows.

Saturday, October 1 - FORT CHIPEWYAN / FORT McMURRAY

MCFN Governance presentations, Fort Chipewyan Municipal Building

MCFN: Melody Lepine, Director, Government and Industry Relations; Carl Braun, Manager, Government Relations; Terry Marten, Councillor; Russel Noseworthy, Manager, Industry Relations; Bruce MacLean, Community Based Monitoring Program; Jocelyn Marten, Community Coordinator; Mark Gustafson, Legal Counsel

Parks Canada: Jonah Mitchell, Field Unit Superintendent, Southwest Northwest Territories; Stuart Macmillan, Resource Conservation Manager, WBNP; George Green, VP Indigenous Affairs and Cultural Heritage; Gilles Seutin, Chief Ecosystem Scientist; Ashley Campbell, Manager, International and Intergovernmental Affairs

08:30 Opening prayers / Introductions

09:00 Summary / Recap

09:30 Governance Context

- MCFN relationship with Parks Canada (Terry Marten, Councillor)
- Regulatory context: LARP, bison recovery, monitoring, federal environmental laws (Mark Gustafson, MCFN Government and Industry Relations Team)
- Mikisew experience with EAs
- Current industrial activities of concern (Teck, Site C, Amisk)
- Importance of WBNP and MCFN Vision

12:30 Lunch / Meeting with **Fort Chipewyan Métis Local 125**, Parks Canada Office

FCML 125: Fred (Jumbo) Fraser, President Fort Chipewyan Métis Local 125, and land user; Ora Campbell, Office Manager and land user; Gabe Bourke, Board Member and land user; Cam MacDonald, Board Member and land user; Larry Paquette, land user; Kim Dertien-Loubert, **Woven Paths Consulting Inc.**

Parks Canada: Jonah Mitchell, Field Unit Superintendent, Southwest Northwest Territories; Stuart Macmillan, Resource Conservation Manager, WBNP; George Green, VP Indigenous Affairs and Cultural Heritage; Gilles Seutin, Chief Ecosystem Scientist; Ashley Campbell, Manager, International and Intergovernmental Affairs

14:30 Meeting with **Athabasca Chipewyan First Nation (ACFN)**, Parks Canada Office

ACFN: Chief Allen Adam; Councillor Raymond Cardinal; Councillor Teri Villebrun; Councillor Michelle Voyageur; Doreen Somers, A/ Director, Industry Relations Corporation; Eriel Deranger, Communications Coordinator, Industry Relations Corporation; Larry Innes, Legal Counsel

Parks Canada: Jonah Mitchell, Field Unit Superintendent, Southwest Northwest Territories; Stuart Macmillan, Resource Conservation Manager, WBNP; George Green, VP Indigenous Affairs and Cultural Heritage; Gilles Seutin, Chief Ecosystem Scientist; Ashley Campbell, Manager, International and Intergovernmental Affairs

MCFN: Melody Lepine, Director, Government and Industry Relations; Bruce MacLean, Community Based Monitoring Program; Jocelyn Marten, Community Coordinator; Mark Gustafson, Legal Counsel

16:00 Meeting with Dr. Roland Hall, **University of Waterloo**, Parks Canada Office

University of Waterloo: Dr. Roland Hall, Professor, Department of Biology; **Wilfrid Laurier University:** Brent Wolfe, Professor, Department of Geography and Environmental Studies

Parks Canada: Jonah Mitchell, Field Unit Superintendent, Southwest Northwest Territories; Stuart Macmillan, Resource Conservation Manager, WBNP; George Green, VP Indigenous Affairs and Cultural Heritage; Gilles Seutin, Chief Ecosystem Scientist; Ashley Campbell, Manager, International and Intergovernmental Affairs

MCFN: Melody Lepine, Director, Government and Industry Relations; Bruce MacLean, Community-Based Monitoring Program; Mark Gustafson, Legal Counsel

IUCN: Dr. Stephen Davis, **WHC:** Tilman Jaeger

University-based Research Program in the PAD since 2000: Dr. Hall, Professor, Department of Biology, **University of Waterloo** and Dr. Wolfe, Professor, Department of Geography and Environmental Studies, **Wilfred Laurier University**

- 16:30** Travel to airport for charter flight to Fort McMurray / aerial tour of oil sands
Parks Canada: Jonah Mitchell, Field Unit Superintendent, Southwest Northwest Territories; Stuart Macmillan, Resource Conservation Manager, WBNP; George Green, VP Indigenous Affairs and Cultural Heritage; Gilles Seutin, Chief Ecosystem Scientist; Ashley Campbell, Manager, International and Intergovernmental Affairs;
Alberta Environment and Parks: Paul MacMahon, Regional Resource Manager, Lower Athabasca Region, Operations Division
Canadian Association of Petroleum Producers: Terry Abel, Executive Vice President
MCFN: Melody Lepine, Director, Government and Industry Relations; Mark Gustafson, Legal Counsel

Sunday, October 2 – FORT McMURRAY

- 08:00 Oil sands site visit to Suncor Facility (Base Plant Mine)**
 Location: minibus will pick everyone up at lobby of Sawridge Inn and Conference Centre
Parks Canada: Jonah Mitchell, Field Unit Superintendent, Southwest Northwest Territories; Stuart Macmillan, Resource Conservation Manager, WBNP; George Green, VP Indigenous Affairs and Cultural Heritage; Gilles Seutin, Chief Ecosystem Scientist; Ashley Campbell, Manager, International and Intergovernmental Affairs
Alberta Environment and Parks: Stan Kavalinas, Manager, Intergovernmental Services Section, Strategy Division; Andy Ridge, Executive Director, Water Policy Branch, Policy and Planning Division
 MCFN: Russell Noseworthy, Manager, Industry Relations
Suncor: Janice Linehan, Senior Advisor Environmental Policy; Christine Daly, Senior Sustainability Advisor; Rodney Guest, Manager of Water Strategy and Solutions; Blair Penner, Senior Technology Advisor; Robin Aitkin, Stakeholder Consultation Team Leader; Peter MacConnachie, Sustainability Issues Manager
Canadian Association of Petroleum Producers: Terry Abel, Executive Vice President
Canada's Oil Sands Innovation Alliance: Kelly Munkittrick, Director, Monitoring
Teck Resources: Scott McKenzie, Director Regulatory and Environment; **CNLR:** Calvin Duane, Environmental Project Leader
- 09:00** Visit of Suncor Facility (Base Plant Mine)
- 13:00** Oil Sands Industry Meetings, Sawridge Inn and Conference Centre
Parks Canada: Jonah Mitchell, Field Unit Superintendent, Southwest Northwest Territories; Stuart Macmillan, Resource Conservation Manager, WBNP; George Green, VP Indigenous Affairs and Cultural Heritage; Gilles Seutin, Chief Ecosystem Scientist; Ashley Campbell, Manager, International and Intergovernmental Affairs
Alberta Environment and Parks: Stan Kavalinas, Manager, Intergovernmental Services Section, Strategy Division; Andy Ridge, Executive Director, Water Policy Branch, Policy and Planning Division
Teck Resources: Marcia Smith, Senior Vice-President, Sustainability and External Affairs; Ray Reipas, Senior Vice-President, Energy; Neil Sandstrom, Manager, Environment; Steve Hilts, Director Environmental Legacies; Scott McKenzie, Director, Environment and Regulatory; Robin Johnstone, General Manager Community and Indigenous Affairs; Sheila Risbud, Manager Regulatory
Canadian Association of Petroleum Producers (CAPP): Terry Abel, Executive VP
Canadian Oil Sands Innovation Alliance: Kelly Munkittrick, Director, Monitoring
MCFN: Melody Lepine, Director, Government and Industry Relations; Russell Noseworthy, Manager, Industry Relations; Mark Gustafson, Legal Counsel
- 13:00** Meeting with Teck Resources
- Ronald Lake Biodiversity Stewardship: Robin Johnstone, General Manager Community and Indigenous Affairs, **Teck** / Melody Lepine, Director, Government and Industry Relations, **MCFN**
 - **Teck** Presentation to Reactive Monitoring Mission to Wood Buffalo National Park: Marcia Smith, Senior Vice-President, Sustainability and External Affairs / Ray Reipas, Senior Vice-President, Energy / Neil Sandstrom, Manager, Environment / Steve Hilts, Director Environmental Legacies

15:00 Meeting with **Canadian Association of Petroleum Producers (CAPP)** and **Canada's Oil Sands Innovation Alliance (COSIA)**
Panel Discussion Terry Abel, Executive Vice President, **CAPP**; Kelly Munkittrick, Director, Monitoring, **COSIA**; Calvin Duane, Environmental Project Leader, **Canadian Natural Resources**; Blair Penner, Senior Technology Advisor, **Suncor**; Rodney Guest, Manager of Water Strategy and Solutions, Sustainable Development, **Suncor**

17:00 Wrap-up discussions

Monday, October 3 - FORT McMURRAY / EDMONTON

10:20 AC 8383 flight to Edmonton

13:00 Meeting with **AHP Development Corporation** to discuss the Amisk Project, Holiday Inn Express Downtown Edmonton

AHP Development Corporation: Krzysztof Muniak, P.Eng., Project Manager; David Berrade: Consultation Lead

MCFN: Melody Lepine, Director, Government and Industry Relations; Carl Braun, Manager, Government Relations

Parks Canada: Jonah Mitchell, Field Unit Superintendent, Southwest Northwest Territories; Stuart Macmillan, Resource Conservation Manager, WBNP; George Green, VP Indigenous Affairs and Cultural Heritage; Gilles Seutin, Chief Ecosystem Scientist; Ashley Campbell, Manager, International and Intergovernmental Affairs

Alberta Environment and Parks: Stan Kavalinas, Manager, Intergovernmental Services Section, Strategy Division; Corinne Kristensen, Senior Manager, Environmental Assessment, Approvals and Dispositions, Policy and Planning Division

BC Ministry of Environment: Lisa Paquin, Director of Intergovernmental Relations, Strategic Policy Branch, BC Ministry of Environment

14:30 Roundtable meeting with environmental NGOs, Holiday Inn Express Downtown Edmonton

University of British Columbia: Dr. Karen Bakker (moderator for session), Professor, Canada Research Chair, Dept of Geography Director, Program on Water Governance, Institute of Resources, Environment and Sustainability

NGO Representatives: **Sierra Club:** Ana Simeon; **Canadian Parks and Wilderness Society:** Alison Woodley; **Canadian Parks and Wilderness Society (Northern Alberta):** Alison Ronson, Pat Chan, Stephane Bowen, Tara Russell, Chris Sargent; **Mighty Peace Watershed Alliance:**

Adam Norris and Alden Armstrong; **Keepers of the Water:** Jule Asterisk and Bob Cameron; **Alberta Water Smart:** Mike Nemeth; **Yellowstone to Yukon Initiative:** Candace Batycki (by teleconference); **Alberta Native Plant Council / Nature Alberta:** Marsha Hayward and Kim MacKenzie; **Alberta Wilderness Association:** Cliff Wallis; **Athabasca Watershed Council:**

Jason Ponto

Faculty of Native Studies, University of Alberta: Patricia McCormack

Department of Anthropology, University of Alberta: Andie Palmer

Parks Canada: Jonah Mitchell, Field Unit Superintendent, Southwest Northwest Territories; Stuart Macmillan, Resource Conservation Manager, Wood Buffalo National Park; George Green, VP Indigenous Affairs and Cultural Heritage; Gilles Seutin, Chief Ecosystem Scientist; Ashley Campbell, Manager, International and Intergovernmental Affairs; Steve Oates, EA Scientist (by teleconference)

Environment and Climate Change Canada: Martin Van Olst, Senior Analyst, West and North Regions, Strategic Policy Branch

INAC: Tamara Kane, Regional Consultation Coordinator, INAC-AB region (by teleconference)

Alberta Environment and Parks: Stan Kavalinas, Manager, Intergovernmental Services Section, Strategy Division

BC Government: Lisa Paquin, Director of Intergovernmental Relations, Strategic Policy Branch, BC Ministry of Environment

MCFN: Chief Steve Courtoreille; Melody Lepine, Director, Government and Industry Relations; Russell Noseworthy, Manager, Industry Relations; Martin Carver, Consultant; Cory Nicotine, videographer

Tuesday, October 4 – EDMONTON

08:30 Meeting with **BC Hydro / BC Government**, Holiday Inn Express Downtown Edmonton

BC Ministry of Environment: Lisa Paquin, Director of Intergovernmental Relations, Strategic Policy Branch, BC Ministry of Environment

BC Environmental Assessment Office: Monica Perry, Executive Project Director

BC Hydro: Siobhan Jackson, Environmental and Community Mitigation Manager; Faizal Yusuf, P.Eng. BC Hydro Specialist Engineer, hydrology; Martin Jasek, P.Eng., BC Hydro Specialist Engineer, expert on Peace River Ice; Leanne Todd, Manager, Water Licensing

Others (representing BC Hydro): Dr. Kevin Timoney; Dr. John Smol, Professor **Queen's University**, Dept. Biology; Canada Research Chair in Environmental Change

Parks Canada: Jonah Mitchell, Field Unit Superintendent, Southwest Northwest Territories; Stuart Macmillan, Resource Conservation Manager, WBNP; George Green, VP Indigenous Affairs and Cultural Heritage; Gilles Seutin, Chief Ecosystem Scientist; Ashley Campbell, Manager, International and Intergovernmental Affairs; Steve Oates, EA Scientist (by teleconference)

Environment and Climate Change Canada: Dr. Daniel Peters, Hydrologist, Watershed Hydrology and Ecology Research Division, Science and Technology Branch

Alberta Environment and Parks: Stan Kavalinas, Manager, Intergovernmental Services Section, Strategy Division; Brian Yee, Director, Transboundary Waters Secretariat, Strategy Division; Tim Toth, Senior Transboundary Water Advisor, Strategy Division; Carmen de la Chevrotiere, Transboundary Water Quantity Specialist, Strategy Division; Jacquie Browne, Transboundary Water Advisor, Strategy Division

MCFN: Chief Steve Courtoreille; Melody Lepine, Director, Government and Industry Relations; Russell Noseworthy, Manager, Industry Relations; Mark Gustafson, Legal Counsel; Carl Braun, Manager, Government Relations; Martin Carver, Consultant

08:30 Introductions / Opening Remarks

08:40 **BC Hydro** Presentations

- Paleoenvironmental Perspectives on Environmental Change in the PAD: Dr. John Smol, Professor Queen's University, Dept. Biology; Canada Research Chair in Environmental Change
- The Peace-Athabasca Delta: A Misunderstood Ecosystem: Dr. Kevin Timoney
- Peace River Hydrology and evidence on influence on the PAD: Faizal Yusuf, P.Eng., BC Hydro Specialist Engineer, hydrology
- Peace River Ice Processes: Martin Jasek, P.Eng., BC Hydro Specialist Engineer, expert on Peace River Ice

14:00 Final mission wrap-up discussion with government authorities; Holiday Inn Express Downtown Edmonton

Parks Canada: Jonah Mitchell, Field Unit Superintendent, Southwest Northwest Territories; Stuart Macmillan, Resource Conservation Manager, WBNP; George Green, VP Indigenous Affairs and Cultural Heritage; Gilles Seutin, Chief Ecosystem Scientist; Ashley Campbell, Manager, International and Intergovernmental Affairs; Steve Oates, EA Scientist (by teleconference)

Environment and Climate Change Canada: Cheryl Baraniecki, Associate Regional Director General, West and North, Strategic Policy Branch; *Canadian Environmental Assessment Agency:* Colette Spagnuolo, Associate Director, Review Panels Division, Operations (by teleconference)

Alberta Environment and Parks: Dr. Fred Wrona, Chief Scientist, Environmental Monitoring and Science Division (by teleconference); Brian Yee, Director, Transboundary Waters Secretariat, Strategy Division; Andy Ridge, Executive Director, Water Policy Branch, Policy and Planning Division, Alberta Environment and Parks; Scott Duguid, Director, Consultation, Land Use Secretariat; Corinne Kristensen, Senior Manager, Environmental Assessment, Approvals and Dispositions, Policy and Planning Division; Cathy Maniego, Executive Director, Resilience and Mitigation, Strategy Division; Stan Kavalinas, Manager, Intergovernmental Services Section, Strategy Division, Alberta Environment and Parks

BC Ministry of Environment: Lisa Paquin, Director of Intergovernmental Relations, Strategic Policy Branch, BC Ministry of Environment

BC Environmental Assessment Office: Monica Perry, Executive Project Director

MCFN: Chief Steve Courtoreille; Melody Lepine, Director, Government and Industry Relations; Russell Noseworthy, Manager, Industry Relations; Mark Gustafson, Legal Counsel; Carl Braun, Manager, Government Relations; Martin Carver, Consultant

16:00 Debriefing by IUCN and WHC representatives with Daniel Watson, CEO Parks Canada.

End of mission and departure of IUCN and WHC representatives

Annex 5: Composition of the mission team

Tilman Jaeger
 Representative of the UNESCO World Heritage Centre
 7, place Fontenoy
 75352 Paris 07 SP, France
<http://whc.unesco.org>

Dr. Stephen E. Davis
 Representative of IUCN
 Rue Mauverney 28
 1196 Gland, Switzerland
<http://www.iucn.org>

Annex 6: People met during the Mission

Listed in alphabetical order by last name in each group. Every effort was made to document all individuals. Possible omissions are unintended and entirely the authors' responsibility.

Parks Canada	
Don Aubrey	Senior Policy Advisor, Southwest Northwest Territories Field Unit
Ashley Campbell	Manager, International and Intergovernmental Affairs
George Green	VP Indigenous Affairs and Cultural Heritage
Michael Keizer	External Relations Manager, Southwest Northwest Territories Field Unit
Stuart Macmillan	Resource Conservation Manager, WBNP
Jonah Mitchell	Field Unit Superintendent, Southwest Northwest Territories
Steve Oates	EA Scientist, Protected Areas Establishment and Conservation
Gilles Seutin	Chief Ecosystem Scientist
Daniel Watson	CEO
Cam Zimmer	Project Manager, Wood Buffalo National Park
Federal Government other than Parks Canada	
Dr. Donald Baird	Research Scientist, Cumulative Effects and Bioassessment, Watershed Hydrology and Ecology Research Division, Science and Technology Branch, ECCC
Cheryl Baraniecki	Associate Regional Director General, West and North, Strategic Policy Branch, ECCC
Stewart Cober	Oil Sands Monitoring (Air), Environment and Climate Change Canada, ECCC (by teleconference)
Nancy Glozier	Physical Sciences Specialist, Fresh Water Quality Monitoring - Pacific Athabasca Arctic Watershed, Water Quality Monitoring and Surveillance, Science and Technology Branch, ECCC (by teleconference)
Tamara Kane	Regional Consultation Coordinator, INAC-AB region (by teleconference)
Bruce Pauli	Chief, Ecosystem Health Research, Ecotoxicology and Wildlife Health Division, Wildlife and Landscape Science Directorate, S&T Branch, ECCC
Dr. Daniel Peters	Hydrologist, Watershed Hydrology and Ecology Research Division, Science and Technology Branch, ECCC
Colette Spagnuolo	Associate Director, Review Panels Division, Operations, Canadian Environmental Assessment Agency
Philippe Thomas	Wildlife Biologist, Ecosystem Health Research, Ecotoxicology and Wildlife Health Division, Wildlife and Landscape Science Directorate, S&T Branch, ECCC
Martin Van Olst	Senior Analyst, West and North Regions, Strategic Policy Branch, ECCC

Richard Wiacek	Manager, Regulatory Affairs Section, Prairie Region, Canadian Wildlife Service, ECCC
Margaret Zellis-Skiba	Acting Regional Director, Programs, Prairie and Northern Region (by teleconference) Indigenous and Northern Affairs Canada: Murray Heap, Sr. Environment Officer, Alberta Region, Transport Canada (by teleconference)
Provincial / Territorial Governments	
Province of Alberta	
Jacquie Browne	Transboundary Water Advisor, Strategy Division
Wayne Crosby	Senior Systems Designer, Innovation and intergovernmental Services Branch, Strategy Division; Alberta Environment and Parks
Carmen de la Chevrotiere	Transboundary Water Quantity Specialist, Strategy Division
Scott Duguid	Director, Consultation, Land Use Secretariat
Corinne Kristensen	Senior Manager, Environmental Assessment, Approvals and Dispositions, Policy and Planning Division
Paul MacMahon	Regional Resource Manager, Lower Athabasca Region, Operations Division, Alberta Environment and Parks
Cathy Maniego	Executive Director, Resilience and Mitigation, Strategy Division
Andy Ridge	Executive Director, Water Policy Branch, Policy and Planning Division
Stan Kavalinas	Manager, Intergovernmental Services Section, Strategy Division
Tim Toth	Senior Transboundary Water Advisor, Strategy Division
Dr. Fred Wrona	Chief Scientist, Environmental Monitoring and Science Division, Alberta Environment and Parks
Brian Yee	Lead for BC-AB Bilateral Water Management Agreement negotiations
Province of British Columbia	
Lisa Paquin	Director of Intergovernmental Relations, Strategic Policy Branch, BC Ministry of Environment (by teleconference and in person)
Monica Perry	Executive Project Director, BC Environmental Assessment Office
Government of the Northwest Territories	
Dr. Erin Kelly	Assistant Deputy Minister, Environment and Natural Resources
First Nations, Métis Representatives, community members	
Some 60 community members attended a meeting in Fort Smith on September 26, 2016 (no formal attendance was taken)	
Some 120 community members attended a Community Supper in Fort Chipewyan on October 01, 2016 (no formal attendance was taken)	
Athabasca Chipewyan First Nation (ACFN)	
Allen Adam	Chief
Raymond Cardinal	Councillor
Melissa Daniels	Former member of the National Aboriginal Advisory Committee on Species at Risk
Eriel Deranger	Communications Coordinator, Industry Relations Corporation
Larry Innes	Legal Counsel
Doreen Somers	A/ Director, Industry Relations Corporation
Teri Villebrun	Councillor
Michelle Voyageur	Councillor
Deninu K'ue First Nation	
Laura Edjericon	
Stanley Lourine	
K'atl'odeeche First Nation	
Chief Roy Fabian	
Little Red River Cree First Nation	
Sylvester Auger, Jim Webb	
Mikisew Cree First Nation (MCFN)	
Archie Antoine	Land User and Elder
Carl Braun	Manager, Government Relations, MCFN
Ronnie Campbell	Councillor

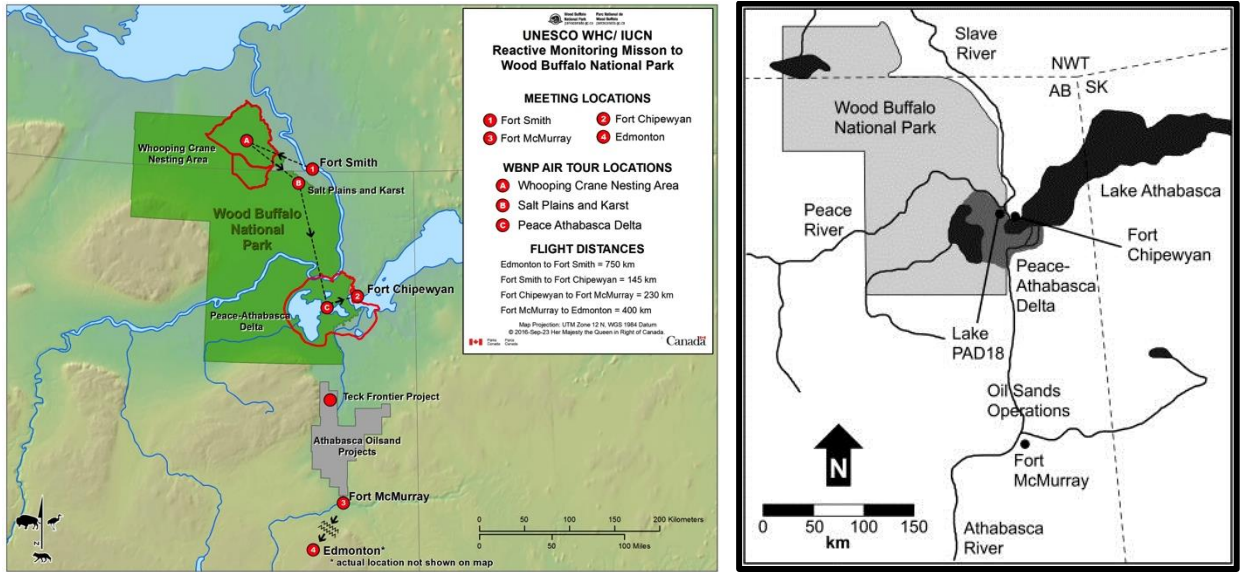
Billy Joe Courtoreille	
Helena Courtoreille	
Kevin Courtoreille	Community Based Monitoring Program and Land User
Steve Courtoreille	Chief
Mark Gustafson	Legal Counsel MCFN
Patricia Hardisty	Coordinator
Denise Holden	Project Advisor
Ashley Jacobs	Executive Assistant
Matthew Lepine	Land User and Elder
Melody Lepine	Director, Government and Industry Relations
Bruce MacLean	Community Based Monitoring Program
George Marten	Land User and Elder
Jocelyn Marten	Community Coordinator and Land User
Larry Marten	Land User and Elder
Misty Marten	Youth and Land User
Sammy Marten	Land User and Elder
Terry Marten	Councillor
Cory Nicotine	Videographer
Russell Noseworthy	Manager, Industry Relations
Fred Vermillion	Land User and Elder
Sheena Voyageur	Administrative Assistant
Ivy Wigmore	Finance Coordinator
Billy Whiteknife	Land User and Elder
Sloan Whiteknife	Land User and Elder
Salt River First Nation	
Brad Laviolette, Ken Laviolette, Colleen Verville	
Smith's Landing First Nation	
Jacki Emile, Cochise Paulette	
Hay River Métis Government Council	
Trevor Beck, Dwayne Klause	
Fort Chipewyan Métis Local #125	
Gabe Bourke	Board Member and Land User
Ora Campbell	Office Manager and Land User
Fred (Jumbo) Fraser	President Fort Chipewyan Métis Local 125, and Land User
Cam MacDonald	Board Member and Land User
Larry Paquette	Land User
Fort Resolution Métis Council	
Arthur Beck, Raymond King	
Fort Smith Métis Council	
Earl Evans, Matt Fraser, Ken Hudson, Bette Villebrun	
Northwest Territories Métis Nation	
Tim Heron	
Non-governmental Organizations	
Alden Armstrong	Mighty Peace Watershed Alliance
Jule Asterisk	Keepers of the Water
Stephane Bowen	Canadian Parks and Wilderness Society (Northern Alberta)
Bob Cameron	Keepers of the Water
Pat Chan	Canadian Parks and Wilderness Society (Northern Alberta)
Candace Batycki (by teleconference)	Yellowstone to Yukon Initiative
Marsha Hayward	Alberta Native Plant Council / Nature Alberta
Mike Nemeth	Alberta Water Smart
Adam Norris	Mighty Peace Watershed Alliance
Kim MacKenzie	Alberta Native Plant Council / Nature Alberta
Jason Ponto	Athabasca Watershed Council
Alison Ronson	Canadian Parks and Wilderness Society (Northern Alberta)
Tara Russell	Canadian Parks and Wilderness Society (Northern Alberta)
Chris Sargent	Canadian Parks and Wilderness Society (Northern Alberta)

Ana Simeon	Sierra Club B.C.
Cliff Wallis	Alberta Wilderness Association
Alison Woodley	Canadian Parks and Wilderness Society
Private Sector, including Industry Associations and Crown Corporations	
AHP Development Corporation (Amisk Project)	
David Berrade	Consultation Lead
Krzysztof Muniak	Project Manager
BC Hydro	
Siobhan Jackson	Environmental and Community Mitigation Manager
Martin Jasek	Specialist Engineer, expert on Peace River Ice
Leanne Todd	Manager, Water Licensing
Faizal Yusuf	Specialist Engineer, hydrology
Canadian Association of Petroleum Producers (CAPP)	
Terry Abel	Executive Vice President
Canada's Oil Sands Innovation Alliance (COSIA)	
Kelly Munkittrick	Director, Monitoring
CNRL	
Calvin Duane	Environmental Project Leader
Suncor	
Robin Aitkin	Stakeholder Consultation Team Leader
Christine Daly	Senior Sustainability Advisor
Rodney Guest	Manager of Water Strategy and Solutions
Janice Linehan	Senior Advisor Environmental Policy
Peter MacConnachie	Sustainability Issues Manager
Blair Penner	Senior Technology Advisor
Teck Resources	
Steve Hilts	Director Environmental Legacies
Robin Johnstone	General Manager Community and Indigenous Affairs
Scott McKenzie	Director Regulatory and Environment
Ray Reipas	Senior Vice-President, Energy
Sheila Risbud	Manager Regulatory
Neil Sandstrom	Manager, Environment
Marcia Smith	Senior Vice-President, Sustainability and External Affairs
Universities	
Dr. Karen Bakker	Professor, Canada Research Chair, Dept. of Geography Director, Program on Water Governance, Institute of Resources, Environment and Sustainability, University of British Columbia
Dr. Roland Hall	Professor, Department of Biology, University of Waterloo
Dr. Patricia McCormack	Professor Emerita, Faculty of Native Studies, University of Alberta
Dr. Stephane McLachlan	Professor, Department of Environment and Geography, University of Manitoba
Dr. Andie Diane Palmer	Associate Professor, Department of Anthropology, University of Alberta
Dr. David Schindler	Killam Memorial Professor of Ecology Emeritus, University of Alberta
Dr. John Smol	Professor Queen's University, Dept. Biology; Canada Research Chair in Environmental Change (representing BC Hydro)
Brent Wolfe	Professor, Department of Geography and Environmental Studies, Wilfrid Laurier University
Consultants	
Dr. Martin Carver	Principal, Aqua Environmental Associates
Kim Dertien-Loubert	Woven Paths Consulting Inc.
Dr. Petr Komers	MSES Inc., President and Principal Consultant
Dr. Kevin Timoney	Representing BC Hydro

Annex 7: Selected Maps

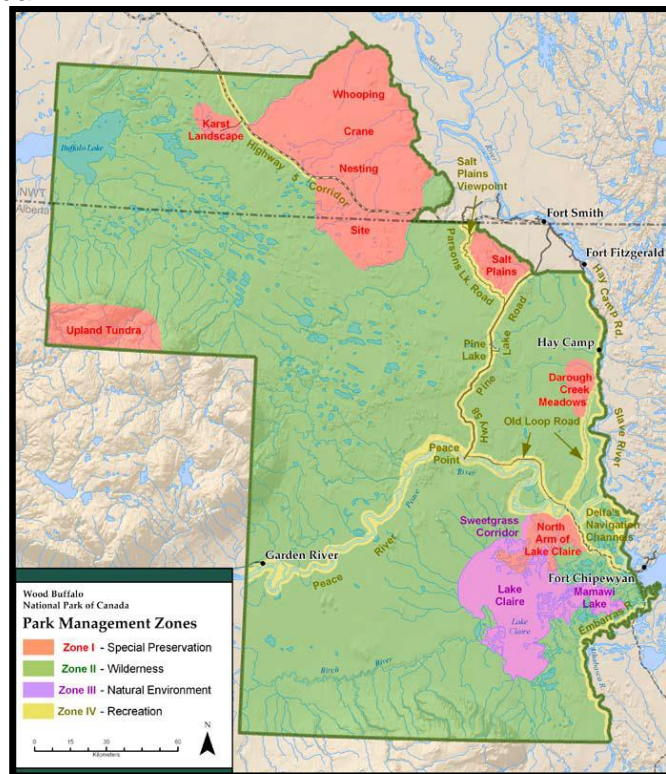
Map 1: Overview Maps of Wood Buffalo National Park

Sources: Parks Canada (1.a, left, includes mission meeting and air tour locations); Wiklund et al. (2012) (1.b right)

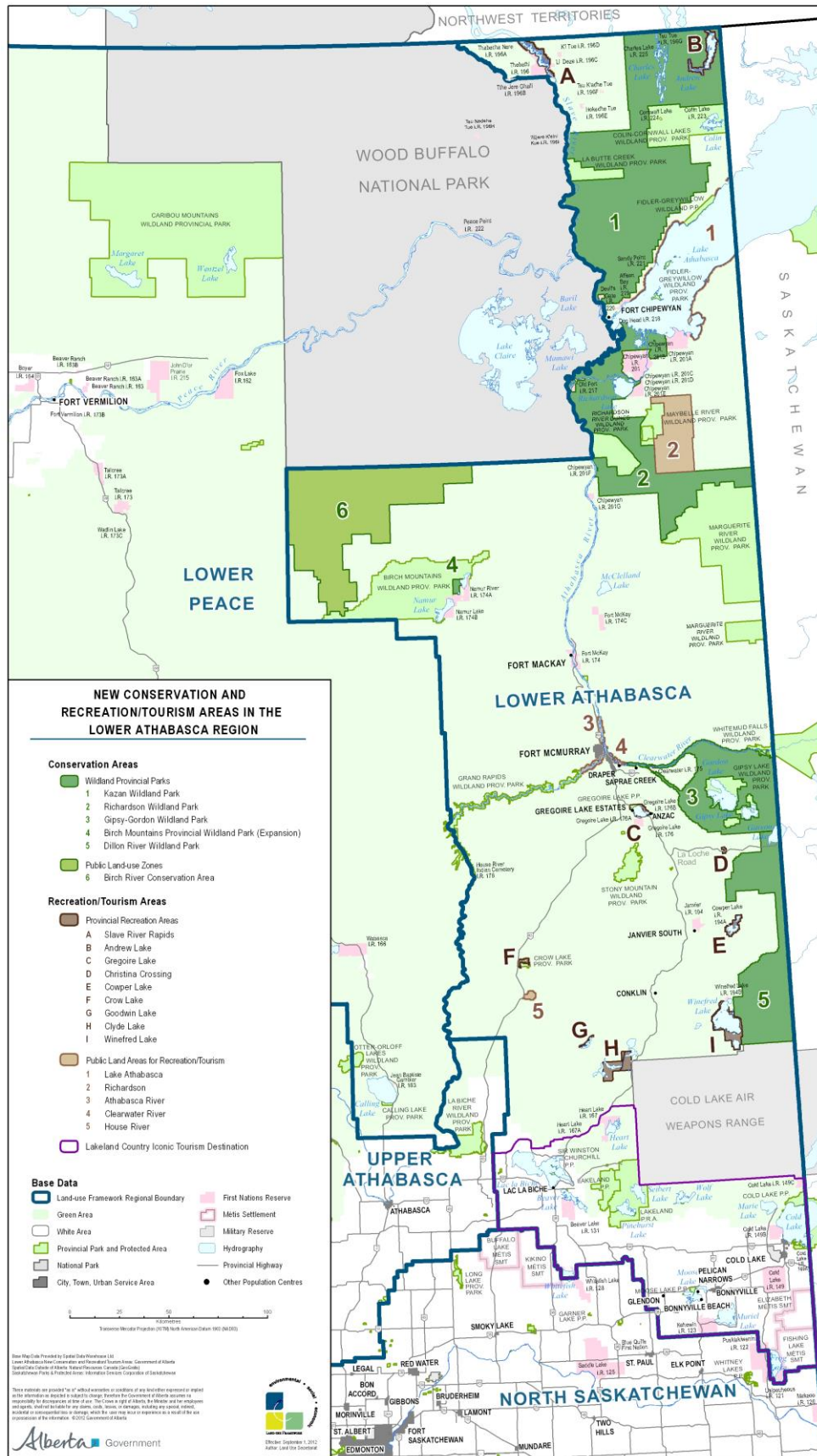


Map 2: Management Zones of Wood Buffalo National Park

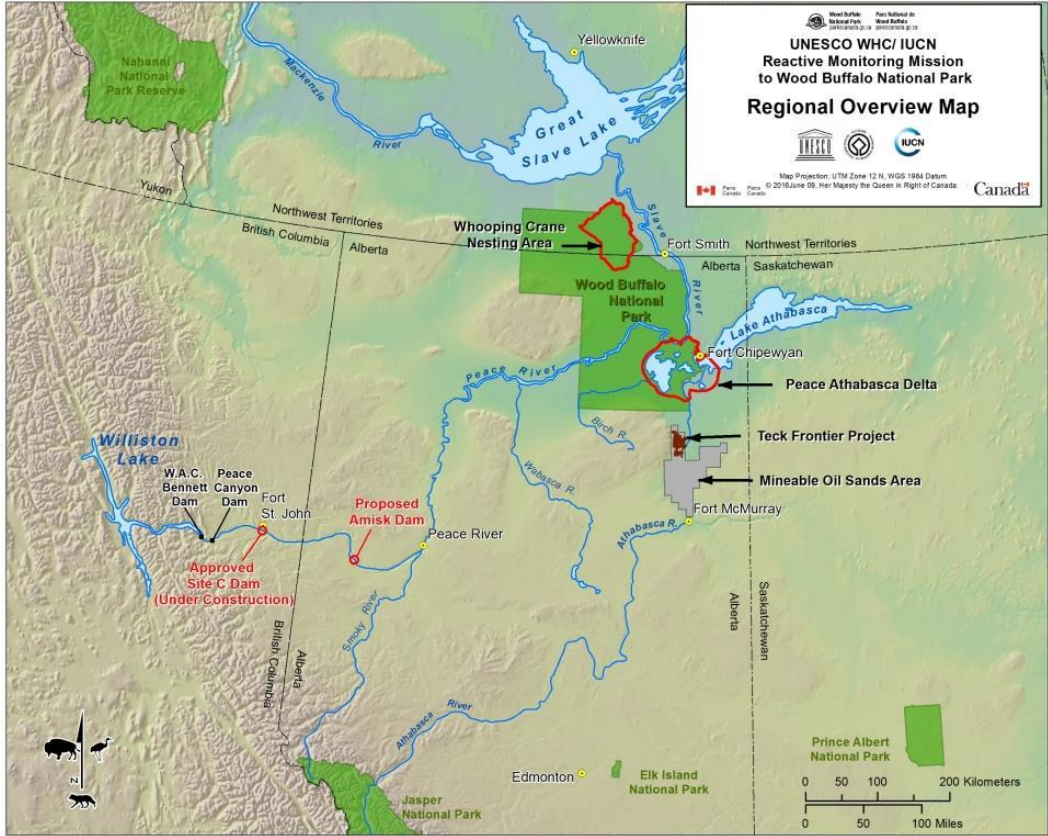
Source: Parks Canada



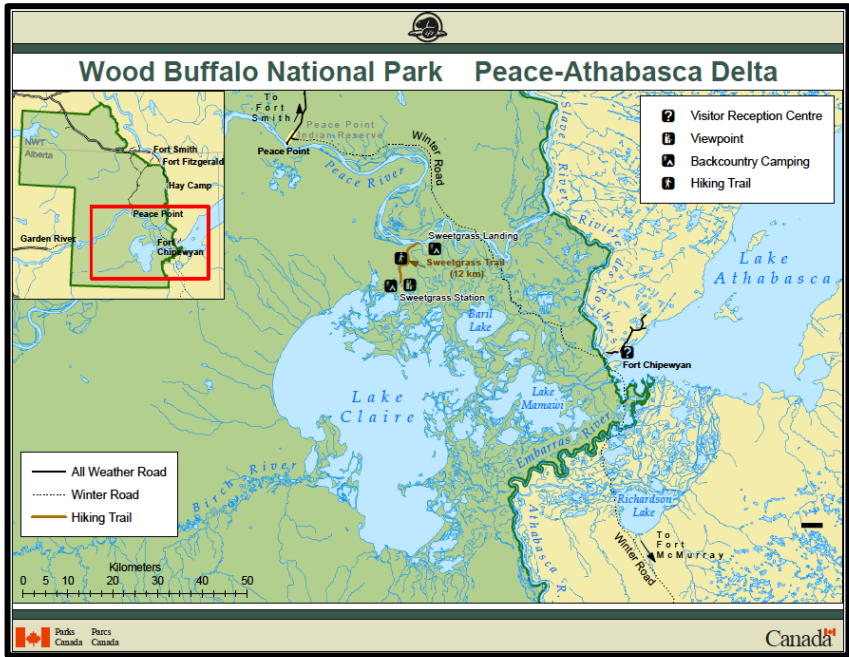
Map 3: Lower Athabasca Regional Plan (LARP)
 Source: Alberta Environment and Parks



Map 4: Regional overview displaying areas of particular concern with respect to WBNP
Source: Parks Canada



Map 5: Overview of the Peace-Athabasca Delta
Source: Parks Canada



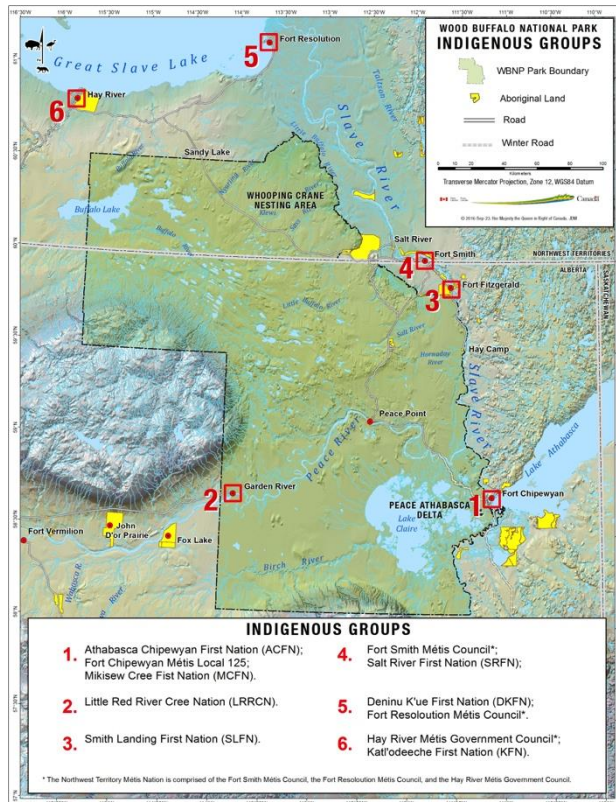
Map 6: Map displaying Area covered by Treaty Eight

Source: Library and Archives Canada

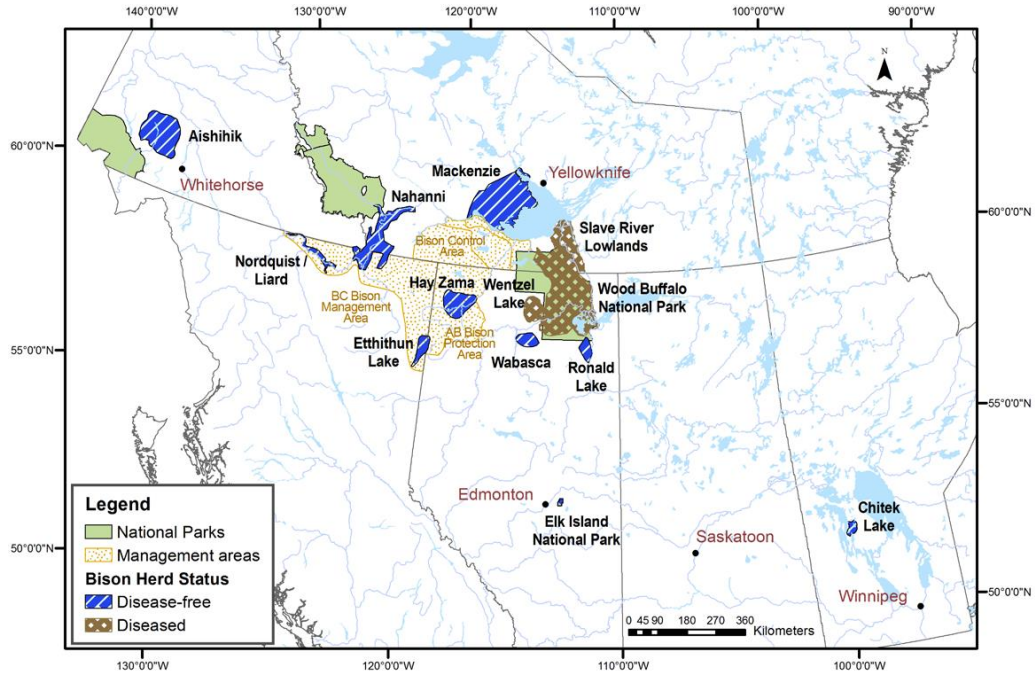


Map 7: Land and main Locations of the 11 First Nations and Métis communities in and near WBNP

Source: Parks Canada



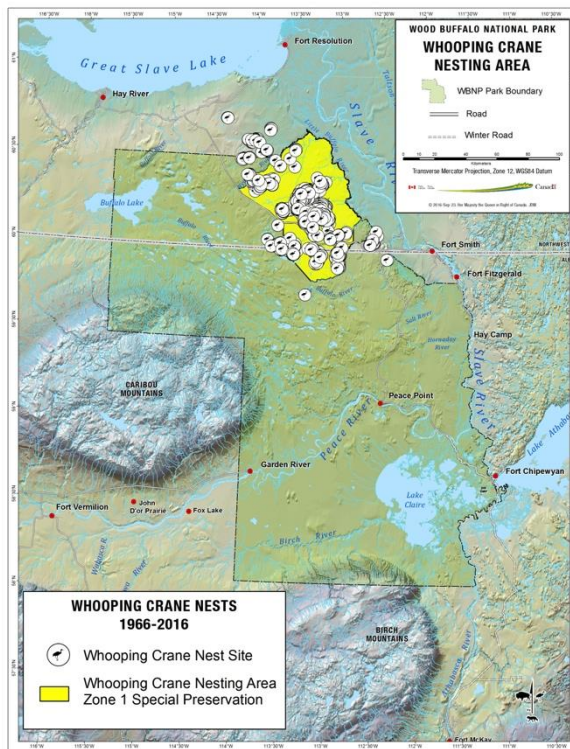
Map 8: Free-ranging Wood Bison populations in Canada



Free-ranging Wood Bison populations in Canada. Disease status (disease-free, or diseased) is indicated per the inset colour key legend to indicate the presence or absence of bovine brucellosis and tuberculosis. Wood Bison control and management areas in NT, BC, and AB are indicated by the light brown stippled areas. Bison are not protected from unregulated hunting on non-federal lands outside the AB bison protection area and removal is encouraged within the NT bison control area to reduce the risk of disease transmission from the Wood Buffalo National Park area to disease-free herds. Green areas indicate National Parks. **Source:** Environment and Climate Change Canada (2016).

Map 9: Whooping Crane Nesting Area

Source: Parks Canada



Annex 8: Quotes from Mikisew Cree Elders during meeting in Fort Chipewyan

The below quotes reflect concerns about environmental contamination from oils sands activity in the lower Athabasca River basin and observations of changes in water availability in the Peace-Athabasca Delta, as well as subsequent changes in delta ecology, attributed to the W.A.C. Bennett Dam along the Peace River.

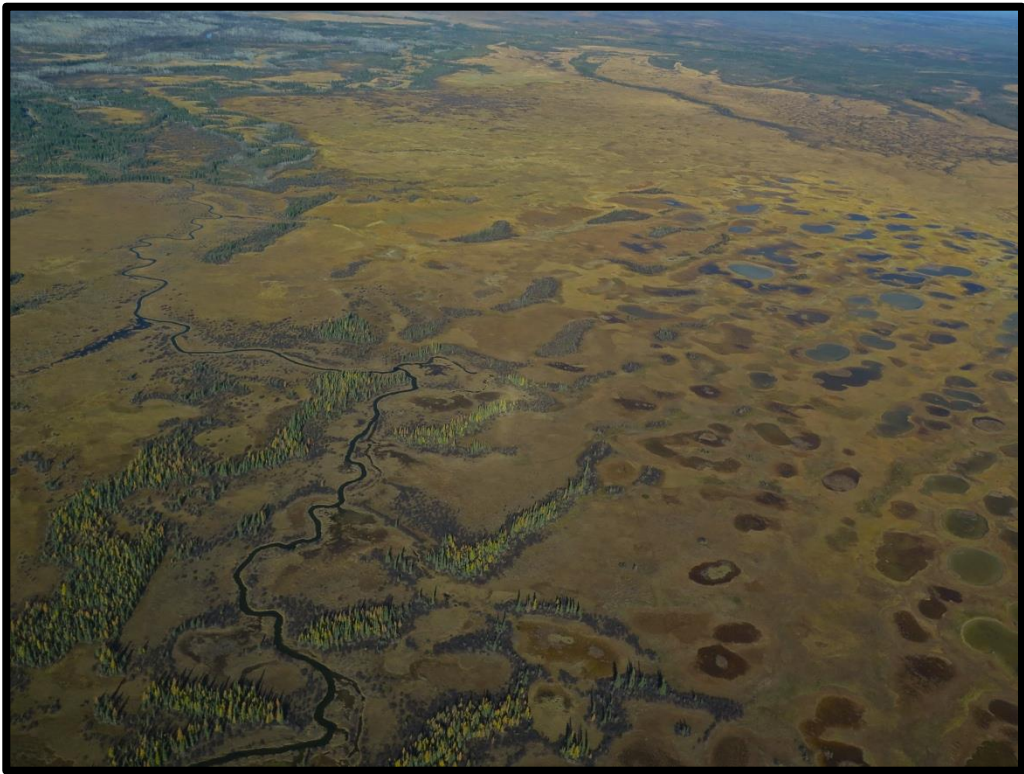
- "If the fur was plentiful, I would still be trapping today";
- "Our water is boss" (in reference to how water drives the ecology of the PAD);
- "Without water we have no life";
- "Today, we take more water than gas when we go out there" (in reference to the need for drinking water today relative to the past when they used to drink water directly from the environment);
- "The heart of our territory is the delta" (in reference to the PAD);
- "Water depth used to be two to three feet deeper";
- "We are past the point of no return"
- "there was no shortage of animals" (in reference to the PAD and living memory);
- "If we could go back 50-60 years, knowing what we know now, we would have fought industry, dams. Our land is worth more than the almighty dollar";
- "When the delta is healthy, we are happy";
- "The delta is my backyard, my front yard";
- "Getting to be a challenge to make that run in my boat" (in reference to the PAD);
- "Not enough water to flush the slough out";
- "We are afraid to drink the water"
- "Willows are invading because the water is too low"
- "There are no more migratory birds, it is too dry, and there are too many willows";
- "Birds are no longer where they used to be or they fly through (the delta) and don't even stop";
- "Bison seem lost, they used to have crossings everywhere";
- "Thistle is all over the place" (in reference to an alien invasive species);
- "I now have fish that I didn't have before; used to get whitefish, now I get trout that didn't used to go up the Peace";
- "Owls used to be abundant, now we don't hear them. There are no mice to feed them, no foxes";
- "It is becoming a safety issue" (in reference to persistent low water and boating access)
- "More willows, bulrushes infilling ponds";
- "My grandniece killed a moose where muskrats used to be and where I used to trap" (a reference to drying conditions);
- "Frog Lake is now full of mud. Can't portage around southern rim any longer, no more creeks";
- "Foxes, martens, and muskrats are gone";
- "All the healthy vegetation is gone";
- "If there is water, it is not good" (in reference to perceived water contamination);
- "All we needed was flour, sugar, tea, and salt, all the food was from the land" (in reference to what was needed to be packed out into the delta in the past. The delta provided inhabitants with water, meat, fish, vegetables);
- "There's no water, no (musk)rats";
- "We used to kill ducks in Lake Claire, now there is no water";
- "Everything was over after Bennett Dam"
- "Oily substance on rocks" (this was mentioned on the boat tour as well and linked to deposits of oil (presumably from the oil sands area) along the rocky shoreline of Ft. Chipewyan);
- "Ice jams (occurred) at bend just upstream of Peace Point, blue ice 3 to 4 feet thick breaks up when river picks up. Saw this a dozen times or more in the 50s and 60s. After BC Dam, after 2nd dam, now more brown water";
- "Now banks (along Peace River) are 8-10 feet above river, used to be spring flows overflowed banks and connected wetlands. Banks used to be 2-3 feet high";

- "Beavers build a house when river is low in October. Now Bennett releases water in November, around November 20. That water flows over the beaver lodges and they're forced out in search of warmth and food. They usually starve and freeze";
- "Today, you could almost walk across Lake Claire";
- "Nobody traps upstream of Peace Point anymore";
- "The animals that die, I don't know where they go. They must have a heaven, I don't know";
- "Peace River today is so low it won't flow into creeks feeding the delta. If this keeps up, Lake Mamawi will dry up";
- "Food was plentiful, plenty of moose";
- "Ice used to be thick in Birch River, you could hear it breaking. Now that doesn't happen";
- "Lake Mamawi used to be about 5 to 7 feet of water";
- "Hunted ducks, trapped muskrats, usually about 30 trappers, now there aren't any" (in reference to Hay River settlement within the PAD);
- "Things were good before Bennett Dam in the 60s. In 1970-71, only about 6-12 inches of water moved to French Lake (western Lake Claire) and Birch River delta. Now places are inaccessible. Now, Hilda Lakes (SW of Lake Mamawi) are now full of plants. We're not going to be able to get out there anymore";
- "Used to be lots of water, fish, ducks, big birds. Water now is too low and not good for drinking. It would be nice if we could get some water back. Need the water to get the (musk)rats, to build their houses. Things are slowly going away" in reference to Lake Claire;
- "Lots of (musk)rats, lots of water in those (pre-Bennett Dam) days";
- "If we had water like we had before, we wouldn't be here";
- "Nowadays it's hard to make a living";
- "This place used to be our grocery store";
- "We filed the petition to raise awareness of the problem".

Annex 9: Photographic Documentation



Photograph 1: Aerial image of part of the Peace-Athabasca Delta south of Fort Chipewyan. ©UNESCO/Tilman Jaeger



Photograph 2: Whooping Crane nesting habitat outside of the World Heritage Property near Fort Smith. ©UNESCO/Tilman Jaeger



Photograph 3: Elders of the Mikisew Cree First Nation during a joint field visit in the Peace-Athabasca Delta. ©UNESCO/Tilman Jaeger



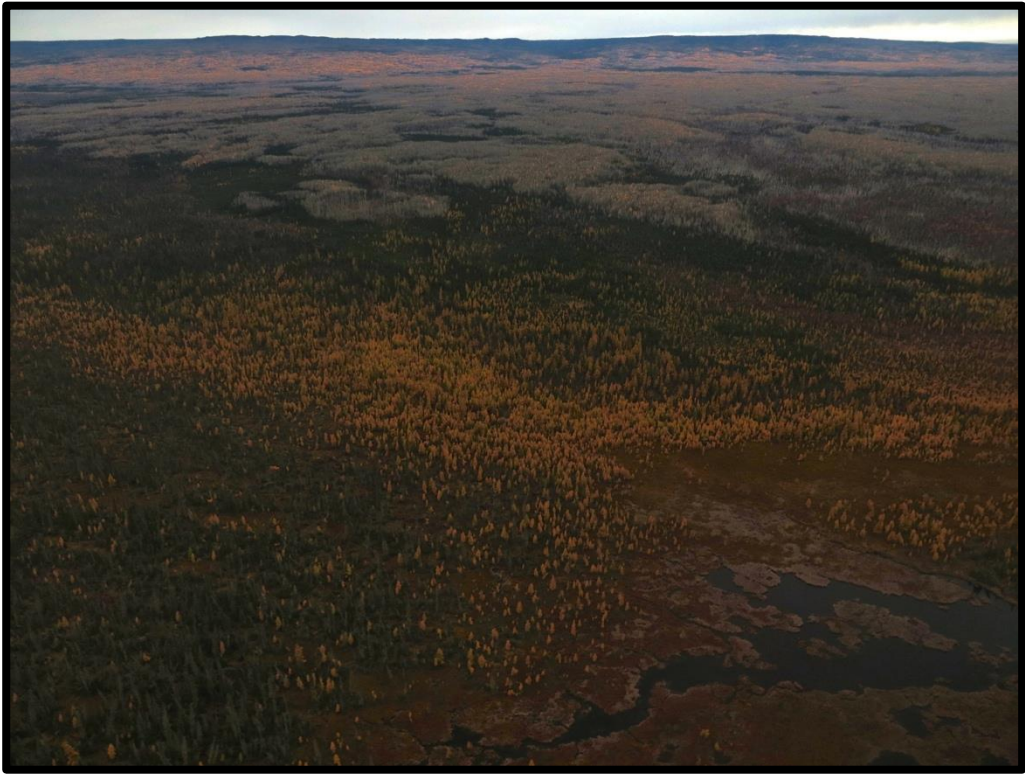
Photograph 4: The Peace River near the Peace-Athabasca Delta. ©UNESCO/Tilman Jaeger



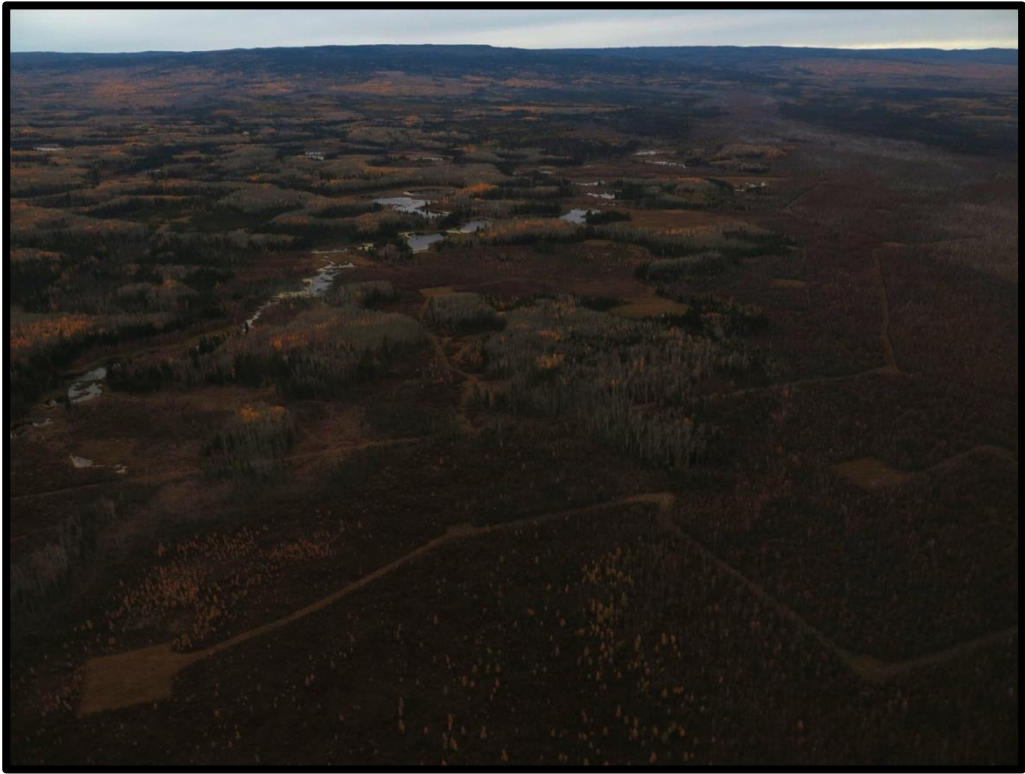
Photograph 5: Parks Canada staff and members of the Mikisew Cree First Nation during a joint field visit of Lake Athabasca near Fort Chipewyan. ©UNESCO/Tilman Jaeger



Photograph 6: Dense willow stands in former wetland areas in the Peace-Athabasca Delta. ©UNESCO/Tilman Jaeger



Photograph 7: Aerial image of a little disturbed area between Wood Buffalo National Park and the Alberta Oil Sands to the south. ©UNESCO/Tilman Jaeger



Photograph 8: Aerial image of exploration areas between Wood Buffalo National Park and the Alberta Oil Sands to the south. ©UNESCO/Tilman Jaeger



Photograph 9: Aerial image of active facilities within the Alberta Oil Sands near Fort McMurray. Note the tailings ponds in the immediate vicinity of the Athabasca River in the foreground. ©UNESCO/Tilman Jaeger



Photograph 10: The currently northernmost active development frontier of the Alberta Oil Sands. Athabasca River in the foreground. ©UNESCO/Tilman Jaeger