



**Canadian Heritage River Monitoring
Report**
North Saskatchewan River: 1999-2010
March 2011



Parks Canada Parcs Canada

Canada

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Photo Cover (from left to right): North Saskatchewan River flooded during the spring melt.

Photo: Parks Canada, A. Smith, North Saskatchewan River Bridge repairs Photo: Parks Canada,

R. Syme and North Saskatchewan River view by Glacier Lake trail. Photo: Parks Canada, S.

Humphries

1.0 Executive Summary

In 1989, the 48.5-km section of the North Saskatchewan River located within Banff National Park was designated a Canadian Heritage River for its outstanding natural, cultural and recreational values. Every ten years, Parks Canada reports to the board of the Canadian Heritage Rivers System on the condition of the river with respect to those values. This report documents major events, management actions, research, monitoring and policy developments that have taken place in and around the North Saskatchewan River over the past decade. It assesses the natural heritage, cultural heritage, recreational and integrity values of the river using criteria developed by the CHRS, and describes changes to those.

The report concludes that there have been no significant changes to the values for which the river was designated. There have been slight improvements in several areas, notably the reintroduction of fire on the landscape and interpretation of the river's human history. Longstanding concerns involving introduced fish species and barriers to fish movement will require decades to address. Appropriate tools are in place for managing recreational and other uses, and policy decisions taken in the past 10 years support the maintenance of the river's ecological and cultural integrity and the facilitation of exceptional visitor experiences.



New Panels at Saskatchewan Crossing Day Use Area – Ktunaxa, Pikani and Stoney express their connection to place. Photo: Parks Canada

2.0 Introduction



North Saskatchewan River aerial view

Photo: Parks Canada, N. Fuss

The section of the North Saskatchewan River located within Banff National Park was nominated to the Canadian Heritage Rivers System (CHRS) by Parks Canada in 1984. In 1989 it was designated a Canadian Heritage River for its outstanding natural and cultural values and recreational opportunities. The 1988 Banff National Park Management Plan was the instrument through which designation to the System was achieved. The unveiling of a commemorative plaque the following year at Saskatchewan Crossing day use area completed the formalities of including the 48.5 kilometre river section in the system.

The designated section of the North Saskatchewan River lies between the larger watersheds of the Athabasca River in Jasper National Park and the Bow River in Banff National Park. The northern boundaries of Banff National Park essentially comprise the watershed of the river and delimit the designated area. Management of the river has been the responsibility of the Lake Louise, Yoho and Kootenay Field Unit of Parks Canada over the ten year period of this report.

The Canadian Heritage River System (CHRS) is a national program that promotes river heritage conservation through the recognition of rivers deemed to be of outstanding Canadian value. A cooperative effort of federal, provincial and territorial governments,

the CHRS promotes, protects and enhances Canada's river heritage, and ensures that Canada's leading rivers are managed in a sustainable manner. Designated rivers must retain the heritage and integrity values for which they were originally nominated.

Within the national system, the North Saskatchewan River provides: representation of western mountain river environments, representation of fur trade history in western Canada, viewing and learning opportunities for travellers, and good opportunities for canoeists and kayakers.

Every ten years, the agency responsible for managing a heritage river must produce a monitoring report that evaluates the condition of the river with respect to the values for which it was nominated. The first monitoring report for the North Saskatchewan River was written in 1999, and covered the time period from 1989 to 1998. It concluded "Parks Canada can report that the North Saskatchewan River remains in good condition in spite of changes and ongoing stresses over the past decade."

This report will cover the subsequent time period, from 1999 to 2010. It has two main objectives. First, to provide a summary of: major events that have affected the river; significant river-based research, monitoring and inventories conducted by Parks Canada and other agencies or institutions; major management actions implemented by Parks Canada in the watershed; policy developments related to river management and second, to assess the natural heritage, cultural heritage, recreational and integrity values of the river against criteria developed by the CHRS and document any significant changes to these values.

3.0 Background

The North Saskatchewan River, measures 1,287 km from its headwaters in Banff National Park to Saskatchewan River Forks north east of Saskatoon. Management of the entire 48.5 km of the designated section of the North Saskatchewan River is the responsibility of Parks Canada, the federal government agency that manages Banff National Park. The river's watershed within Banff National Park is 1684 km² or 24.6% of the park's land base. The watershed includes the Howse, Mistaya, and Alexandria Rivers. The river's nomination values are impacted by elements within a roughly defined corridor that runs along the river from its source at the Saskatchewan Glacier, to the point where the river leaves the park. Management of these values on a watershed-wide level is made possible through Parks Canada's jurisdiction over the river's headwaters.

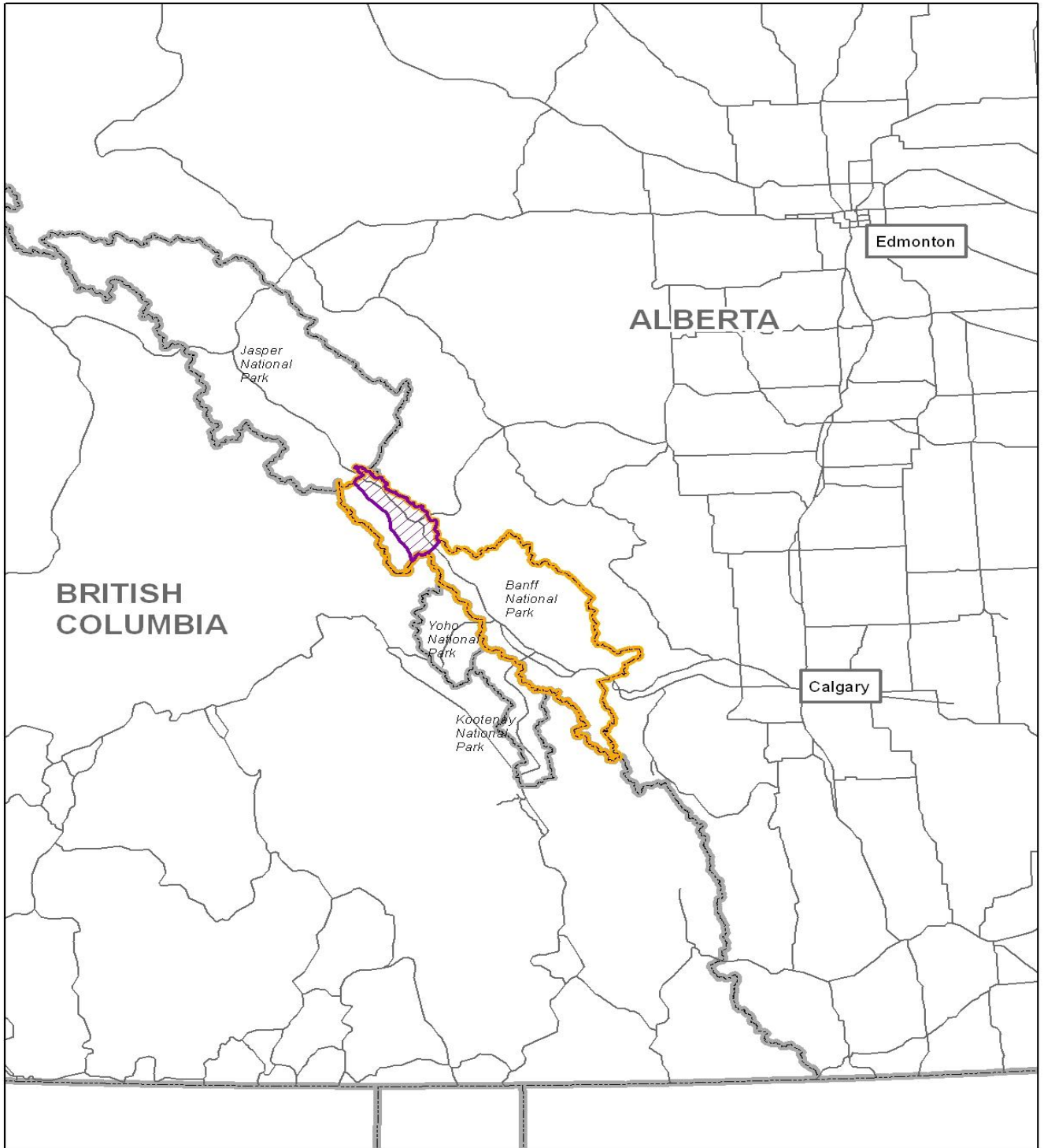


Figure 1. Location of the North Saskatchewan River

3.1 Policy Context



View from helicopter of the North Saskatchewan River

Photo: A. Smith

The North Saskatchewan Heritage River is managed under the Banff National Park Management Plan and the overarching policy and statutory framework of Parks Canada. The *Canada National Parks Act*, last amended in 2010, continues to be the primary piece of legislation governing management of the national parks. The Parks Canada Agency is the decision-making authority for the North Saskatchewan River within Banff National Park.

The North Saskatchewan River has been managed under a series of Banff National Park Management Plans since 1988. During the last 10 years the 1997 Banff National Park Management Plan along with amendments in 2004 and 2007 were in place. According to the previous Ten Year Monitoring Report of the North Saskatchewan River the 1997 plan contained over 20 initiatives directly or indirectly related to the values of the North Saskatchewan River. Key among these were to 1) Use this document as the management plan for the North Saskatchewan Heritage River and, 2) Ensure that the heritage values that led to the nomination of the North Saskatchewan River as a Canadian Heritage River

are preserved. Also, important was the creation of Landscape Management Units (LMUs) with direction linked to each unit. With respect to the North Saskatchewan River, direction was to manage the associated LMUs for low use with minimal facilities; concentrate high use within the Icefields Parkway corridor and low to moderate use on designated trails within the primitive area. The plan also directed management to continue to have available at the park scale a wide range of recreational and tourism opportunities, facilities and services that enable visitors with varying interests to enjoy the park.

The 1997 park management plan also contained a number of key actions related to aquatic health. For example the vision stated that “Aquatic programs will enhance the natural biodiversity of aquatic ecosystems, and restore natural flow regimes.” Although there was good direction with respect to the management of aquatic resources that direction wasn’t focussed particularly on the North Saskatchewan River, largely because there were more pressing concerns elsewhere.

Another important development in the early part of the decade was the declaration, in regulation, of approximately 95.6% of the park as wilderness areas. This provided Canadians with more certainty that uses and development would be consistent with the parks wilderness character.

In 2003 the park released its first State of the Park Report (SoPR). The SoPR assessed the condition of resources and program outcomes in key areas of Parks Canada’s mandate: resource protection, visitor experience, and public outreach and education. The report contributed to the identification of issues that needed to be addressed during the next park management plan review.

The 2003 SoPR contained several measures of aquatic ecosystem integrity. A second report followed in 2008; this time a set of measures common to the mountain national parks (Banff, Banff, Kootenay, Waterton, Mount Revelstoke, Glacier) was used to rate the state of the parks. Once again, the report contained several measures of ecological conditions that relate to the North Saskatchewan River.

The Western Asset Management Service Centre developed a Salt Management Plan in 2004. The Salt Management Plan strives to minimize the amount of salt entering the environment by including best salt handling practices, and using new technologies to ensure its most effective use over the road system.

Water quality in the North Saskatchewan River was rated in the national Water Quality Index as good with a stable trend. The aquatic connectivity measure provides a snapshot of how park management practices, such as culvert installation, have altered the aquatic environment. Aquatic connectivity condition is rated as poor with a stable trend in Banff

Park overall. Aging culverts, some of which no longer perform as intended, contribute to the declining trend of this measure.

The Banff National Park Management Plan (1997) was amended in 2004. It was amended again in 2007 to incorporate the Lands Adjacent to the Town of Banff planning work.

The completion in 2007 of site-specific redevelopment guidelines for outlying commercial accommodations, including one located along the North Saskatchewan River, will ensure that future development of the site happens in a way that maintains important ecological, cultural and aesthetic values and improves ecological integrity through, for example, the preparation of heritage tourism and environmental strategies.

Howse Pass National Historic Site is directly related to cultural values associated with the heritage river. In 2007, a management plan for the site was written for the first time. It provides a strong framework for improved protection and presentation of the site. Projects in 2007 through 2009 renewed the day use area at Saskatchewan Crossing and improved the interpretive offer including content on the North Saskatchewan Heritage River, Aboriginal use of the area, and history.



Saskatchewan Crossing Viewpoint overlooking the Howse Pass Valley and North Saskatchewan River

Banff's park management plan was updated in 2010. The limits to development established over the past decade were reaffirmed in the new plan, as was existing direction concerning ecological integrity and cultural resources. Plan content related to visitor experience was strengthened. The new plan also contains direction to work with others to raise the profile of the North Saskatchewan as a

Canadian Heritage River. In line with the wilderness character of the area, Parks Canada helicopter use was restricted to that required for fire operations, search and rescue and

emergencies. The Icefields Parkway Strategic Concept (2009) was annexed to the 2010 management plan. It proposes five strategies and a corresponding set of key actions to move the Icefields Parkway towards its future best.

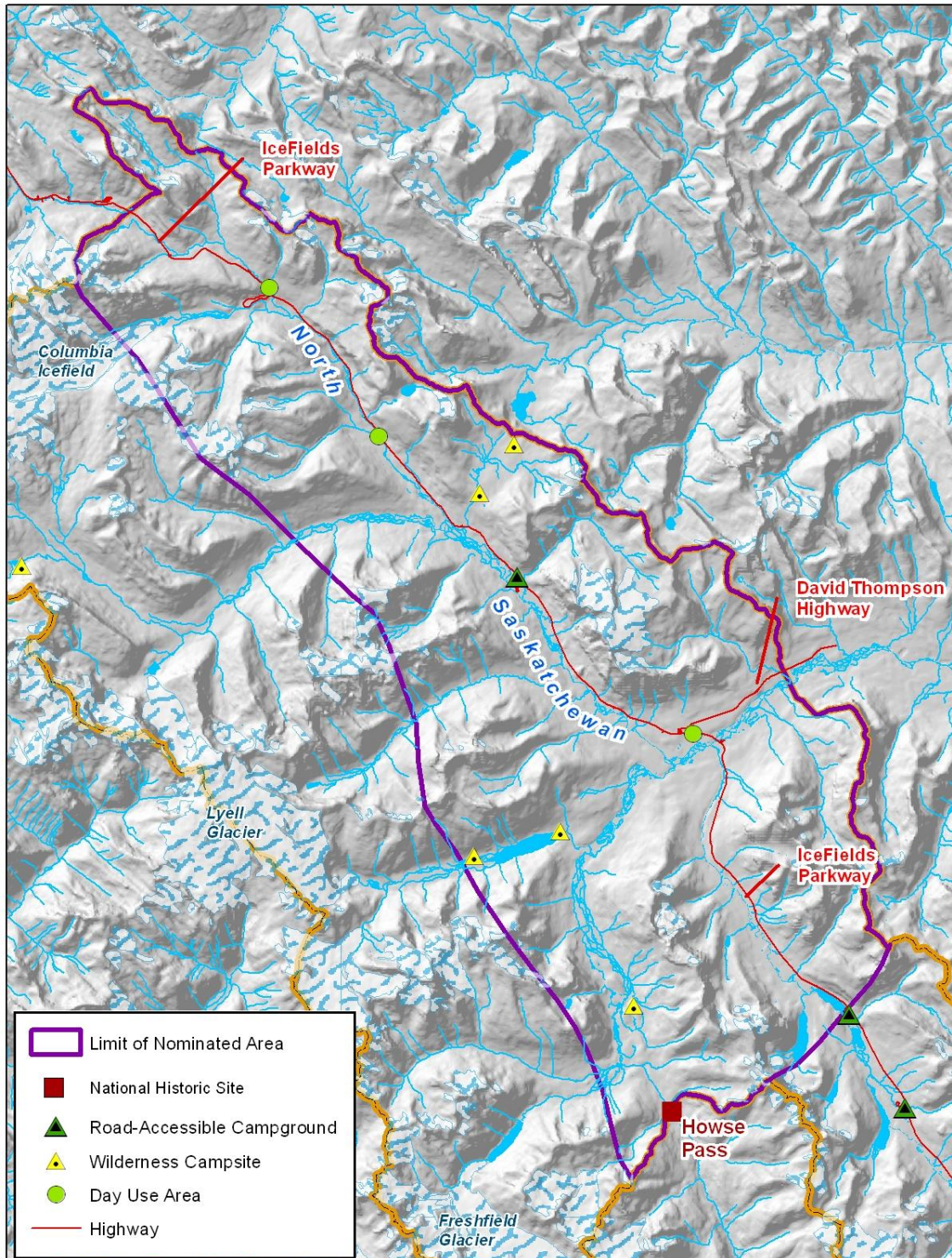


Figure 2. Nominated Area and Significant Features

3.2 Nomination Values

The North Saskatchewan River's nomination values reflect its rich natural and human history, abundant examples of the geological and ecological processes that define the Rocky Mountains, its important historic role as part of a traditional travel route used by Aboriginal people and later for a short time by European fur traders. The nomination values also include the river's outstanding scenic values, and the array of recreational opportunities the river supports.

Table 1 lists the values for which the river was nominated in 1984. New CHRS frameworks for natural, cultural and recreational values have been developed since the North Saskatchewan River was first nominated. In Sections 4 to 7, the river is assessed based on the new frameworks and values. The results of the assessment are summarized and presented in Section 8.

Table 1. Nomination Values for the North Saskatchewan River (1984)

Natural Heritage Values	
Representation of Earth History	<p>The North Saskatchewan contains several outstanding features related to the earth's evolutionary history including:</p> <ul style="list-style-type: none"> • Representative stratigraphic sequences from a 570 million year period of Rocky Mountains evolution • Outstanding examples of folding, faulting, anticlinal and transverse valleys in the Main and Front Ranges • Excellent examples of glacial activities and landforms, notably in the area of the Columbia Icefield, the largest icefield in the Rocky Mountains
Representation of Ongoing Processes	<p>The North Saskatchewan contains outstanding features that represent ongoing processes including:</p> <ul style="list-style-type: none"> • Fluvial erosion and deposition along the river • Aeolian processes including two distinct volcanic ash layers and silt and sand deposits • Ongoing glacial activities, best exemplified by the Columbia Icefield and associated glaciers including the Saskatchewan
Physiographic and Landscape Uniqueness	<p>The river contains along its course outstanding examples of natural phenomena and exceptional beauty including:</p> <ul style="list-style-type: none"> • The Rocky Mountains • The Columbia Icefield and the Saskatchewan Glacier
Historical Heritage Values	
Canadian Development	<p>The South Saskatchewan played a role in Canadian development serving:</p> <ul style="list-style-type: none"> • As an early trans-mountain aboriginal and later fur trade route (following both the North Saskatchewan and Howse River over Howse Pass)

	<ul style="list-style-type: none"> • Later as part of an expansion of the Rocky Mountains Park (later Banff), the development of wilderness recreation, resource protection and scenic roads in Canada.
Cultural Associations	<p>The North Saskatchewan River valley is strongly associated with a person of Canadian significance:</p> <ul style="list-style-type: none"> • David Thompson and his epic 1807 trip through Howse pass which contributed substantially to European mapping of the Rockies and beyond
Recreational Values	
Recreational Experience	<p>The river provides the capability for outstanding recreational opportunities:</p> <ul style="list-style-type: none"> • Opportunities for river touring, natural heritage appreciation, human heritage appreciation and shore-based activities such as hiking, camping and picnicking • Highly scenic landscapes enhance the recreational experience and facilities support recreation potential
Environmental Impact	<p>No serious environmental implications have been identified in association with a potential moderate increases in the recreational use of the river and its immediate shore lands.</p>
Integrity	
Size	<p>The segment of the North Saskatchewan River designated a Canadian Heritage River although relatively short contains the river's source, the Saskatchewan Glacier as well as the entire upper part of the river's regime. It provides a good example of a Rocky Mountain river.</p>
Viability	<p>The North Saskatchewan contains ecosystem components for species continuity. The river's integrity is protected by virtue of the location of its watershed within a national park, and is further buffered by the extensive Rocky Mountains Forest Reserve which is downstream to the east.</p>
Water Quality	<p>The water quality of the river is very turbid, especially in early summer when glacial melt is high. Most negative environmental effects are the result of glacial activity and as such, forms a part of the rivers natural heritage. Some localized contamination from highway related visitor facilities and from river tourists occurs in the lower river reaches</p>

4.0 Chronology of Events

The following section summarizes major river-related natural events, projects and actions, research and monitoring, and policy developments from 1999 to 2010.

2000

- Dr. Erin Kelly samples several lakes for mercury in biota in 2000 and 2001 (Kelly 2007)

- Most of the park (95.6%) is declared wilderness by regulation of the *Canada National Parks Act*
- Abandoned fuel tank removed from Saskatchewan Crossing Warden Station

2001

- Upper North Saskatchewan River Fish Inventory Survey (Gardner 2001)

2002

- Owen Creek Culvert Restoration
- Owen Creek – Superintendent’s order to close creek to angling to protect spawning bull trout.
- 2002-2003 Upper North Saskatchewan River and Abraham Lake Bull Trout Study (Fontana et al 2005)

2003

- First State of the Park Report for Banff National Park released

2004

- Environment Canada completes decadal water quality summary report (Glozier et al. 2004)
- Amendment to 1997 Park Management Plan
- Clean up of lead from gun range
- Contaminated soil from fuel tank at Saskatchewan Crossing Warden Station removed

2005

- Cultural Integrity Statement for Howse Pass NHS approved
- Park-wide inventory of culverts and assessment of aquatic connectivity begins with field work starting in 2006

2006

- Cultural Integrity Statement signed for Howse Pass National Historic Site

2007

- CABIN sampling-data collection to support a water quality reference model that includes benthic invertebrates as bio indicators
- David Thompson bi-centennial commences, Parks Canada and in particular the Lake Louise, Yoho and Kootenay field unit played a key role in concept development and organization
- New national historic sites management plans approved
- Amendment to 1997 Park Management Plan

2008

- Renewal made to Saskatchewan Crossing Day Use Area, trail improved, paving, toilet relocated, new interpretation of the Heritage River, Howse Pass NHS and the ecology.
- Second State of the Park Report released

2009

- Survey of *Didymo* algae
- Westslope Cutthroat Trout DNA survey – Watchman Lake
- Monitoring program on the Saskatchewan Glacier commences
- North Saskatchewan prescribed fire
- Improved interpretation of Aboriginal heritage at Saskatchewan Crossing Day Use Area

2010

- Banff National Park Management Plan tabled in Parliament

5.0 Natural Heritage Values

5.1 Background & Status

Visitors have been drawn to Banff National Park for over 125 years to view many natural wonders including glaciers, mountains, lakes, and rivers. The three natural heritage values for which the North Saskatchewan River was nominated—outstanding features which provide evidence of the earth’s evolutionary history, representation of ongoing geological processes and several unique landscapes—have changed little since designation. The ecological processes that have shaped the landscape for millennia still function largely as they did.

The river is home to nine species of fish (see Table 2) one of which has been designated species-at-risk provincially. It is likely that four species of amphibian can be found in wetlands associated with the river. The Western Boreal Toad (*Anaxyrus boreas*) is a species of special concern. Less is known about aquatic invertebrates, an important community used to monitor water quality.

Several bird species are closely associated with the river. Harlequin ducks, a species of Special Concern provincially occur on the river at certain key times. They are present in low numbers.

The river also provides habitat for many land-based wildlife species. River users may catch a glimpse of a grizzly bear, a species that symbolizes wilderness for many Canadians and the driver for many management decisions in the mountain national parks. Or they may discover the tracks of a wolf. Banff National Park has a complete complement of carnivores, a trait that is becoming rarer in many parts of western North America. Since the State of the Park Report, described in Section 3, provides a comprehensive overview of the status of many terrestrial species, this report focuses on aquatic resources.

The river runs through the three ecoregions of the park: the montane, subalpine, and alpine. Rare whitebark/limber pine communities are present at high elevations within the designated area. Vegetative features of interest include: representations of dry montane forest communities; good alpine-tundra plant associations; and plant colonization and attempts at colonization on shifting sand and gravel bars, on flood plains, on river terraces and in fire succession forests dominated by lodge pole pine.

The North Saskatchewan River is assessed against the 2001 CHRS natural heritage values framework. Table 3 outlines the themes and sub-themes that comprise the values, changes or threats to those values that have emerged since designation, and significant actions, research or studies related to each theme.

Table 2. Fishes of the North Saskatchewan River in Banff National Park

Rocky Mountain Whitefish	native
Bull trout	native
Westslope Cutthroat trout	introduced
Yellowstone Cutthroat trout	Introduced
Eastern Brook Trout	Introduced
Rainbow Trout	Introduced
Lake Trout	introduced
Long Nose Sucker	native
Long Nose Dace	native

Table 3. Natural Heritage Values since Designation

CHRS Natural Framework (2001) Themes & Sub-Themes	Natural Heritage Elements Description	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
1. HYDROLOGY			
1.1 Drainage Basins	Hudson Bay Basin Rises in continental divide Major feeder of the Nelson River system		Retreat of Saskatchewan and other glaciers threatens long term flows and water content. Climate change may exacerbate retreat
1.2 Seasonal Variation	Minor double peak Glacial melt water provides late summer flow.		No change

1.3 Water Content	<p>Heavy sedimentation, high diss. solids</p> <p>Sediment originates in Saskatchewan and other glaciers which feed all southern tributaries</p>		No change
1.4 River Size	<p>Large river, stream order ranges from 1st order directly off of glacier to 5th order ast Saskatchewan River Crossing - Strahler order based on 1:50,000. About 140cfs. at Sask. R. Crossing in July.</p>		No change
2. PHYSIOGRAPHY			
2.1 Physiographic Regions	Cordilleran Eastern Ranges		No change
2.2 Geological Processes	<p>Folding and Faulting</p> <p>Numerous examples in Main Ranges</p> <p>Volcanism</p> <p>Volcanic ash layer visible near junction of Howse River</p> <p>Glacial Scouring</p> <p>Saskatchewan Glacier -largest valley glacier in Canada, and</p>		No change

Glacial Retreat	Freshfield Glacier Saskatchewan Glacier has retreated up to 77 metres in a single year since 1912. Other glaciers also retreating		
Glacial Melting	Neoglacial landscapes and moraines in Freshfield Ck and Alexandra River valleys		
2.3 Hydrogeology	Soluble limestone. Castleguard Caves - longest cave system in Canada and second deepest		No change
2.4 Topography	Alpine gradient: 28.65 m per km		No change
3. RIVER MORPHOLOGY			
3.1 Valley Types	U-shaped with peaked interfluves and narrow floodplain		No change
3.2 Channel Types			
Lakes and Ponds	Confined channel; broad in places but contains no		No change

<p>Waterfalls and Rapids</p> <p>Riffles</p> <p>Boulder Rapids</p> <p>Waterfalls</p>	<p>significant lakes</p> <p>Numerous examples over length of designated section below Alexandra River confluence</p> <p>Glacier Rapids</p> <p>Cirrus Mt., Glacier Falls, Bridal veil, Panther Falls visible from Icefields Parkway near Nigel Creek</p>		
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Divided falls	Weeping Wall		
3.3 Channel Profile	Confined channel; broad and braided in places (see 3.2)		No Change
3.4 Fluvial Landforms			
Springs	Several large karst system springs near Castleguard River incl. Big Spring which yields 500 litres p.s.		
Braided channels	Excellent examples of anastomosed and unstable channels at confluence of Alexandra River (Graveyard Flats). Also Howse River, where loess deposits are also found.		No change Periodic building of berms beside Icefield Parkway for example near Sunset Pass trailhead (2005) alters natural flow. Such work is informed by an Environmental Assessment.
River Terraces	Examples located between Saskatchewan Crossing and park boundary		
Caves and Sinkholes	Castleguard Cave is the longest in		No change

	<p>Canada (16.2 km) and second deepest at 350 metres. Caves contain the finest stalagmites and stalactites in Canada, and rare features including gypsum, hydromagnesite, and other minerals, very rare cubic pisolites, and speleotherms.</p> <p>Sinkholes connect various levels of the caves (caves are just outside of designated area)</p>		<p>Very fragile site - susceptible to deterioration with minimal amounts of visitation</p> <p>Only recognized groups permitted with approval of superintendent</p>
Potholes	Sides of Mistaya Canyon		No change
Gorges	N. Sask. River below Saskatchewan Glacier, Owen Creek, and Mistaya River Canyon all exemplify bedrock canyons		No change
4. BIOTIC ENVIRONMENTS			
4.1 Aquatic Ecosystems	Headwaters zone. Exceptionally cold		No change

	<p>and cloudy water not conducive to aquatic life.</p> <p>Regionally important bull trout spawning on several tributaries</p>	<p>Repaired culvert blocking passage to spawning site</p> <p>Reduced angling season to protect bull trout spawning</p>	
<p>4.2 Terrestrial Ecosystems</p> <p>Montane Cordillera</p>	<p>Montane is the most significant as river valley contains largest example in Banff NP, of which only 5% is montane. Alpine and sub-alpine systems also represented.</p>	<p>2009 prescribed fire</p>	<p>Slight improvement in that prescribed fire has been recently introduced to the area.</p> <p>Mountain pine beetle outbreak causing mortality of lodgepole pine and whitebark pine.</p>
5. VEGETATION			
<p>5.1 Significant Plant Communities</p> <p>Areal Extent of Community</p> <p>Dynamic nature of community</p>	<p>Castleguard Meadows: Alpine karst from Jasper boundary to Parker Ridge and Castleguard River.</p> <p>Lodgepole pines re-vegetating burned areas</p> <p>Plant succession in</p>		<p>Designated as part of the Castleguard Caves Special Preservation Area</p>

	neoglacial landscapes of Freshfield Ck and N. Sask. Glacier		
5.2 Rare Plant Species Whitebark/Limber Pine Communities	Within BNP these communities are more prevalent at upper elevations well away from the river. Just outside of the park at Whirlpool Point there are several ridges where these communities can be found at lower elevations into the Montane.		No change
6. FAUNA			
6.1 Significant Animal Populations Birds	Black and grizzly bear, elk goats (winter range), bighorn sheep, and wolves American bittern, Cooper's Hawk and Common Nighthawk associated with river valley bird community. Concentrations of rare birds in Graveyards Flats	Wildlife Watch program aimed at recruiting public to curtail poaching Active education programs to reduce habituation of bears and to encourage driving at safe speeds and with wildlife in mind	Poaching and vehicular collisions. Habitat disturbance by roads and visitor use.

Amphibians	<p>and Sask. R. Crossing areas. Peregrine falcon at Parkers Ridge</p> <p>Spotted Frog population near river between Rampart Creek and Norman Creek.</p>		
6.2 Rare Animal Species Vulnerable grizzly bear.	Species abundant n river valley in 19th century.	<p>Wildlife Watch program aimed at recruiting public to curtail poaching</p> <p>Active education programs to reduce habituation of bears and to encourage driving at safe speeds and with wildlife in mind</p>	<p>Poaching of trophy species includes grizzlies</p> <p>Poor wildlife viewing practices can habituate bears</p> <p>Bear deaths while crossing the highway.</p>
Invertebrates	Rare isopod (Sakmasellus steganothrix) and unique amphipod (Stygobromus canadensis) in Castleguard Cave which appears to have survived in cave during Pleistocene glaciation		Only recognized groups permitted access to cave with approval of superintendent

5.2 Condition of Natural Heritage Values since Designation



Aerial shot of the North Saskatchewan River Photo: Parks Canada, A. Smith

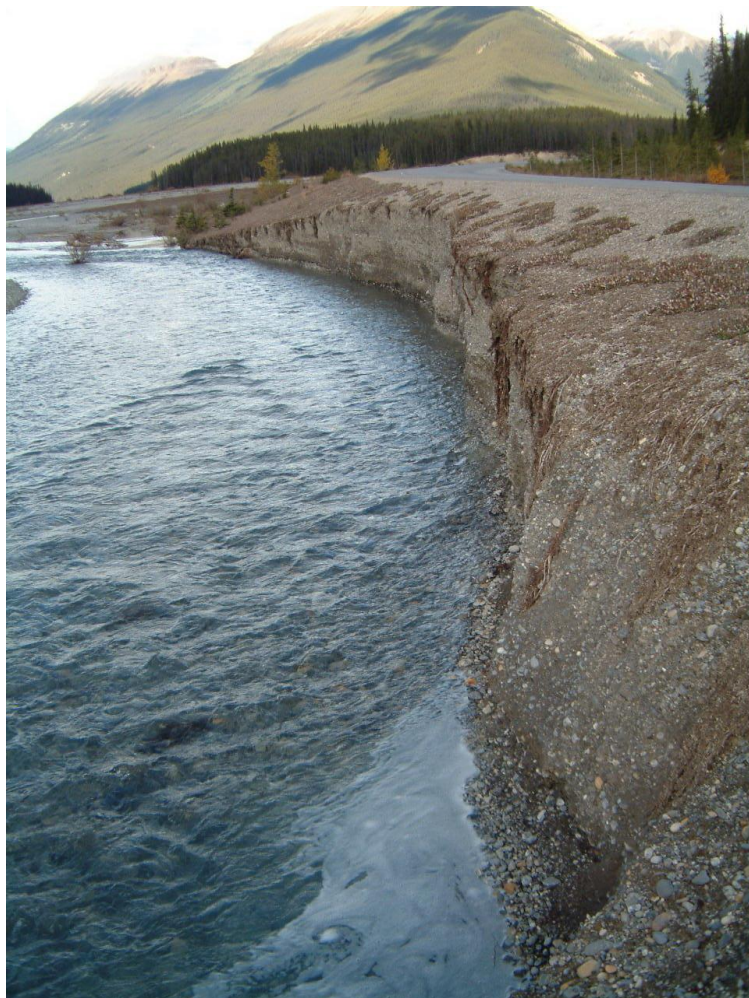
Overall there has been little change with respect to the natural heritage values since designation. Some issues such as wildlife mortality related to connectivity and habituation are ongoing although Parks Canada continues to take mitigating actions and use educational programs to influence these issues. Significant world leading progress on reducing highway wildlife mortality has been addressed through fencing and creation of wildlife crossing structures

elsewhere in Banff National Park leading to an improved situation at the park scale. The large outbreak of mountain pine beetle in western North America has begun to affect pine stands in the watershed. There has been an improvement to the terrestrial ecosystem processes through the reintroduction of fire within the park and in particular within the designated area for the heritage river with the 2009 Upper North Saskatchewan prescribed fire. There has been a minor improvement to aquatics through improvements to the Owen Creek culvert. The river remains protected by virtue of its location within a national park. Portions of the river are adjacent to the Icefields parkway and therefore sometimes managed, especially to control flood damage to the road and verge.

Longer term, Parks Canada will continue to monitor climate and ecosystem variables that may lead to a better understanding of potential environmental effects related to global climate change.

Hydrology and Physiography

The river is a dynamic environment, its fundamental physical characteristics, such as river morphology, erosion and depositional dynamics and hydrological processes have



Erosion of the North Saskatchewan River Photo: Parks Canada, T. Damm

changed little since designation. One aspect of interest concerning the river's hydrological cycle is the impact of climate change.

The 2008 State of the Park report for Banff indicated that the international consensus that the global climate is warming is reflected in the park weather data. Precipitation at Banff and Lake Louise weather stations for example is declining for all seasons and data also indicates that winter snow depth is in decline.

Glaciers

Until recently there has been no site monitoring of the position of the toe of the Saskatchewan Glacier, but it is known to have been in retreat for the past 150 years. Other glaciers feeding the river have also retreated. In 2008,

a monitoring program was established on the North Saskatchewan Glacier. The following is from the 2008 State of the Park Report pages 20-21

“Glaciers are internationally recognized as key indicators of climate and environmental change taking place on a larger regional and global level. This measure examines changes to volume and area of Peyto Glacier in Banff National Park. Descending from the Wapta Icefield, Peyto Glacier (51.67 N, 116.53 W) covers an area of 12 km² and is visible from the Icefields Parkway. It contributes flow to the Mistaya River and the North Saskatchewan River. It is one of the most researched glaciers in North America: studies date back to 1933, and are currently

being conducted by national and international organizations, including UNESCO's International Hydrological Programme. Peyto Glacier is assessed in terms of mass balance (the volume a glacier loses or gains each year) and glacial extent (area). Mass balance is a good assessment tool, in that it can provide a direct signal of climate change as glaciers respond by losing or gaining volume. Mass balance studies have been conducted on the Peyto Glacier since 1965, making it the site of the longest series of complete mass balance studies of its kind in western Canada.

Peyto Glacier has been in recession (net loss of mass) since 1976 (Marshall 2003). It is estimated that Peyto Glacier has lost 70% of its volume since it was first observed in 1896 (Demuth 2006). Satellite imagery indicates that the areal extent of the Peyto Glacier (within a demarcated area) has receded from 231 ha in 1975 to 135 ha in 2005.”

Peyto Glacier has experienced an accelerated decrease of volume and area since the mid-1970s.

Parks Canada will continue to monitor climate and ecosystem variables that may lead to a better understanding of potential environmental effects related to global climate change.

Major Ecological Events



Upper North Saskatchewan Prescribed Burn 2009
Photo: Parks Canada, T. Damm

There were no major wildfires in the North Saskatchewan Valley in the last ten years. Since Rocky Mountain ecosystems are fire-adapted, Parks Canada has been actively reintroducing fire into the park to ensure that vegetation patterns, and consequently wildlife abundance and distribution, fall within the range of natural variability. In 2009 the Upper North

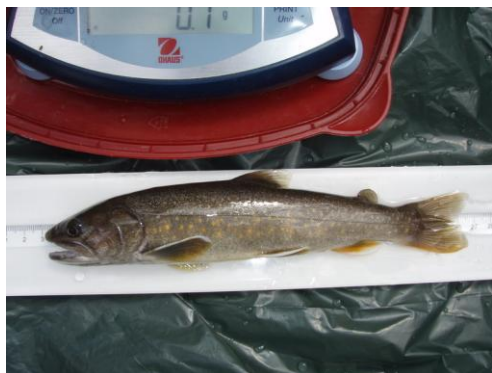
Saskatchewan prescribed burn helped to achieve management objectives for

the restoration of fire to the landscape.

Fish Populations

Several lakes in the North Saskatchewan drainage had biota sampled for mercury and other contaminants in 2000 and 2001. Fish in Glacier Lake and Outram Lake in particular have elevated levels. There is now a precautionary consumption advisory in place.

Widespread sampling of fish populations have not occurred. The 2001-2003 studies on bull trout indicate that large fluvial populations are still present and spawn in the park. However widespread historic stocking of introduced species such as brook trout and lake trout into the lakes throughout this watershed are believed to be putting native fish at risk and has likely reduced the extent of the habitat once historically occupied. Peyto, Mistaya, Waterfowl(s), Cirque, Cephren, Warden, Glacier, Outram, David, Honeymoon, Watchman lakes, and Alexandra pond all contain self sustaining populations of introduced species.



Bull Trout Photo: Parks Canada,
S. Humphries

Invasive Species

In the last 10 years, the presence of an aggressive species of freshwater algae in water bodies in many parts of Alberta has generated concern. A survey of park water bodies shed some light on the prevalence of didymo (*Didymosphenia geminata*), a species of algae that can form large mats on the bottom of lakes, rivers and streams. The mats reduce habitat for fish, invertebrates and plants, can threaten fish populations and diminish the aesthetic appeal of streams. Sixteen sites were surveyed in Banff

National Park by Parks Canada staff and a University of Calgary researcher. Didymo was present at most sites surveyed. Efforts to educate river users to avoid transporting didymo from one location to another are underway.

A non-native vegetation inventory by Parks Canada personnel is ongoing. At present the area remains relatively free of species of concern.

In conclusion, scientific knowledge of aquatic ecosystems has increased over the past ten years, but many gaps remain. Progress has been made in some areas, such as the reintroduction of fire to park landscapes. However large challenges remain in addressing longstanding issues such as the many culverts that create barriers to fish movement and

the existence of non-native fish species. These will take decades to address as new construction allows for culvert replacement and as research and methods are developed.

6.0 Cultural Heritage Values

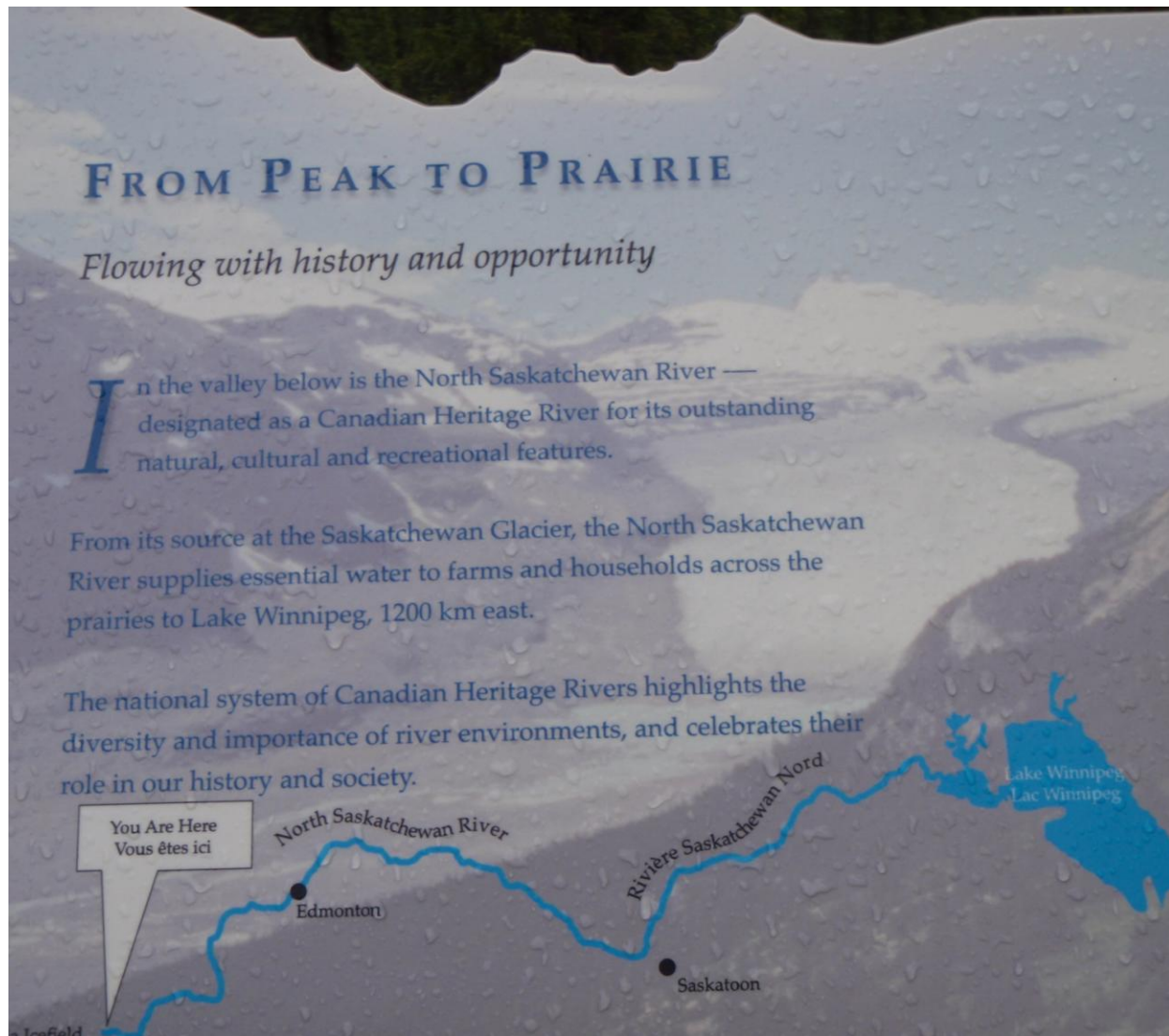
6.1 Background & Status



The 2008 David Thompson Brigade Launch near Rocky Mountain House
Photo: Parks Canada, R. Macdonald

The North Saskatchewan River has a rich human history, with strong ties to Howse Pass National Historic Site. The archaeological and historical record indicates use of the area by Aboriginal people. In particular, Howse Pass and the North Saskatchewan River is known to be part of a trans mountain route taken by the Ktunaxa to travel from the west side of the Rockies to the prairies to hunt for bison. New interpretive panels at Saskatchewan Crossing day use area, the site of the CHRS plaque explain the connection of place to the Pikani, Stoney and Ktunaxa. The Howse Pass area was used as the

trans-mountain fur trading route for a short period by David Thompson and others including Joseph Howse between 1807 and 1810. An 1810 blockade by Pikani caused Thompson to move north and establish trade using Athabasca Pass. Few tourists ventured north of Lake Louise to the area until in 1940 the Icefields Parkway allowed for a great growth in visitation. Today 1.6 million visitors utilize this route, known as one of the most scenic roads in the world.



New Panel at Saskatchewan Crossing educates visitors about the river and the Canadian Heritage River System Photo: Parks Canada

Table 4. Cultural Heritage Values since Designation

CHRS Cultural Framework (2000)	Cultural Heritage Value(s)	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
1. RESOURCE HARVESTING			
1.1 Fishing	The only strong evidence of fishing is a large double-notched flat pebble, which has been interpreted as a net sinker, found in the 1969 survey		None
1.2 Shoreline Resource Harvesting	Aboriginal people used Sunset Pass and Howse Pass as well as Saskatchewan River valley Main fur trade route for period 1807-11. Simpson Cabin at Sask. Crossing	Regular archaeological site monitoring. More intensive surveys in 1996 (Howse River and N Sask), and 2007 (as part of the Environmental Assessment for the fed/prov cross boundary prescribed burn). Dendrochronological dating of several historic cabins, in 1999	None
1.3 Extraction of Water	N/A		
2. WATER TRANSPORT			
2.1 Commercial	None		None

Transportation			
2.2 Transportation Services	None		None
2.3 Exploration & Surveying	<p>David Thompson (1807); Howse (1810); Palliser (1857); Wilcox (1896); Collie (1898)</p> <p>A.O. Wheeler survey of Alberta-B.C. border (1919)</p>	<p>Howse Pass National Historic Site archaeological monitoring 2010 2006, and 1996</p> <p>Some early wooden survey stakes and cairns recorded as archaeological sites 1996, 1997, 2007</p> <p>Lead role in organizing 2007-11 David Thompson bi centennials</p>	None
3. RIPARIAN SETTLEMENT			
3.1 Siting of Dwellings			
Shoreline seasonal settlements	<p>Aboriginal campsites and lithic workshops at Sunset Pass and base camp at Sask. Crossing. Smaller campsites all along north shore of N Saskatchewan, and on prominent aeolian landforms beside Howse.</p>	<p>Archaeological survey work c. 1994</p>	<p>Natural erosion of some sites by water and wind</p>
3.2 River-based	Not applicable		

Communities			
3.3 River-influenced Transportation	Icefields Parkway (1940), formerly Banff-Jasper Highway links Lake Louise and Jasper. David Thompson highway follows the river to Saskatchewan Crossing area.	Archaeological survey of historic Depression work camps along parkway, 2001.	No change
4. CULTURE & RECREATION			
4.1 Spiritual Associations	Burial Grounds Native log tombs near Owen Ck. dating from early 19th century.		No change
4.2 Cultural Expression	Not described at time of nomination		
4.3 Early Recreation	Early backcountry tourism and opening of the Icefields Parkway in 1940		No change
5. JURISDICTIONAL USES			
5.1 Conflict & Military Associations	N/A		
5.2 Boundaries	N/A		

<p>5.3 Environmental Regulation</p> <p>Early protected areas</p>	<p>Establishment of Banff NP in 1885.</p> <p>See a History of Canada's National Parks Vol. I (1976) by W.F. Lothian for a comprehensive overview of the establishment of national parks, including Banff)</p> <p>Howse Pass NHS designated a national historic site in 1978</p> <p>Warden Glacier Cabin on Owen Creek built c.1910.</p>	<p>Cultural Integrity Statement for Howse Pass NHS completed in 2005</p>	<p>No change</p>
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6.2 Condition of Cultural Heritage Values Since Designation

There has been little change since designation in the condition of the cultural resources that contribute to the cultural heritage values of the North Saskatchewan River. Recent work has involved monitoring of archaeological sites in the Howse Pass area as well as cooperation with Aboriginal people related to management of a burial site in the area.

There is an ongoing problem of water and wind erosion of some riverside aboriginal campsites, particularly those in the Howse River area which are situated on soft loess. As well, remains of a log tomb previously reported in the Owen Creek area just outside of the park were not found in surveys and may have been lost to vandals and natural deterioration.



Skier on Howse River, a tributary of the North Saskatchewan - Photo: Parks Canada, A. Smith

7.0 Recreational Values

7.1 Background & Status

While canoeists and kayakers enjoy an outstanding experience, the vast majority of people enjoy the river while pleasure driving on the Icefields Parkway one of the world's premier driving experiences. The Parkway parallels the river for most of its designated length.

In addition, people experience the river through a variety of activities such as hiking, ski touring, ice climbing, viewing wildlife and camping. There is a renewed opportunity to learn about the river at the Saskatchewan Crossing day use area. There are also new panels at Mistaya Canyon and Glacier Lake trailheads interpreting Howse Pass NHS. In addition, information on the North Saskatchewan as a Canadian Heritage River continues to be featured in the displays at the Icefields Centre.



Canoeist on North Saskatchewan River - Photo: Parks Canada, T.Damm

Prior to and post visit people can learn about the river, its associated resources and the park by visiting the web site for Banff National Park, Howse Pass NHS, or the CHRS. They can also mail in a request for information or phone the information centre directly.

In summary, the river experience is supported by infrastructure and staff to make visits enjoyable, safe and interesting.

Table 5. Recreation Values since Designation

Recreational Capability Themes and Sub-themes	Description of Current Situation	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
1. BOATING			
1.1 Whitewater Canoe, Kayak & Raft	35 km of river suitable for canoeing. Relatively few canoeists (200 p.a.) due to remoteness from main park attractions and nearby alternative rivers		No change
1.2 Extended Canoe Tripping (motor & non-motor)	Not applicable within designated area as the river is short		No change
1.3 Day Paddling & Rowing	See 1.1		No change
1.4 High Speed Boating	Not permitted		
1.5 Motorized Pleasure Cruising/Houseboats	Not permitted		
1.6 Commercial Tour Boats	Not applicable		
2. ANGLING			
2.1 Day Angling	Open season July 1 to October 31. Except	Limits on native species such as bull trout have	No change

	Owen Creek May 15- August 15 - As with most mountain rivers, fishing is not good due to the water's turbidity. Game fish do include lake trout, mountain whitefish, bull trout and several varieties of suckers, but catches are modest at best	been reduced to zero This limit is shared by the province of Alberta for bull trout	
2.2 Weekend Angling	As above		
2.3 Extended Angling Vacation	As above		
2.4 Fly Fishing	As above		
2.5 Ice Fishing	No open season		No change
2.6 Specific Fish Species	As in 2.1		
3. WATER CONTACT/CONTENT			
3.1 Swimming	Not suitable		No change
3.2 Water Skiing	Not applicable		

3.3 Snorkel/Scuba	Not applicable		
4. WATER-ASSOCIATED ACTIVITIES			
4.1 Trail Use (hiking, walking, cycling)	<p>Several spectacular trails leading from river and parkway. Parker Ridge Trail to Saskatchewan Glacier is best known.</p> <p>Bicycling for pleasure</p> <p>230 km Icefields Parkway</p> <p>7 viewpoints, 5 trailheads, one campground, and 2 hostels (Rampart Creek and Hilda Creek) along designated section</p> <p>Approx. 50 cyclists per day travel parkway</p>		No change
4.2 Camping	Two campgrounds at time of nomination - Cirrus Mt. and Rampart Creek campground beside river. Latter contains		No change

	50 sites. No primitive camping allowed along river. Cirrus Mountain campground closed in 1994.		
4.3 Hunting	Not permitted		
5. WINTER ACTIVITIES			
5.1 Snowmobiling/Dog Sledding	Not permitted/Not applicable		No change
5.2 Cross-country Skiing	Permitted		No change
5.3 Ski Touring	Permitted	Changes made to information concerning safety and avalanche bulletins	Improvement
5.4 Skating	Not applicable		
5.5 Ice Climbing	Of greatly increasing	Vault toilet installed at	Improvement

	importance as an international destination. Approx. 1,000 climbers per annum now visit frozen waterfalls of N. Sask. River valley.	Weeping Wall day use area	
6. NATURAL HERITAGE APPRECIATION			
6.1 Wildlife		Information programs highlight safe and appropriate viewing.	No change
6.2 Vegetation			No change 2009 North Saskatchewan prescribed burn provides opportunity to witness and learn about fire and forest regeneration over time
6.3 Vistas/Scenic Quality	Parkway is one of the premier pleasure drives in the world.		No change
6.4 Geological Features/Water Features	Castleguard caves are second longest	Fragile landforms in caves. Safety of	Only recognized

Caving	system in Canada	speleologists difficult to ensure	groups approved by Superintendent are permitted
7. HUMAN HERITAGE APPRECIATION			
7.1 Historic Sites	<p>Howse Pass NHS plaque and CHRS plaque at Sask. Crossing day use area. Associated exhibits include material on Aboriginal connections to the area.</p> <p>Icefields Centre across boundary of Jasper NP has display on CHRS</p>	<p>Renewal of Saskatchewan Crossing day use area 2008 and 2009</p> <p>Installation of improved trailhead information panel regarding NHS at Mistaya and Glacier Lake Trails.</p>	Improvement
7.2 Cultural Landscapes	<p>Icefields Parkway</p> <p>Howse Pass</p>	<p>Recent major investment to refurbish Saskatchewan Crossing highway bridge</p> <p>In 2009 Parks Canada, along with key stakeholders, prepared a Strategic Concept for the Icefields Parkway to improve outstanding visitor experiences, resource protection and educational initiatives along this scenic corridor</p>	No change

7.3 Sporting Events/Activities	Occasional events on parkway such as the bicycle or running events		No change
7.4 Cultural Events/Activities	Occasional.	2009 opening of Aboriginal displays at Sask. Xing DUA including Pipe ceremony 2007 -11 David Thompson bicentennials	No change

7.2 Condition of Recreational Values since Designation

The majority of the recreational opportunities associated with the river have not changed substantially over the last decade. Improvements relate to the redevelopment of Saskatchewan Crossing day use area and the provision of renewed interpretation there related to Howse Pass National Historic Site (NHS), ecological integrity, Aboriginal connection to place, and the North Saskatchewan Canadian Heritage River. In addition, there have been improvements in the form of new web material related to Howse Pass NHS available on the web. Material on the web concerning fishing has been expanded to include information helpful to conservation including encouragement of the use of barbless hooks, advice not to play fish too long, how to recognize a bull trout and how to watch fish. Finally with respect to ice climbing a vault toilet has been installed at the day use area near the Weeping Wall.

There are opportunities to improve awareness of the North Saskatchewan as a Canadian Heritage River. Web content on the parks site could be developed to link to the CHRS site in addition; one could look for ways to include mention of the CHRS and designated rivers in the Mountain Guide.

8.0 Integrity Guidelines

8.1 Background & Status

The North Saskatchewan River's location within a national park affords it a high level of protection. The maintenance or restoration of ecological integrity is a priority in decision-making about the river and recreation is the only land use in the park. Overall

the river's integrity remains for the most part unchanged since designation. High numbers of visitors and the existence of highways mean that there is some level of impact within the designated area. For example, upper reaches of the river are constrained by the highway and its berms. Old or poorly designed culverts impede fish movement in and out of tributaries. Outside the park the Bighorn dam built in 1972 is a barrier to migratory fish. Water quality in the river can be extremely turbid but as noted in the nomination document this is a natural feature of a glacial river.

The North Saskatchewan River has a high degree of integrity with respect to cultural resources. The river's natural appearance has changed little since pre-contact use by Aboriginal people and even less since use by early Icefields Parkway visitors. There has been minimal development along most stretches of the designated area. Development supports recreation values and includes the facilities most people use to enjoy the river. New development is limited to redevelopment of the existing outlying commercial accommodation and park facilities and it is governed by stringent architectural and redevelopment guidelines to ensure that it respects the character of the park.

Archaeological investigations generally precede any major ground disturbing projects. If any cultural resources are unearthed during a project, Parks Canada archaeologists are consulted on the course of action to be taken before work resumes.

Table 6. Integrity Guidelines since Designation

CHRS Principles, Procedures and Operational Guidelines (2000)	Significant Actions Research or Studies	Changes or Threats to Integrity Value(s) since Nomination
1. NATURAL INTEGRITY GUIDELINES		
1.1 The nominated area is of sufficient size and contains all or most of the key interrelated and interdependent elements to demonstrate the key aspects of the natural processes, features, or other phenomena which give the river its outstanding natural	48 kilometre length represents the headwaters of the river system. Entirely protected within national park boundaries	No change

value.		
1.2 The nominated area contains those ecosystem components required for the continuity of the species, features or objects to be protected.		No change
1.3 There are no human-made impoundments within the nominated area.	No impoundments exist within nominated area	No change
1.4 All key elements and ecosystem components are unaffected by impoundments located outside the nominated area.		<p>No change since nomination</p> <p>Big Horn Dam built in 1972 is 62 kilometres downstream of park and constitutes an obstacle to migratory fish</p> <p>Given the distance of the designated area from the dam it appears that direct impacts are minimal. An Alberta Fish and Wildlife paper indicates the dam “has significantly changed the river and natural riparian functions for at least 30 km upstream (Alberta Fish</p>

		and Wildlife, 2008. Fisheries Management Objectives for the North Saskatchewan River pg. 11)
1.5 Natural values for which the river is nominated have not been created by impoundments.		No change
1.6 The water of the nominated area of the river is uncontaminated to the extent that its natural aquatic ecosystem is intact.		No change
1.7 The natural aesthetic value of the river is not compromised by human developments.		No change
2. CULTURAL INTEGRITY VALUES		
2.1 The nominated area is of sufficient size and contains all or most of the key interrelated and interdependent elements to demonstrate the key aspects of the features, activities or other phenomena which give the river its outstanding cultural value.		No change
2.2 The visual appearance of the nominated area of river enables uninterrupted appreciation of at least one of the periods of the river's historical importance.		No change Many opportunities particularly for those enjoying the river from the parkway.

		Those on the river will note the highway in a number of areas.
2.3 The key artifacts and sites comprising the cultural values for which the river is nominated are unimpaired by impoundments and human land uses.		No change
2.4 The water quality of the nominated area does not detract from the visual character or the cultural experience provided by its cultural values.		No change The national Water Quality Index indicates good condition with a stable trend for the North Saskatchewan River
3. RECREATIONAL INTEGRITY VALUES		
3.1 The river possesses water of a quality suitable for contact recreational activities, including those recreational opportunities for which it is nominated.		No change
3.2 The river's visual appearance is capable of providing river travellers with a continuous natural experience, or a combined natural and cultural experience, without significant interruption by modern human intrusions.		Generally true, helicopter over-flights may compromise experience on occasion

3.3 The river is capable of supporting recreational uses without significant loss or impact on its natural, cultural or aesthetic values.		No change
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8.2 Condition of Integrity Values Since Designation

There has been little change to the condition of integrity values since designation. Some improvements have been made with respect to highway operations, installation of a new vault toilet at Weeping Wall to support ice climbing, aquatic connectivity and the reintroduction of fire on the landscape.



Benthic invertebrate sampling on the Mistaya River, tributary of the North Saskatchewan River. Photo: Parks Canada, S. Humphries

Aquatic Connectivity

Steep or hanging culverts hinder the passage of fish and other aquatic species and fragment aquatic ecosystems. The North Saskatchewan River mainstream does not have any culvert crossings, only bridges. However, almost every tributary emanating from the north or east must pass under a highway through a culvert. In 2006 the road stream crossings in Banff National Park were surveyed. One hundred and sixty seven culverts were assessed for fish passage with only about 12% meeting criteria for barrier free fish passage. Work on some of these culverts will occur as time permits.

In 2002/3 a regional bull trout study led to the repair of the Owen Creek culvert. The culvert was impeding fish passage for fluvial bull trout seeking access to regionally important spawning locations. Culverts need ongoing monitoring as the channel work can be altered during flood events. Owen Creek needed additional work after flooding in 2006. Culvert restorations are short to mid-term solutions costing between two and two hundred thousand dollars. Full culvert replacements to contemporary installation standards exceed a million dollars.

Waste Water

The Saskatchewan warden station is on a septic field which needs replacement. Currently wastewater from the station is pumped and transported to the Lake Louise wastewater treatment facility. A new vault toilet has been installed for the use of Ice Climbers at the Weeping Wall.

Water Quality

Water quality at the Environment Canada station is assessed using the Canadian Water Quality Index (CWQI). This index tracks key water quality variables such as turbidity, temperature and major ions. Each is measured and the results compared to established guidelines for the protection of aquatic life. Five rankings are possible: excellent, good, fair, marginal and poor. Water quality condition is rated as good with a stable trend.

Other Water Quality Issues

With about 2.03 km of the Icefield Parkway located within 50 m of the North Saskatchewan River, the use of salt and abrasives to make the road surface safer in winter and spills of pollutants from motor vehicle accidents can have impacts on water quality.

Environment Canada declared road salt a toxic substance in 2001. In 2004 Environment Canada released its Code of Practice for the Environmental Management of Road Salts. This Code of Practice encourages public road authorities that use more than 500 tonnes



of salt annually to develop their own salt management plans. In 2004 the Western Asset Management Service Centre of Parks Canada introduced a new Salt Management Plan which strives to minimize the amount of salt entering the environment. Road maintenance never uses 100% salt on the Icefield Parkway. Instead a 4% salt/abrasive mix is applied. Often it is applied on curves and hills rather than

Motor Vehicle Accident in the North Saskatchewan River

Photo: Parks Canada, T.Damm

on the whole road surface. This minimizes abrasive use while maintaining a standard suitable to the class of roadway. No commercial trucks are allowed on the parkway except for those associated with servicing Parks Canada operations or one of the several businesses. This reduces the potential for serious spills significantly. First responders are trained to contain spills until professional contract services arrive.

Recent work on the highway bridge at Saskatchewan Crossing fully considered environmental and social factors. Work under the bridge was enclosed to keep materials from the river. River use was not curtailed during construction. A permanent improvement blocked off drains and surface run-off is now redirected to a settlement area near the bridge abutment.

Aesthetics and Recreational Capacity

The river's visual appearance continues to provide visitors with a sense of what it looked like historically and a continuous natural experience; aesthetics are carefully considered when facilities are developed for the first time or redeveloped.

In terms of the amount of use the river can sustain, much depends on the timing, location, amount and type of use proposed. Current levels and types of use appear to be sustainable. The new park management plan contains a goal to increase visitation to the park by urban Canadians, new Canadians and youth. Increased visitation will be directed to ecologically robust areas and facilities designed for that use.

9.0 Summary and Conclusions

There has been little change over the past 10 years in the values for which the North Saskatchewan River was designated. Its location in a national park ensures a level of protection found in few jurisdictions. The condition of ecological integrity, cultural



North Saskatchewan aerial view Photo:
Parks Canada, N.Fuss

resources and visitor experiences in Banff National Park is assessed every five years in a State of the Park Report.

There has been little change in the hydrology, physiography and morphology of the river since it was designated. It is probable that climate change is influencing these aspects of the natural heritage of the river, but on a time scale that is beyond the scope of this report. Parks Canada

and other government agencies are monitoring key variables (e.g. glacier mass balance, water flows) that, in future, may tell us more about the effect of climate change on these values.

We know more about the biotic environment than we did ten years ago, and important steps have been taken to improve its integrity, however aquatic and terrestrial ecosystems are still being stressed by longstanding issues, such as barriers to fish movement created by the highways, and invasive non-native species (e.g. brook trout introduced through stocking). Nonetheless, fire has been reintroduced to the landscape, aquatic connectivity has been improved at Owen Creek, and water quality in a nearly pristine environment remains good with a stable trend.

Cultural heritage values have changed little since designation. River travellers experience a landscape that is similar to that experienced in the past by early park visitors. Important cultural resources found within the designated area are receiving increased attention. Howse Pass National Historic Site received a monitoring visit by an archaeologist in 2010.

Recreational use of the river by boaters remains available but is not monitored. However, it can be said, the majority of visitors enjoying the river and environs do so from their vehicle, at a day use area or while engaged in a land based activity such as hiking or ice climbing. There have been upgrades to several facilities that allow visitors to experience the river environment and learn about its natural and cultural heritage. In particular, the redevelopment of the Saskatchewan Crossing day use area has enhanced information concerning the North Saskatchewan as a Canadian Heritage River. The redevelopment also improved communication with respect to Howse Pass NHS, ecological integrity and notably includes information from three First Nations who express their connection to place.



Appropriate tools are in place to manage recreational use and foster enjoyable visitor experiences, from angling regulations, restriction on use of the Castleguard Cave, to Redevelopment Guidelines for Outlying Commercial Accommodation in the Rocky Mountains National Parks.

Black bear in the North Saskatchewan River

Photo: Parks Canada, P.Watters

The river continues to meet such fundamental statements of integrity as:

- The nominated section includes those ecosystem components which contribute significantly to the provision of habitat for species in need of protection.
- The key artefacts and sites comprising the values for which the river is nominated are unimpaired by impoundments and human land uses.
- The river's visual appearance is capable of providing river travellers with a continuous natural experience, or a combined natural and cultural experience, without significant interruption by modern human intrusions.

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11.0 Further Contacts

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