Banff National Park | Parc national Banff

North Saskatchewan River

Canadian Heritage Rivers System
10-Year Monitoring Report
2011-2020

Canadian Heritage Rivers System | *Réseau des rivières du patrimoine canadien*

Parks Canada | Parcs Canada | Canada

Introduction

The Canadian Heritage Rivers System (CHRS) is a national program that recognizes and promotes the conservation of rivers of outstanding national value. The program was established in 1984 as a cooperative effort of the federal, provincial and territorial governments. The CHRS currently includes 41 designated rivers across Canada representing a diversity of river environments.

The North Saskatchewan River in Banff National Park was designated in 1989 in recognition of its important natural and cultural heritage and recreational values. The designated section includes the 48.5 km headwater section of the North Saskatchewan River and its adjacent mountain landscape within the park (Figure 1). The North Saskatchewan River rises from the Saskatchewan Glacier – the largest outlet glacier of the Columbia Icefield. The Lyell, Mons and Freshfield icefields also provide significant input to the river's headwaters. This river section is fed by three main tributaries – the Alexandra River, the Howse River and the Mistaya River.

The Parks Canada Agency reports to the Canadian Heritage Rivers Board every ten years on the condition of the river and the values for which it was designated. The previous report covered the period 1999-2010 (Parks Canada 2011). This report describes factors affecting the designated portion of the North Saskatchewan River between 2011 and 2020 following the 10-year reporting format presented in the ***Canadian Heritage Rivers Principles, Procedures and Operational Guidelines 2023***.

The objectives of this report are to:

- provide a summary of the designated river and its values;
- provide a brief summary of significant events, actions and research that occurred during this time period that are relevant to the designated section of river;
- outline any changes or threats to the natural, cultural and recreational values for which the river was designated;
- report any changes to the CHRS integrity values relative to the designation;
- report the status of the CHRS plaque; and,
- provide recommendations for the continued recognition of the Canadian Heritage River.

Background

The designated portion of the North Saskatchewan Canadian Heritage River is entirely within the boundaries of Banff National Park and is managed in accordance with the ***Canada National Parks Act*** and the Banff National Park Management Plan (2010). The river was nominated for its outstanding representation of the following natural, cultural and recreational values and themes.

Cover image: North Saskatchewan River at Saskatchewan Crossing.

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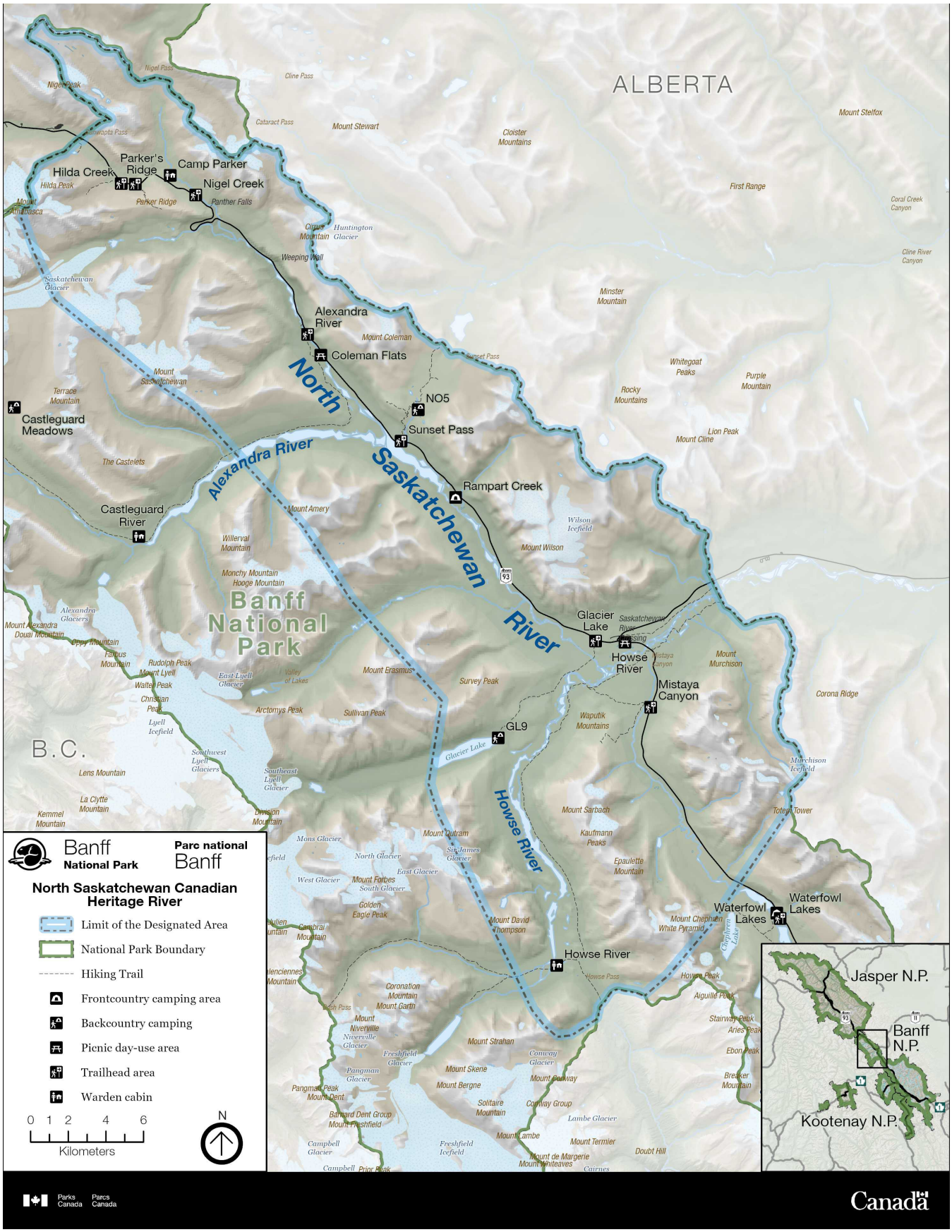

Figure 1: The Designated Area of the North Saskatchewan Canadian Heritage River in Banff National Park

Natural Values

Representation of Earth's History

The upper North Saskatchewan River watershed includes many landscape features that illustrate significant episodes in earth's history. These include excellent representation of ongoing glacial erosion as illustrated by the Saskatchewan Glacier, and a range of glacial and fluvial depositional landforms such as lateral moraines, river terraces and braided river channels. The surrounding landscape also provides excellent examples of tectonic folding and thrust faulting in the eastern Main Ranges of the Rocky Mountains.

Representation of Ongoing Processes

Many of the processes that created the current landscape continue to actively shape the land. These include glacial erosion and deposition by the Saskatchewan Glacier and Columbia Icefield, and fluvial processes that continue to create dynamic stream channels, outwash plains and alluvial fans. The landscape also protects relatively self-regulating vegetation communities representing the three ecozones of the Rocky Mountains – the montane, subalpine, and alpine.

Physiographic and Landscape Uniqueness

The designated area for the North Saskatchewan River contains excellent examples of two key mountain features – the Eastern Main ranges of the Rocky Mountains, and the Columbia Icefield – the largest non-polar icefield in North America.

Cultural Values

Cultural Association

A number of archaeological sites in the North Saskatchewan and Howse river valleys indicate that the area was used for thousands of years by Indigenous peoples for travel, hunting and gathering. Additional cultural heritage values of the designated portion of the North Saskatchewan River include its association with the explorations of David Thompson during the fur trade era. Thompson followed the North Saskatchewan and its tributary, the Howse River to cross Howse Pass into the Columbia River watershed where he established a trading post in 1807.

Recreational Values

Recreational Experience

The North Saskatchewan provides a range of outstanding recreational experiences. These include river paddling opportunities in a wilderness setting, as well as hiking, camping, ski touring, ice climbing, and natural and cultural heritage appreciation. These opportunities are enhanced by the relatively easy access provided by the Icefields Parkway and the support facilities maintained within the national park.

Environmental Impact

The river is maintained in a natural state, surrounded by a largely wilderness landscape. The Icefield Parkway and Highway 11 transportation corridors result in only a minor intrusion to recreational users and their appreciation of the river, while simultaneously providing relatively easy access.

Chronology of Significant Events, Actions and Research, 2011-2020

Year	Event, Action, Research
2013	High flows during the spring freshet caused significant flooding along the North Saskatchewan River. Culverts on several tributaries along the Icefields Parkway required significant repair.
2014	The Spreading Creek wildfire burned approximately 5,800 hectares of forest on the south side of the North Saskatchewan River immediately downstream of Saskatchewan Crossing. This fire was jointly managed by Parks Canada and the Province of Alberta to protect built infrastructure while achieving fire restoration objectives on the landscape. Fish sampling was conducted in Glacier Lake and several smaller lakes in the Howse River watershed to inventory species diversity. Lake trout data from Glacier Lake were shared with the Province of Alberta to establish lake trout growth curves from an unharvested montane lake as an end point for a provincial fish sustainability model.
2015	Spoonhead sculpin (*Cottus ricei*) samples were collected from the North Saskatchewan River to support a molecular taxonomic study of this group of fishes in western North America (Young et al. 2022).
2016	A bat inventory was conducted at Saskatchewan Crossing to survey local bat populations. This confirmed the presence of the endangered little brown myotis (*Myotis lucifugus*), as well as five additional bat species. A little brown myotis maternity roost was also located. The Parks Canada welcome gate on Highway 11 was destroyed by fire.
2017	The Howse Pass National Historic Site Management Statement was completed, confirming that the site will be maintained as a wilderness landscape with a strong sense of place, providing opportunities for self-reliant visitors to experience the historic route in an authentic setting.
2018	Parks Canada completed a State of the Park Assessment (SOPA) for Banff National Park in preparation for a review of the Park Management Plan. The SOPA evaluated indicators related to ecological integrity and visitor experience that are relevant to many of the key values for which the river was designated. A project to renew and upgrade trailhead parking facilities at Mistaya Canyon was initiated.
2019	The Saskatchewan-Nelson River population of bull trout (*Salvelinus confluentus*) was listed as threatened under Canada's **Species at Risk Act**. Monitoring was initiated at three sites in the North Saskatchewan River area to assess habitat suitability for the endangered black swift (*Cypseloides niger*). Aerial mountain goat surveys were flown in portions of Banff National Park, including the headwater area on the west side of the North Saskatchewan River watershed from Howse Pass to Parker Ridge.
2020	Most of the visitor facilities in Banff National Park were temporarily closed for most of the year due to public health measures related to the COVID-19 pandemic. Park trails and waterways remained available for recreational purposes. A new Parks Canada welcome gate was constructed on Highway 11 at Saskatchewan River Crossing. Mistaya Canyon trailhead improvements were completed. Owen Creek cabin was submitted for evaluation by the Federal Heritage Buildings Review Office. Acoustic monitoring to inventory bats was conducted at Howse Pass. This work confirmed the presence of several species of bats and identified the potential importance of this area to migrating silver-haired bats (*Lasionycteris noctivagans*). Parks Canada acquired aerial drone imagery from outflow glaciers of the Freshfield, Lyell and Columbia Icefields. This imagery will be used for future monitoring of glacier change in the upper watershed of the North Saskatchewan River. The North Saskatchewan CHRS plaque was refurbished by the Parks Heritage Conservation Society.

Changes and Threats to Natural, Cultural and Recreational Values

This section outlines the positive or negative changes to the heritage values of the river that were identified during the 10-year reporting period. It also describes actions taken to address any factors that affect the values for which the river was designated.

Natural, Cultural or Recreational Value	Description of Change or Threat	Reason for Change	Actions Taken in Response	Change/ Threat Still Present?
Aquatic ecosystems	Potential introduction of aquatic invasive species (AIS).	Whirling disease was confirmed in Johnson Lake within Banff National Park in 2016. Whirling disease is an infectious disease of freshwater fish that is spread by a protozoan. The Johnson Lake occurrence was the first confirmed incidence of this disease in Canada. The introduction of zebra mussels and quagga mussels is also a potential threat.	Parks Canada implemented a widespread fish sampling program to test for the potential presence of the disease in other fish populations in the mountain parks. All results from the North Saskatchewan River watershed in Banff National Park were negative. However, the disease has been detected further downstream in the North Saskatchewan River below the Bighorn Dam. This dam prevents fish-borne migration of the disease upstream, but humans could inadvertently spread the disease. Parks Canada has implemented an AIS monitoring program that includes a mandatory self-certification program for recreational users that requires all gear to be cleaned, drained and dried before entering park waters. A voluntary inspection station has also been established along the Trans-Canada Highway in Banff National Park.	Yes – potentially negative.
Glacier headwaters	Glacial recession may lead to a reduction in the amount of ice and snow cover available for input to water flows within the upper North Saskatchewan River watershed. The North Saskatchewan River derives a significant portion of its headwater flow from snowmelt, glaciers and icefields along the Continental Divide, namely the Columbia, Lyell, Mons, Freshfield and Wapta Icefields.	Climate change is accelerating the loss of glacial ice in western North America and may lead to reduced seasonal snow cover. The alpine glaciers on the Continental Divide are in a state of strong negative mass balance that results in glacier thinning and recession (Parks Canada 2019). Between 1977 and 2018 annual monitoring of the Peyto Glacier in the Wapta Icefield observed a negative mass balance in all but two years (Pradhananga et al. 2021). The area covered by the Columbia Icefield diminished by 42 km^2 or 18% between 1985 and 2018 (Intsiful and Ambinakudige, 2021).	Monitoring of several glaciers, including the Saskatchewan and Peyto, is being conducted by the Geological Survey of Canada with support from Parks Canada. Drone imagery of glacier terminuses taken in 2020 will contribute to future monitoring of glacier change.	Yes – negative.


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Integrity Guidelines

The integrity values assessed during the process to designate the North Saskatchewan Canadian Heritage River included the following:

Size

The designated area includes only 48.5 km of the river's total 1400 km length. However, the designated section includes the river's glacial source, and the entire upper headwaters, and this is of sufficient size to represent key elements of the river environment, it's natural, cultural and recreational values.

Viability

The entire watershed of the designated river is contained within Banff National Park, and thus is protected as a self-regulating natural unit. This ensures that the designated river, its tributaries, natural, cultural and recreational features remain intact.

Water Quality

The water in the North Saskatchewan River is naturally turbid (during warm season) due to the presence of glacially-eroded rock flour. Impacts of pollution from transportation corridors are considered to be minor and localized.

The North Saskatchewan River and its adjacent environment continues to meet all of the integrity guidelines for which it was designated. There have been no significant changes to the integrity values since the last report in 2010.

Management Recommendations and Current Status

The portion of the North Saskatchewan River designated under the Canadian Heritage Rivers System is entirely within Banff National Park. Management direction for the river for this reporting period is contained within the *Banff National Park Management Plan* (2010). Achievement of management objectives was evaluated in the *Banff National Park of Canada State of the Park Assessment* (2018). Key attributes related to the heritage river are described below, with updates to 2020 where available.

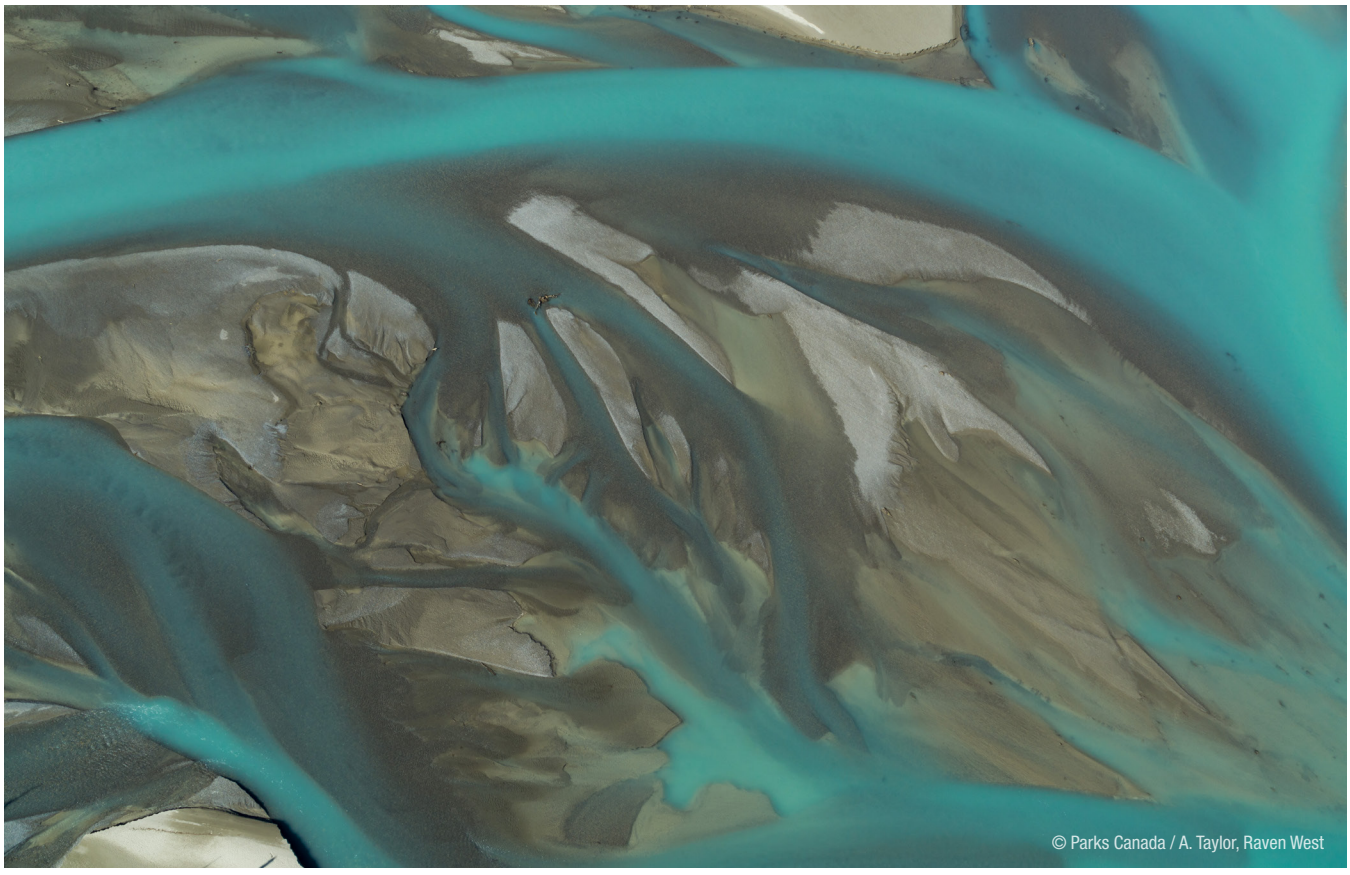
Recommendation or Key Action	Status	Comments
Maintain Water Quality	Achieved	Water quality in the North Saskatchewan River is measured through a monitoring station located at Whirlpool Point just downstream of the Banff National Park boundary. This station is operated by Environment and Climate Change Canada (ECCC) in partnership with Parks Canada and evaluates water quality using the Canadian Council of Ministers of the Environment (CCME) water quality index. This index assesses water quality relative to the Canadian Environmental Quality Guidelines and provides an estimate of the degree to which water quality may be affected by human activities. Annual results are obtained and reported using a three-year rolling average to dampen any effects related to annual variations in weather and hydrology. Results reported in the SOPA for the period 2009-2016 indicate that the annual water quality index in the North Saskatchewan River was consistently good (Parks Canada 2019). Data reported by ECCC for 2016-2020 indicates excellent water quality in the upper North Saskatchewan River[1].
Maintain Healthy Aquatic Ecosystems	Achieved	Parks Canada also monitors aquatic ecosystem health using benthic macroinvertebrate communities as part of the Canadian Aquatic Biomonitoring Network (CABIN). The CABIN protocols compare the biological communities at sample sites to reference sites to assess potential effects of various stressors. The mountain national parks developed a predictive reference condition model in 2011. Random sampling was conducted at 31 sites throughout Banff National Park, including five sites within the designated section of the North Saskatchewan River watershed. Collected data are then compared to the reference model. For the period 2014 to 2016, 28 of the 31 sites were within the reference condition, indicating an overall good rating for this indicator (Parks Canada 2019). All five sites within the North Saskatchewan River watershed were within reference conditions, indicating good water quality.
Restore native fish species and reduce non-native fish species	Not yet initiated	Native fish species within the upper North Saskatchewan River watershed include bull trout, mountain whitefish, lake trout (Glacier Lake only), spoonhead sculpin, longnose dace, and longnose sucker. These species may be threatened by non-native fish that were historically stocked in the watershed, including eastern brook trout, rainbow trout, westslope cutthroat trout, hybrid cutthroat trout, and lake trout (outside of Glacier Lake). The condition for the stream fish indicator is considered to be fair, with native species widely present in the main channel and Glacier Lake, but with non-native species also present and comprising the only species in some tributaries (S. Humphries, pers. comm.[2]). Parks Canada staff have collected DNA from bull trout within the North Saskatchewan River area. These efforts will help conserve and restore diminished and segmented populations by identifying genetically pure donor populations.
Prevent introduction of new non-native species	Achieved	In 2016, whirling disease was confirmed in Johnson Lake within Banff National Park. Whirling disease is an infectious disease of freshwater fish that is spread by a protozoan. The Johnson Lake occurrence was the first confirmed incidence in Canada. Due to its potential to spread throughout the mountain park watersheds, a comprehensive sampling program was launched to determine if there were more occurrences of the disease. Results for the North Saskatchewan River watershed were negative.

1 Environment and Climate Change Canada. https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/water-quality-canadian-rivers.html

2 Aquatic Ecosystem Specialist, Parks Canada, Lake Louise, Yoho and Kootenay Field Unit.

Recommendation or Key Action	Status	Comments
Restore fire as an ecosystem driver to the landscape of the park	Ongoing	The Spreading Creek Wildfire was managed to restore fire disturbance to a portion of the North Saskatchewan River watershed. Approximately 5,700 hectares was burned on the south side of the river, including 2,300 hectares in Banff National Park adjacent to the designated Canadian Heritage River. The remainder is on Alberta Crown land. (Figure 2) A prescribed fire plan was prepared for a large tract of subalpine forest in the Alexandra River watershed, within the designated area of the North Saskatchewan Canadian Heritage River[3]. A new Fire Management Plan (FMP) for Banff, Yoho and Kootenay national parks was completed in 2020. The FMP is a 10-year plan spanning 2020 to 2030 and outlines prescribed fires and wildfire risk reduction projects.
Maintain viable populations of native species – species at risk.	Ongoing	Whitebark pine was listed as endangered under the **Species at Risk Act** in 2012, and in 2014 limber pine was assessed as endangered by COSEWIC[4]. Both species are threatened by white pine blister rust, an introduced fungal disease. Management efforts are focussed on identifying and propagating individuals that are naturally resistant to the disease. From 2012-2020, within the North Saskatchewan River area, Parks Canada staff identified and collected seeds from one whitebark pine and 14 limber pine trees that appear to be rust-resistant. By 2020, 101 limber pine seedlings cultivated from these seeds were planted in the area. These efforts will help to develop naturally resistant populations of limber pine and whitebark pine in the North Saskatchewan River area.

3 *This fire was successfully implemented in 2022.*
4 *Committee on the Status of Endangered Wildlife in Canada.*



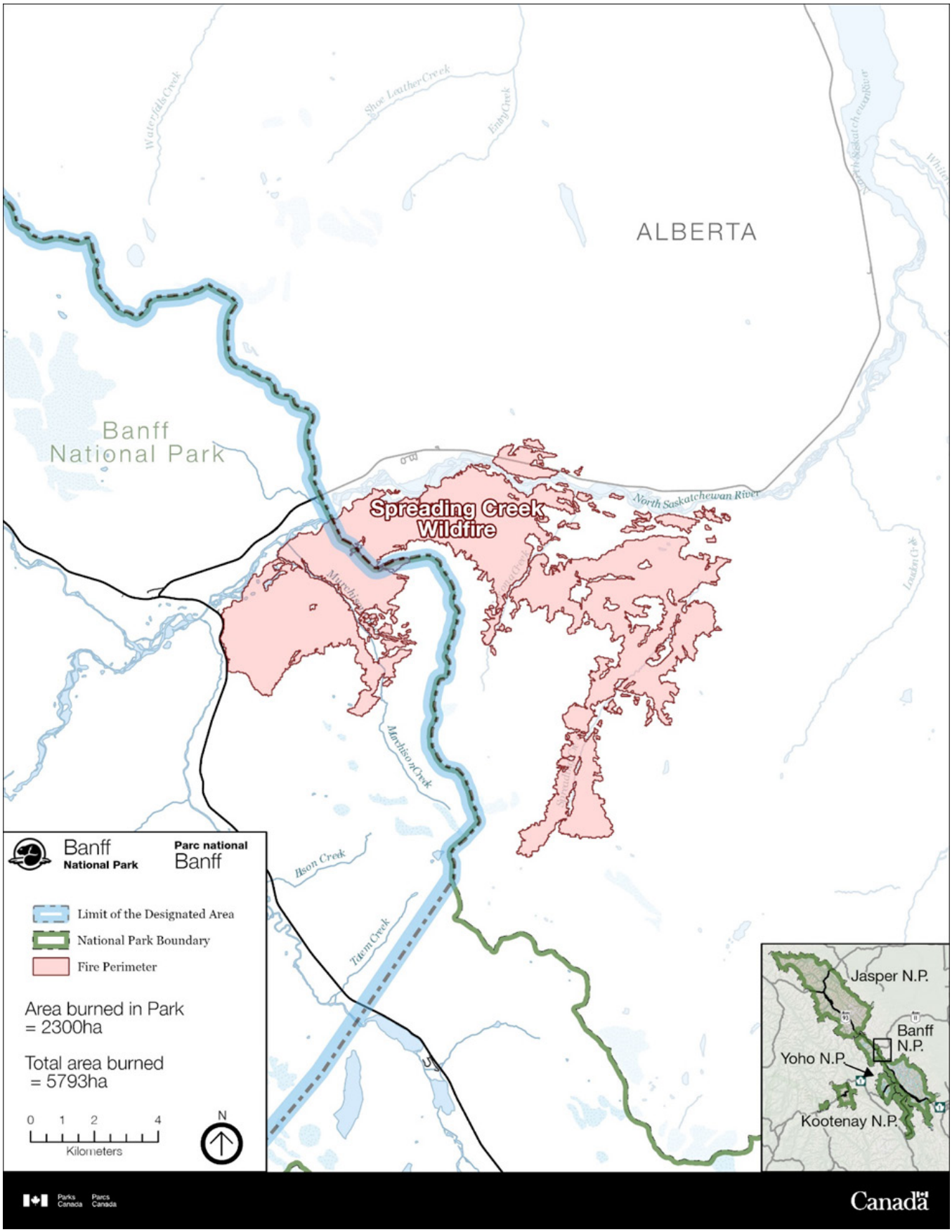


Figure 2: The 2014 Spreading Creek Wildfire

North Saskatchewan Canadian Heritage River Plaque, March 30, 2023.

Condition of Plaque

The plaque commemorating the North Saskatchewan Canadian Heritage River is located at the Howse Pass viewpoint adjacent to the Icefields Parkway. It complements a series of interpretive exhibits describing the heritage values of the river. The plaque is in good condition.

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Summary of Benefits Since Last Report

The location of the designated section of the North Saskatchewan River in Banff National Park ensures a high level of protection for its natural, cultural and recreational values. Potential benefits of the CHRS designation such as improved water quality, research and protection of cultural heritage, development of recreational opportunities, and conservation of biodiversity are achieved as a result of the river being within the national park. The designation as a Canadian Heritage River adds another layer of recognition to the importance of this natural landscape and helps to increase awareness of its value among park visitors. In particular, the CHRS website highlights the North Saskatchewan River and increases awareness of its natural, cultural and recreational values.

Access to additional funding for research and promotion of the river is another important benefit of participation in the CHRS. Parks Canada received funding from the CHRS to support aerial drone surveys of the glaciers in the headwaters of the North Saskatchewan River in 2020. High resolution drone imagery acquired through this work will assist in mapping natural and cultural resources, glacier recession and other changes over time along the river corridor.

Overall Assessment

The natural, cultural and recreational values for which the North Saskatchewan River was designated remain in good condition. The river and its surrounding environment continue to be managed to maintain and restore ecological integrity and provide outstanding visitor experiences for both roadside visitors and wilderness travellers. The designation as a Canadian Heritage River should remain in place.

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