

Tsiigehnjik/Arctic Red River

Northwest Territories

Canadian Heritage Rivers System
Ten-Year Monitoring Report
2005 - 2014

April 2017



**Canadian
Heritage Rivers
System**

CANADA'S NATIONAL RIVER CONSERVATION PROGRAM



**Government of
Northwest Territories**

Cover photo by Lawrence Norbert, Tsiigehtchic, Northwest Territories

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Executive Summary

Since its designation as a Canadian Heritage River in 1993, Tsiigehnjik/Arctic Red River has remained largely the same. A number of surveys and studies have been undertaken along the river since designation as a Canadian Heritage River including fish and wildlife surveys, ecological assessments, ethno-archaeology projects, and documentation of traditional knowledge, traditional use and place names. This report is the second ten-year monitoring report for the Canadian Heritage Rivers System, covering the period 2005 to 2014. Ten-year monitoring reports are intended to assess the ability of Tsiigehnjik/Arctic Red River to meet the criteria for continued designation as a Canadian Heritage River.

Climate change appears to be the main threat facing Tsiigehnjik/Arctic Red River at present. It is likely that climate change is having some impact on the amount and timing of water flows of the river. Spruce budworm has become established along the river, likely due to climate change which allows populations to shift north into previously unaffected areas. Also, the number and size of landscape slumps is accelerating in recent years on the Peel Plateau through which Tsiigehnjik/Arctic Red River passes. These slumps are not yet affecting Tsiigehnjik/Arctic Red River but they are having an impact in the adjacent watershed. Another change noted along Tsiigehnjik/Arctic Red River is that moose densities have declined compared to survey data from the 1980's and late 1990s.

Despite these few changes, the natural and cultural values of Tsiigehnjik/Arctic Red River are still in excellent condition and it is recommended that Tsiigehnjik/Arctic Red River maintain its Canadian Heritage River designation.

Designation of Tsiigehnjik/Arctic Red River as a Canadian Heritage River has resulted in some benefits to date. The designation of river is recognized in the Gwich'in Land Use Plan, further highlighting its importance to the Gwichya Gwich'in. Designation also brought attention to the headwaters area, which was identified for further studies to determine whether it should be protected through zoning in the Gwich'in Land Use Plan or through formal legal protection.

Introduction

A Canadian Heritage River is a river which is designated to the Canadian Heritage Rivers System for its outstanding natural or cultural values. A Canadian Heritage River designation does not add any legal protections for the river or restrict any uses of the river. The designation is recognition of these outstanding rivers, and the Canadian Heritage Rivers System encourages their long-term management for the benefit and enjoyment of Canadians.

Tsiigehnjik/Arctic Red Riverⁱ was nominated to the Canadian Heritage Rivers System in 1992 by the community of Tsiigehchic, the Government of the Northwest Territories, and the Government of Canada. A management plan was prepared and the river was designated as a Canadian Heritage River in 1993. This is the second ten-year monitoring report. It builds on the first ten-year monitoring report which covered the period 1993-2004.

Ten-year monitoring reports are compiled for Canadian Heritage Rivers to:

- provide a chronology of significant events that have occurred since the designation of the river,
- assess the management of the natural and cultural heritage values and recreational values since designation, including any changes or threats to these values,
- assess any changes or threats to the integrity of the river since nomination,
- list the river conservation, stewardship, economic, and cultural benefits that have resulted from designation as a Canadian Heritage River,
- summarize the status of actions and management measures called for in the management plan,
- assess the river's ability to meet the criteria for continued designation and recommend whether the river maintain its designation as a Canadian Heritage River or be de-designated.

This document is meant to be a summary of the above information only. It follows the templates of the Canadian Heritage Rivers System Principles, Procedures and Operational Guidelines (2014) for the completion of ten-year monitoring reports, and is guided by the Canadian Heritage Rivers System documents "*A Framework for the Natural Values of Canadian Heritage Rivers, Second Edition, March 2001*" and "*A Cultural Framework for Canadian Heritage Rivers, Second Edition, January 2000*".

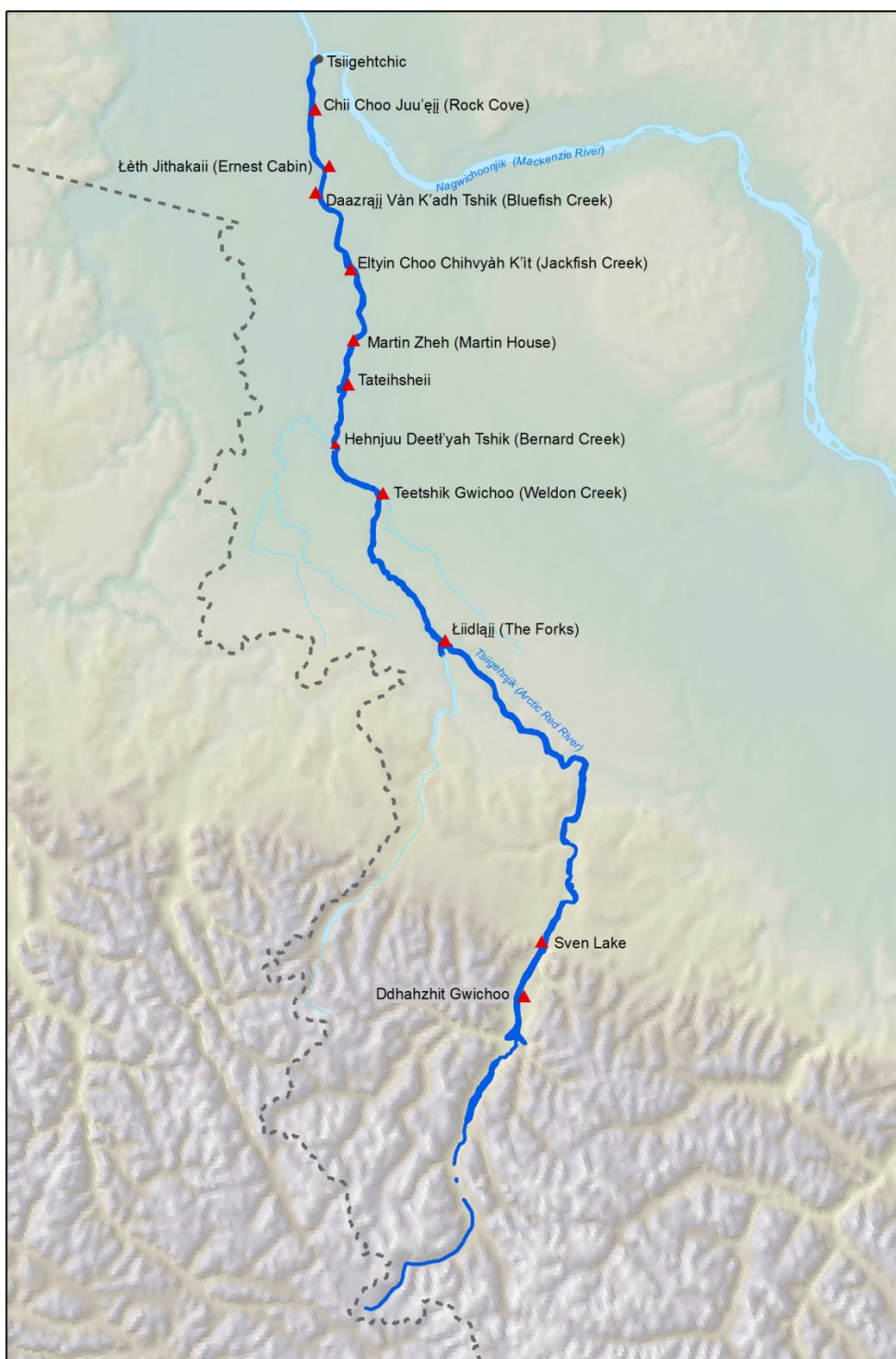
For more detail on the natural, cultural and heritage values, integrity, and management of the river, please refer to the references listed in this document, and to the nomination and designation documents for the river:

Background Document for the Nomination of the Arctic Red River, Northwest Territories to the Canadian Heritage Rivers System, 1991

Canadian Heritage Rivers System Nomination Document for the Arctic Red River, Northwest Territories, May 1992

Canadian Heritage Rivers System Management Plan for the Arctic Red River, Northwest Territories, June 30, 1993

Map



Chronology of events since designation in 1993

Year	Significant Events, Actions, Research or Studies
1992 - onwards	Implementation of the Gwich'in Comprehensive Land Claim Agreement.
1992	<i>"The Traditional use of the Travaillant Lake Area Using Trails and Place Names of the Gwichya Gwich'in From Arctic Red River, NWT"</i> report published by the Gwich'in Social and Cultural Institute.
1993	Gwich'in Place Names Project outlines Gwich'in and English place names along with their translation, associated stories and legends, trails, traditional campsites, historic cabin sites and renewable resources. Publication titled <i>"Gwichya Gwich'in Place Names up the Arctic Red River and south of the Mackenzie River, Gwich'in Settlement Area, N.W.T."</i> published by the Gwich'in Social and Cultural Institute.
1993	The term Gwichya Gwich'in is now the preferred term instead of Kwitchia Gwich'in.
1994	The community of Arctic Red River changed its' name to Tsiigehtchic to honour its' traditional name.
1994	<i>"Gwichya Gwich'in Oral History Project"</i> article published in <i>"Bridges Across Time: The NOGAP Archaeology Project"</i> . The article presents an overview of the 1992-1993 oral history work undertaken with elders living in Tsiigehtchic.
1995	Video <i>"Tsiigehtjik: Life Along the Arctic Red River"</i> published by the Gwich'in Social and Cultural Institute. Available in Gwich'in with English sub-titles. In this video, Hyacinthe Andre, the oldest Elder in Tsiigehtchic, talks to his son Noel Andre about the traditional use of the Arctic Red River.
1995	Forest vegetation inventory completed for the lower reach of the Arctic Red River that provides stand level forest information including land cover classification, species composition, density, height, age, understory, as well as site variables such as moisture and productivity.
1994 - 1997	Archaeology and oral history reports published by the Gwich'in Social and Cultural Institute which outline the traditional and historic use of the Arctic Red River as recounted by Gwichya Gwich'in Elders now living in Tsiigehtchic. Archaeological surveys used the traditional knowledge and land use history to identify sites for the lower 80 miles of the river, from Bernard Creek to the community of Tsiigehtchic in 1994, and the upper reaches of the river between Bernard Creek to the Forks in 1995. Excavations and field schools were carried out at the Martin Zeh site in 1995 and 1996. ⁱⁱ
1997	<i>"Nành' Kak Geenjit Gwich'in Ginjik (Gwich'in Words About the Land)"</i> is published. This is Book 1 of the Gwich'in Environmental Knowledge Project. It highlights elders' knowledge of species of wildlife in the western Arctic.
1997	<i>"Gwich'in Traditional Knowledge and Heritage Studies in the Gwich'in Settlement Area"</i> paper is published in the book <i>"At a Crossroads: Archaeology and First Peoples in Canada"</i> . The paper includes a discussion of how traditional knowledge and archaeological research is used to meet needs such as the identification of culturally significant sites for protection and land management purposes.
1997	The Nagwicheonjik National Historic Site along the Mackenzie River is designated, which includes the mouth of the Arctic Red River.
1997 – 1998	Reports on migration patterns of inconnu within the Mackenzie River system published. These reports included results based on gillnetting and radio telemetry in the Arctic Red River, identified migration routes from the coast and timing for inconnu that spawn in the Arctic Red River, and indicated a location for inconnu spawning in the Arctic Red River.

Year	Significant Events, Actions, Research or Studies
1999	Aerial moose survey undertaken in the Arctic Red River Region, between Tsiigehtchik and the mouth of the Cranswick River to describe the status of moose in the area by determining an estimate of moose numbers, composition of the population, and distribution. The numbers were compared to the harvest to determine trends in population and the future harvest potential for the area. Report titled <i>"Moose abundance and composition survey in the Arctic Red River Region of the Gwich'in Settlement Area, Northwest Territories"</i> published by the Gwich'in Renewable Resources Board.
2000	Mountain Caribou (<i>Rangifer tarandus caribou</i>) aerial and ground survey undertaken in the Northern Mackenzie Mountains, including an evaluation of caribou habitat and use of the region. Report published in 2011 by the Gwich'in Renewable Resources Board.
2000	A study was conducted to quantify contaminants in three species of fish from the Arctic Red River (inconnu, broad whitefish and burbot). Fish were tested for heavy metals and organochlorines. Report prepared in 2002 for the Tsiigehtchik Renewable Resource Council.
2000	Interviews of Gwich'in fishers, including from Tsiigehtchik, were conducted to determine community knowledge and concerns about broad whitefish as part of the preparation of an integrated management plan for broad whitefish in the lower Mackenzie River. Report published in 2001 by the Gwich'in Renewable Resources Board.
2000	Tsiigehtchik Forest Use Planning Workshop. Workshop report published in 2001 by the Gwich'in Renewable Resources Board.
2001	<i>"Gwindòo Nành' Kak Geenjit Gwich'in Ginjik (More Gwich'in Words About the Land)"</i> is published. This is Book 2 of the Gwich'in Environmental Knowledge Project.
2001	<i>"Gwichya Gwich'in Googwandak: The History and Stories of the Gwichya Gwich'in"</i> is published by the Gwich'in Social and Cultural Institute. This publication presents the story of Gwichya Gwich'in life on the land from pre-contact times to the present, including use of the Arctic Red River. It is based on information and stories provided by Gwichya Gwich'in elders during oral history and archaeological research carried out from 1992 - 2001. Also incorporated is archival information and oral history interviews carried out in the late 1960s and early 1970s during the COPE (Committee of Original Peoples Entitlements) project in preparation for land claim negotiations in the Mackenzie Delta. Numerous archival, personal and Gwich'in Social and Cultural Institute project photographs, drawings and maps illustrate the text.
2003 onwards	Gwich'in Land Use Plan in effect. Most of the management area for the Arctic Red River is included in a Special Management Zone or Conservation Zone.
2002	The Water Survey of Canada hydrometric station located on the Arctic Red River near Martin Zeh (Martin House), Station number 10LA002 ⁱⁱⁱ , began collecting water level information. The station has been in operation since 1968 measuring water flow, and sediment load data was collected between 1972 and 1975.
2003	Preliminary study of fish resources of the Arctic Red River undertaken which determined the presence of fish species and gathered baseline biological characteristics of those fish species. Report by Gwich'in Renewable Resources Board, prepared in 2004.
2004	The Gwich'in Harvest Study was undertaken between 1995 and 2004. Final Report published by the Gwich'in Renewable Resources Board in 2009. The Harvest Study is a requirement of the Gwich'in Comprehensive Land Claim Agreement; it provides harvest data for calculating the Gwich'in Minimum Need Level and for the effective management of wildlife. The study counted the number of animals, fish and birds harvested by Gwich'in participants in the Settlement Area.

Year	Significant Events, Actions, Research or Studies
2005	<i>"Arctic Red River Headwaters – Phase I Ecological Assessment"</i> is published by the Gwich'in Land Use Planning Board. The Arctic Red River headwaters has been identified in the Gwich'in Land Use Plan Implementation Plan as requiring additional studies to reconsider whether the area meets the current zoning criteria, as well as to make recommendations regarding the potential for the headwaters area as a protected area.
2005	<i>"Arctic Red River Headwaters Phase I Cultural Assessment – Gaps Analysis Final Report"</i> prepared by the Gwich'in Social and Cultural Institute for the Gwich'in Land Use Planning Board. The report analyses traditional use and heritage resources for the Arctic Red River headwaters to provide input into determining if the status of this area should change from a Special Management Zone in the Gwich'in Land Use Plan to a Gwich'in Heritage Conservation Zone, or to a legislated protected area.
2005	The Tsiigehtchic Graveyard Project began with assessment and mapping of the New Graveyard in Tsiigehtchic, located on Vik'ooyendik (Church Hill) overlooking the Arctic Red River.
2006	Aerial moose survey undertaken in the Gwich'in Settlement Area. In order to monitor and estimate moose population trends over the long-term, the survey included the Arctic Red River area because it had been surveyed in the past. The results of the survey indicated that the moose population in the Arctic Red River valley had declined since the first survey conducted in 1985, and since the 1999 survey. ^{iv}
2006	<i>"Arctic Red River Headwaters Project Phase II: Cultural Assessment – Interviewing Elders"</i> report is prepared by the Gwich'in Social and Cultural Institute. The Arctic Red River headwaters has been identified in the Gwich'in Land Use Plan Implementation Plan as requiring additional studies to reconsider whether the area meets the current zoning criteria, as well as to make recommendations regarding the potential for the headwaters area as a protected area.
2007	<i>"Headwaters of the Arctic Red River Phase III: Traditional Ecological Knowledge and Archaeological Assessment"</i> study conducted by the Gwich'in Social and Cultural Institute as part of the evaluation of the headwaters area for a zoning change in the Gwich'in Land Use Plan or potential formal protection. Includes traditional knowledge interviews with harvesters and Elders, and a preliminary archaeological assessment focussed on identifying archaeological potential.
2007	The Gwich'in Renewable Resources Board undertook a study to document Traditional Knowledge of fish migration and spawning patterns in Tsiigehtchic (Arctic Red River) and Nagwichoonjik (Mackenzie River). Harvesters were interviewed and information was recorded about timing of migration, spawning areas, and other relevant observations about the fish. ^v
2007	Tsiigehtchic resident Shane Van Loon discovered animal remains eroding from the side of a hill beside the Arctic Red River. The remains were of a steppe bison, which became extinct near the end of the last Ice Age, around 10,000 years ago. Due to the permafrost and the undisturbed terrain, the bison was well-preserved and is one of the most interesting palaeontological discoveries made in the Northwest Territories.
2007	The Gwich'in Renewable Resources Board collected Loche (burbot, <i>Lota lota</i>) from traditional fishing locations in the Gwich'in Settlement Area, including the Arctic Red River. Loche livers are considered a delicacy, and the study was designed to address community concerns regarding abnormal-looking loche livers. Report published in 2008 by the Gwich'in Renewable Resources Board.
2007	The second, revised edition of <i>"Gwichya Gwich'in Googwandak: The History and Stories of the Gwichya Gwich'in"</i> is published, which presents the story of Gwichya Gwich'in life on the land from pre-contact times to the present, including use of the Arctic Red River. Originally published in 2001.
2008 - 2009	The Tsiigehtchic Graveyard Project continued with assessment and mapping of the Old Graveyard in Tsiigehtchic in the centre of the community. Report published in 2014.

Year	Significant Events, Actions, Research or Studies
2009	The Gwich'in Harvest Study was re-initiated. It is a community-based monitoring program that informs wildlife management through providing data on species abundance and distribution. Results are reported to the Renewable Resources Councils in each community. ^{vi}
2010	Vik'ooyendik (Church Hill) in Tsiigehtchic, located at the mouth of the Arctic Red River, is designated as a Territorial Historic Site.
2010	Permafrost slumping research begins in the adjacent Peel River watershed, on the Peel Plateau. Traditional Knowledge workshops were held to discuss and gather information on permafrost disturbance and its effects on the land and water systems in the Richardson Mountains. Government and academic researchers, the Tetlit Gwich'in Renewable Resource Council, Gwich'in Tribal Council and Gwich'in Renewable Resources Board initiated a collaborative research and monitoring program in response to community concerns and scientific interest in the recent acceleration in mega-slump growth. These disturbances cause dramatic alterations to the landscape, hydrology, geochemistry and ecology of streams across the Peel Plateau, and this phenomenon has implications for other landscapes underlain by permafrost such as the Arctic Red River. Reports, posters and scientific papers were published by various authors. ^{vii}
2011	Moose Abundance and Composition in the Gwich'in Settlement Area and Inuvialuit Settlement Region survey conducted by Gwich'in Renewable Resources Board. ^{viii}
2011	The Gwich'in Social and Cultural Institute and Gwich'in Renewable Resources Board conducted a study to gather traditional knowledge on Woodland Caribou (Boreal population). This study informed the recovery planning process being led by Environment Canada for Woodland Caribou as it is classified as threatened under the federal <i>Species at Risk Act</i> .
2013	The Government of the Northwest Territories officially recognised over 400 traditional Gwich'in place names reflecting their land use across the Gwich'in Settlement Area of the NWT. Through the efforts of the Gwich'in Social and Cultural Institute working closely with Gwich'in Elders between 1992 and 2012, the names of various geographic features were identified and registered with the NWT Cultural Places Program.
2013	The NWT Community-based Water Quality Monitoring Program begins collecting water quality data for the Arctic Red River at Tsiigehtchic.
2011-2014	Government of Northwest Territories Department of Transportation Local Area Monitoring Program (LAMP) is carried out with the Tsiigehtchic Renewable Resource Council in the vicinity of the ferry landing on the Mackenzie River, near the mouth of the Arctic Red River. Some of the monitored fishing sites are located on the Arctic Red River.
2014	The Gwich'in Social and Cultural Institute and Gwich'in Renewable Resources Board conducted studies to gather traditional knowledge on Wolverine and Grizzly Bears as part of the " <i>Nin Nihlinehch'i' – Łi' hàh Guk'àndehtr'inahtii (Animals at Risk – animals we are watching closely) 2012-2014 Project</i> ".
2014	" <i>The Gwich'in Atlas: Place Names, Maps, and Narratives</i> " is published in: " <i>Developments in the Theory and Practice of Cybercartography</i> ." This chapter describes the results of place names research over a 20 year period with Gwich'in Elders living in the NWT, which resulted in an on-line Gwich'in Place Names Atlas showcasing 900 named places and the oral history behind them, a series of place name maps, and the official recognition of over 400 Gwich'in place names by the Governments of Northwest Territories and Yukon.
2014	Tsiigehtchic Tourism Society established.

Year	Significant Events, Actions, Research or Studies
2014	Devolution of authority from the Government of Canada to the Government of Northwest Territories for management of public lands, water and resources in the NWT.
2014	Bank Swallow surveys began in 2014, undertaken by the Gwich'in Renewable Resources Board in the lower reaches of the river (to approximately 30 km upstream of the mouth of the river).



Tsiigehnjik/Arctic Red River, October 2014

Photo by Lawrence Norbert, Tsiigehchic, Northwest Territories

Assessment of Natural Heritage Values since Designation (in 1993)

CHRS Natural Framework Themes	Natural Heritage Elements Description	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
1. HYDROLOGY			
1.1 Drainage Basins	<p><i>Drainage area:</i> 18,600 km²</p> <p><i>Basin:</i> Arctic Ocean Basin</p> <p><i>Stream number:</i> 2 (drains into Mackenzie River)</p>	None	None
1.2 Seasonal Variation	<p>Very low flow over winter (March mean discharge rate 11m³/s).</p> <p>Highest flow typically during spring runoff in June (June mean discharge 505 m³/s).</p> <p>A major rainstorm caused high flows and flooding in July 1970, flows at 7,650m³/s.</p> <p>The river freezes mid-October, with spring break-up in mid- to late-May.</p> <p>Ice depths vary from 1 to 2m.</p> <p>An ice jam develops during spring break-up at the river mouth where it enters the Mackenzie River. The Mackenzie River is still frozen at that time, and as the Mackenzie River melts, the rising water (typically 5 to 8 metres, sometimes up to 10 metres) reverses the flow of the Arctic Red River and pushes debris and the ice jam back up the Arctic Red River typically 40km. Mackenzie River ice has been found 40-50km upstream on the Arctic Red River, and scraping of the bark on trees along the banks of the river is visible sometimes 4 metres above the summer river levels.</p>	<p>Water Survey of Canada continues to operate a gauging station (in operation since 1968) on the Arctic Red River, measuring water flow and level. The station is located approximately 90 kilometres upstream from the river mouth, near Martin House.</p> <p>Highest (peak) flow on record during 1993-2004 was 2,060m³/s in early August 2000; daily discharge during that time was 1,840m³/s.</p> <p>During the 2005-2013 period (2014 data not available), peak flow was 2,750m³/s in May 2011; daily discharge that day was 2,650m³/s.</p> <p>While studies have not been conducted on the Arctic Red River itself, studies on the Mackenzie River, which the Arctic Red River drains into, have shown climatic variation over a 40 year period since the 1970's. Peak flows from snowmelt come a few days earlier, decreasing maximum flows in the spring, and increasing in winter base flows^{ix}.</p>	It is likely that climate change is having some impact on the amount and timing of water flows.
1.3 Water Content	<p><i>Physical:</i> Heavy sediment load. In winter the river is nearly devoid of sediments (Jackson Turbidity Unit = 2), however it is very turbid in the summer (Jackson Turbidity Unit = >100).</p>	None	None

CHRS Natural Framework Themes	Natural Heritage Elements Description	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
	<p>Sediment concentration data is available from the Water Survey of Canada for the period 1972-1975. During that time, the highest daily sediment concentration was 9,630 mg/L in early August 1974, and by the end of September, it was 50 mg/L. Sediment load in early August 1974 was 1,760,000 tonnes/day, and by end of September, was 648 tonnes/day.</p> <p><i>Chemical:</i> medium level of total dissolved solids (51-100mg/L)</p>		
1.4 River Size	<p>430 km long. The entire length is included in the Designation, from headwaters at Archie Lake to the confluence with Mackenzie River.</p> <p>Mean annual flow 157.8m³/s; mean total annual flow 4977 106m³/yr.^x</p>	None	None
2. PHYSIOGRAPHY			
2.1 Physiographic Regions	<p>Interior Plains (Peel Plain)</p> <p>Cordillera (Mackenzie Mountains, Peel Plateau)</p>	None	None
2.2 Geological Processes	<p><i>Bedrock Formation:</i> Sedimentation <i>Surficial Material Formation:</i> Glacial Scouring, Glacial Movement <i>Geological regions:</i> Mackenzie Fold Belt of the Mackenzie Mountains and Peel Plateau, and the Northern Interior Platform of the Peel Plain^{xi}.</p> <p>The area contains outstanding examples of the geological processes associated with the orogeny which created the Mackenzie Mountains. This includes classic examples of folded sedimentary mountain features, such as synclinal and antisyndinal cliff faces.</p> <p>The headwaters are in the Mackenzie Mountains, flowing from glaciers in the "Source Peaks" area on the unnamed mountain north of Archie Lake, the highest peak in the watershed. This area is also a source of water for the Bonnet Plume, the north and south Stewart River, the Snake River, the Stone Knife River and the Mountain River. It is a hydrologic centre for the north-east Yukon and north-west NWT. The glaciated area of the Source Peaks covered approximately 57 square kilometres in 1991.</p>	<p>In 2010, permafrost slumping research began in the adjacent Peel River watershed, on the Peel Plateau. No specific research related to slumps on the Arctic Red River has occurred.</p>	<p>While slumps have been a part of the landscape for decades, there has been notable acceleration in mega-slump growth. These disturbances cause dramatic alterations to the landscape, hydrology, geochemistry and ecology of streams across the Peel Plateau.</p>

CHRS Natural Framework Themes	Natural Heritage Elements Description	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
	<p>The area contains outstanding examples of landscapes associated with alpine glaciation and continental glaciation and contains one of the few un-glaciated areas (the Canyon Range) in Canada.</p> <p>There are superb examples of mass-wasting in a permafrost environment on the Peel Plateau section of the river, which was glaciated. Two land slumps, each 400 metres wide, are located immediately adjacent to the river, 20km north of Sven Lake. Also, at some locations in the Peel Plateau section, large fissures of ground ice (around 1 metre wide) can be seen exposed along the river bank.</p> <p>There also exists an unusual geologic phenomenon at the location known as at Jùuk'an, which involves permanently burning sulphide formations. These "Smoking Hills" exist immediately adjacent to the river and appear as smouldering rocks, from which smoke slowly rises.</p>		
2.3 Hydrogeology	<p><i>Bedrock:</i> Pervious (shales)</p> <p><i>Surficial Unconsolidated Materials:</i> Low Porosity – Fine-grained Clay and silt</p>	None	None
2.4 Topography	<p><i>Gradient:</i> From its headwaters, the river flows 120 kilometres through the Backbone and Canyon Ranges of the Mackenzie Mountains and descends 1,300 metres. The place where the river flows out of the mountains is known as Ddhahzhit Gwichoo. It enters the foothills, flowing through the Yellow and Lichen Ranges, descending another 300 metres. The elevation of the river at the start of the foothills is only 200 metres above sea level. The river then winds through the western side of the Mackenzie lowlands/Peel Plain.</p> <p><i>Relief:</i> In the headwaters in the Mackenzie Mountains, the highest peak in the watershed is an unnamed mountain north of Archie Lake at a height of 2,593 metres.</p> <p>Continuing downstream, the Canyon Range extends along the</p>	None	None

CHRS Natural Framework Themes	Natural Heritage Elements Description	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
	<p>eastern length of the north Mackenzie Mountains, with the highest mountains of this range around 2000 metres.</p> <p>Next is the Peel Plateau, dominated by rolling hills approximately 600 to 800 metres in height.</p> <p>Finally, in the downstream reaches, the Peel Plain is only slightly elevated above the river, generally with a rolling surface, with some hills reaching 200 metres.</p>		
3. RIVER MORPHOLOGY			
3.1 Valley Types	<p><i>Valley Walls:</i> In the headwaters in the Mackenzie Mountains, the west face of the unnamed mountain north of Archie Lake rises 1,500 metres directly from the river valley. Heading downstream through the Canyon Range, the river has steep sided valleys and canyons. In the Peel Plateau, which is characterized by V-shaped valleys and straight walled canyons, the river has cut a canyon 200 to 300 metre deep through the shale.</p> <p><i>Valley Floors:</i> For its first 90 kilometres, the river braids its way through the gravel bottom of a valley 3 kilometres wide. The river valley widens to nearly 10 kilometres across at the confluence of the Orthogonal River. Through the Canyon Range and Peel Plateau the river is confined within canyons. In the lower reaches through the Peel Plain the river is within a floodplain one to two kilometres wide.</p> <p><i>Interfluves:</i> Varies from peaked in the headwaters and upper reaches in the mountains, to round in the Peel Plateau and flat through the Peel Plain.</p>	None	None
3.2 Channel Types	<p><i>Stream configurations:</i> Meandering and branching. The river meanders and branches through the wide floodplains in the upper reaches, with some branching around channel islands through the lower reaches of the Peel Plain.</p> <p><i>Lake configurations:</i> Floodplain and feeder lakes in the lower reaches. The Peel Plain has an immense number of lakes dotting its surface, and many lakes within the rivers floodplain. Łèth Jithakaii (Ernest Cabin) is one place where there is a series of lakes</p>	None	None

CHRS Natural Framework Themes	Natural Heritage Elements Description	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
	immediately adjacent to the river, and Tateihsheii is another place where there is a lake within a horseshoe bend.		
3.3 Channel Profile	<p><i>Level Water:</i> Flat water in the lower reaches through the Peel Plain. Very steep in the headwaters.</p> <p><i>White Water:</i> Very limited.</p> <p><i>Waterfalls:</i> At least one^{xii}. The canyon sections have several drops of at least 1 to 3 metres^{xiii}. Canoeist trip reports note four or five rock ledges between Sven Lake and Cranswick River that produce falls or rapids^{xiv}.</p>	None	None
3.4 Fluvial Landforms	<p>The river has cut a 200-300 metre deep canyon through the shale formations of the Peel Plateau.</p> <p>The river is braided in the lower reaches around channel islands.</p> <p>The 1970 flood cut pathways through the dense vegetation slopes, meanders and channel islands in the lower reaches of the river. Some islands were removed, and new levees and dunes were formed.</p>	Evidence of the 1970 flood was visible at the time of nomination in 1993 with large log piles found hundreds of metres from the main channel, and channel island with only pioneering species growing on them.	None
4. BIOTIC ENVIRONMENTS			
4.1 Aquatic Ecosystems	The river includes spawning and nursery habitat for fish, including inconnu, arctic grayling, chub, sucker and cisco ^{xv} .	The Phase 1 Ecological Assessment of the Arctic Red River Headwaters completed in 2005 included an assessment of fish and the aquatic environment.	<p>None</p> <p>The ecological assessment of the headwaters noted no immediate concerns for fish or the aquatic environment.</p>
4.2 Terrestrial Ecosystems	<p>Boreal forests in the lowlands and valley bottoms (70% of the watershed), and alpine tundra above 1000 metres in elevation (30% of watershed).</p> <p>The boreal forest is subdivided into open spruce forest of the hills of the Peel Plain and Peel Plateau, and the riparian communities in the valley bottoms of the Arctic Red River.</p>	None	None
5. VEGETATION			
5.1 Significant	The treeline occurs at roughly 900 metres in elevation so most of	A forest vegetation inventory was completed	Spruce budworm has established along the

CHRS Natural Framework Themes	Natural Heritage Elements Description	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
Plant Communities	<p>the Mackenzie Mountains are free of forest vegetation, with dwarf birches and willows, grasses and tundra (heath) shrubs dominating. There are three types of tundra: meadows, low shrub-heath and rock deserts with little vegetation. The alpine meadows are comprised of mountain avens, sedges rushes and lichens.</p> <p>Riparian communities (primarily black spruce forest) within valley bottoms of the Arctic Red River have superior growing conditions within a generally harsh sub-arctic environment. Trees growing here can reach heights of 30m+ and have diameters over 60cm. In contrast, trees on the rolling hills of the Peel Plateau and Peel Plain are stunted and rarely exceed 20cm in diameter. The trees in the riparian valley through the Peel Plateau are growing just 120km south of the continental tree line and represent some of the largest trees growing north of the Arctic Circle in Canada.</p>	<p>for the lower reach of the river (extending from the river mouth to approximately 65 km upstream) from 1:20,000 scale black and white photography acquired in 1995. The inventory provides stand level forest information on land cover classification, species composition, density, height, age, understory as well as site variables such as moisture and productivity. Although the inventory is now 20 years old, the slow growth of forests and relatively small impact from forest fires means that the inventory should still be relevant.</p> <p>GNWT Environment and Natural Resources has been monitoring the forested areas along the river for spruce budworm.</p>	<p>Arctic Red River, with the first records in 2008 (although due to gaps in monitoring it could possibly have entered the area as early as 2006). The area and severity of defoliation have increased since then. In 2008, total defoliation along the river measured 3,521 hectares. By 2012 the area had doubled to 7,264 hectares, and in 2014 the extent of defoliation measured 10,443 hectares with severe defoliation occurring over the majority (9,567 hectares) of that area. Several consecutive years of defoliation has resulted in tree mortality. It is possible the stands will regenerate; however monitoring will continue to determine the regeneration capacity. It is likely that this spruce budworm outbreak is a consequence of climate change with populations shifting north into previously unaffected areas.^{xvi}</p>
5.2 Rare Plant Species	<p>Seven species of plants which may be in the headwaters area have been rated as May be at Risk or Sensitive in the General Status Ranks of Wild Species in the Northwest Territories: Porsild's Blue Grass (<i>Poa porsildii</i>), Fragile (Slender) Rock Brake (<i>Cryptogramma stelleri</i>), Green Spleenwort species (<i>Asplenium trichomanes-ramosum</i>), Spreading (Northern) Woodfern (<i>Dryopteris expansa</i>), Northern Beech Fern (<i>Phegopteris connectilis</i>), and Floating Pondweed (<i>Potamogeton natans</i>)^{xvii} These plants occur in other areas of the Taiga Cordillera Ecozone, although it is not known if they occur in the Arctic Red River headwaters area.</p>	<p>The Phase 1 Ecological Assessment of the Arctic Red River Headwaters completed in 2005 included an assessment of plant species which may occur in the headwaters area.</p>	<p>None</p>
6. FAUNA			

CHRS Natural Framework Themes	Natural Heritage Elements Description	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
6.1 Significant Animal Populations	<p>The mountain headwaters area encompass a portion of the wintering grounds of the Porcupine Caribou (<i>Rangifer tarandus granti</i>) herd, which is of importance to particular Aboriginal people in Alaska, the Yukon and NWT.</p> <p>The wintering grounds of a portion of the Bonnet Plume Woodland Caribou (<i>Rangifer tarandus caribou</i>) herd also occur in the headwaters of the Arctic Red River.</p> <p>Boreal Woodland Caribou (<i>Rangifer tarandus caribou</i>) occur in the lower portions of the Arctic Red River.</p> <p>The Mackenzie Mountains support large numbers of Dall's Sheep, as well as wolverine and grizzly bear.</p> <p>In the river valley of the lower river reaches are grizzly bear, black bear, moose, wolf, coyote, lynx, marten, mink, weasel, fisher, muskrat, beaver, fox and river otter.</p> <p>The cliffs along the river and the habitat of the valley bottom and lowland section of the river are ideal for Peregrine Falcons which are found in high numbers along the cliffs. Bank Swallows also use the lower reaches of the river. Other migrating birds and waterfowl which use the watershed include Sandhill Cranes, Snow Geese, Canada Geese, Whistling (Tundra) Swans, and Greater White-fronted Geese. Golden Eagles, Bald Eagles and Gyrfalcons are also seen along the water course.</p> <p>The river is a migration route and major spawning area for fish in the region, including Arctic Grayling, Broad Whitefish, Burbot (loche), Humpback/Lake Whitefish, Inconnu (coney) and Northern Pike (jackfish).</p>	<p>Information and knowledge of mountain woodland caribou in the headwaters of the Arctic Red River, and the boreal woodland caribou found along the lower reaches of the river, was documented in the 2011 report on Gwich'in Traditional Knowledge: Woodland Caribou, Boreal Population by the Gwich'in Social and Cultural Institute. Information from this report was included in the Aboriginal Traditional Knowledge Summary Reports on Woodland Caribou (<i>Rangifer tarandus caribou</i>), Boreal Population, compiled in 2011 by Environment Canada. ^{xviii}</p> <p>An aerial and ground survey for part of the Bonnet Plume herd of mountain caribou in the Mackenzie Mountains in the area of the Arctic Red River was undertaken in 2000. ^{xix}</p> <p>An aerial survey for moose was undertaken in the Arctic Red River region by the Gwich'in Renewable Resources Board in November 1999 and again in 2006. ^{xx}</p> <p>In 2014, reports summarizing Gwich'in traditional knowledge of Wolverine and knowledge of Grizzly Bears were compiled, including information on distribution of Wolverine and Grizzly Bears in the Arctic Red River area. ^{xxi, xxii}</p> <p>Bank Swallow surveys began on the lower reaches of the river in 2014.</p> <p>Several studies on fish which include the Arctic Red River have been completed:</p> <ul style="list-style-type: none"> • Migration patterns of inconnu in the Mackenzie River watershed in 1998 ^{xxiii, xxiv} • Documentation of community concerns 	<p>The report on the 2006 aerial moose survey indicates a significant decline in moose densities compared with the results of surveys done in 1999 and in the 1980's. The report notes that the habitat may not be favourable to moose, and that woodland caribou had been observed in the area instead. The 2011 aerial moose survey results indicated a slightly higher density than observed in 2006, but moose density in the area is still very low.</p>

CHRS Natural Framework Themes	Natural Heritage Elements Description	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
		<p>and knowledge about Broad Whitefish in 2001^{xxv},</p> <ul style="list-style-type: none"> • Index netting in 2004^{xxvi} • A traditional knowledge study of fish migration and spawning patterns in 2007^{xxvii}, • Burbot biology and liver quality in 2008^{xxviii} 	
6.2 Rare Animal Species	<p>Wolverine, Grizzly Bear, Fisher, Peregrine falcon, Arctic Grayling, and Inconnu have been ranked as sensitive in the General Status Ranks of Wild Species in the Northwest Territories. These are species that are not considered to be at risk in the Northwest Territories, but may require special attention or protection to prevent them from becoming at risk. Grizzly Bear, Wolverine and Peregrine Falcon (<i>Falco peregrines anatum</i>), are federally listed as special concern.</p> <p>Boreal Woodland Caribou (<i>Rangifer tarandus caribou</i>) occur in the lower reaches of the Arctic Red River, and are listed as threatened under the federal <i>Species at Risk Act</i> and the territorial <i>Species at Risk (NWT) Act</i>.</p> <p>Bank Swallow (<i>Riparia riparia</i>) are considered in the General Status Ranks of Wild Species in the Northwest Territories to be at risk. COSWIC has assessed Bank Swallow as Threatened; the species is under consideration to be formally listed federally as a species at risk.</p>	<p>Information and knowledge of Boreal Woodland Caribou in the Arctic Red River watershed was documented in the 2011 report on Gwich'in Traditional Knowledge: Woodland Caribou, Boreal Population by the Gwich'in Social and Cultural Institute. Information from this report was included in the Aboriginal Traditional Knowledge Summary Reports on Woodland Caribou (<i>Rangifer tarandus caribou</i>), Boreal Population, compiled in 2011 by Environment Canada. xxix</p> <p>A management plan is in place for the Northern Mountain Population of Woodland Caribou under the federal <i>Species at Risk Act</i>.^{xxx}</p> <p>Bank Swallow surveys began on the lower reaches of the river in 2014.</p>	<p>In 2014, Boreal Woodland Caribou were listed as Threatened in the NWT under the territorial <i>Species at Risk (NWT) Act</i>. An NWT Boreal Caribou Recovery Strategy is being prepared.</p> <p>For the Northern Mountain Population of Boreal Woodland Caribou, the management plan indicates that the status continues to be special concern, overall the population is stable or increasing. The Bonnet Plume herd in particular is believed to be stable^{xxxi} although recent survey data is lacking. A survey was conducted by the Gwich'in Renewable Resources Board in the northern Mackenzie Mountains in 2000 and noted it did not appear that the population or habitat were under any threat from development or human activities^{xxxii}. Information collected by ENR from voluntary wildlife observation data from Mackenzie Mountain outfitters and clients since 1991 was analysed and suggests that the herd has been relatively stable over the past 20 years.^{xxxiii}</p>

Assessment of Cultural Heritage Values since Designation (in 1993)

CHRS Cultural Framework Themes	Cultural Heritage Value(s)	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
1. RESOURCE HARVESTING			
1.1 Fishing	<p><i>Aboriginal prehistoric fishing:</i> For centuries, the Gwich'in people have relied on the annual migration cycle of Broad (<i>Coregonus nasus</i>) and Lake (Humpback) (<i>Coregonus clupeaformis</i>) Whitefish, Inconnu, Burbot and Northern Pike for food for both themselves and their dogs.</p> <p>There are many known traditional fishing places, reflected in their place names.</p> <p>Daats'it K'adh Chii Hidi Chuudlajj is a location noted as a river where fishtraps for sucker were placed.</p> <p>Eltyin Choo Chihvyah K'it is another location where people coming down from the mountains in mooseskin boats used to stop to fish for jackfish (northern pike), and is named for Jackfish Creek, which was known to be a place to put underwater snares/fishnets for jackfish.</p> <p>Daazrajj Vàn K'adh Njik and Daazrajj Vàn K'adh Tshik are Gwich'in Place Names for a creek that flows out of Swan Lake (also known as Bluefish Creek or Swan Creek) where people used to use fishtraps for grayling.</p> <p>Hehnjuu Deet'yah Tshik is the location at the mouth of a creek (also known as Bernard Creek or Sainville River) which is a good fishing spot and, in the past, was one of the most important places along the Arctic Red River.</p> <p>Teetshik Gwichoo (Weldon Creek) was an important place for making dry fish in the spring^{xxxiv}.</p> <p><i>Historic domestic fishing and processing:</i> The Gwich'in continue harvesting fish from the Arctic Red River from May through December^{xxxv}. Whitefish is traditionally, and presently, used to make dryfish.</p>	<p>Participants in the 2007 traditional knowledge study on fish migration and spawning in the Arctic Red River agreed that the most important fish for human consumption is Whitefish (Broad Whitefish). The second most important species is Inconnu (coney), with Crookedback (Lake Whitefish) and loche (Burbot) tied for third^{xxxvi}.</p> <p>The 2000 Arctic Red River fish contaminant study indicated that Inconnu, Broad Whitefish and Burbot were considered safe to eat, provided that guidelines for consumption of Burbot livers were followed.</p> <p>The Gwich'in Land Use Plan has zoned much of the Arctic Red River and its headwaters area as a Special Management Zone, which applies specific conditions to activities relating to fish.</p> <p>The Traditional Gwich'in Place Names project identified places known for fishing, including Daats'it K'adh Chii Hidi Chuudlajj and Eltyin Choo Chihvyah K'it, Daazrajj Vàn K'adh Njik, Daazrajj Vàn K'adh Tshik, Hehnjuu Deet'yah Tshik, and Teetshik Gwichoo.</p>	None

CHRS Cultural Framework Themes	Cultural Heritage Value(s)	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
	<p><i>Commercial fishing:</i> Unknown</p> <p><i>Collection of shellfish:</i> None</p>		
1.2 Shoreline Resource Harvesting	<p><i>Trapping of fur-bearing animals:</i> Trapping has always been a part of the subsistence lifestyle of the Gwich'in. In the late 1800's and early 1900's, fur trade activities with Hudson's Bay traders and other trading companies was very active in the area. Trapping as part of a subsistence lifestyle continued through the 1940's, 1950's and into the late 1960's. Trapping in the Martin Zheh (Martin House) area along the Arctic Red River was good particularly for marten.^{xxxvii} Trapping as part of the traditional economy continues today, with wolverine, lynx, marten, mink, weasel, fisher, muskrat, beaver, fox and river otter taken. Wolverine are regularly caught by trappers operating close to the mountains.</p> <p><i>Collection of aquatic plants:</i> Bladderwort and Water lily/Yellow pond lily are aquatic plants that are harvested and used for medicinal purposes^{xxxviii}, although it is unknown if they occur along the Arctic Red River.</p> <p>The traditional Gwich'in Place Names Atlas notes a location named Nichih Sree Tthòo' adjacent to the river, which is a hill named for rosehips ripened by the sun, and is a good place to harvest rosehips.</p> <p><i>Hunting of birds and land animals:</i> The Arctic Red River has traditionally been the main access route to hunt Dall's Sheep and caribou from the Porcupine Caribou herd in the Mackenzie Mountains. It continues to be an access route to hunt these resources.</p> <p><i>Riverside mines and quarries:</i> None.</p>	None	None
1.3 Extraction of Water	<p><i>Power generation:</i> None</p> <p><i>Human consumption:</i> There is no water extraction from the Arctic Red River, likely due to</p>	None	None

CHRS Cultural Framework Themes	Cultural Heritage Value(s)	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
	<p>high turbidity and suspended solids. Water for drinking and domestic purposes for the community of Tsiightchic is taken from Tso Lake, and cabins and campsites along the Arctic Red River obtain drinking water from clear-running tributary streams.</p> <p><i>Agricultural extraction:</i> None</p> <p><i>Industrial extraction:</i> None</p>		
2. WATER TRANSPORT			
2.1 Commercial Transportation	<p><i>Prehistoric Trade:</i> There are a number of heritage sites along the Arctic Red River, including at Teetshik gwichoo, which is at the mouth of Weldon Creek, where people coming down from the mountains would stop to make moose skin boats^{xxxix}.</p> <p><i>Historic human-powered freight:</i> In the 1900's, people from the mountains would travel to a trading post at Hehnjuu deet'yah tshik (Bernard Creek) on the Arctic Red River to buy supplies.</p> <p><i>Powered commercial freight:</i> None.</p> <p><i>Surface bulk transportation:</i> None.</p>	The Gwich'in Land Use Plan has zoned much of the Arctic Red River and its headwaters area as a Special Management Zone, with a portion zoned as a Conservation Zone and three Heritage Conservation Zones. Significant heritage sites in these zones are protected through application of special conditions to development projects or through the prohibition of certain land uses, depending on the zone.	None
2.2 Transportation Services	<p><i>Fur trading posts:</i> There was a small town and trading post in the 1900's at Hehnjuu deet'yah tshik (Bernard Creek) on the Arctic Red River where people from the mountains would travel to buy supplies. People also travelled down and along the Arctic Red River to trap and bring furs to the two trading posts at the confluence of the Arctic Red River with the Mackenzie River.</p> <p><i>Navigational improvements:</i> None.</p>	None	None

CHRS Cultural Framework Themes	Cultural Heritage Value(s)	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
	<p><i>Shipyards:</i> None.</p> <p><i>Facilities for loading and provisioning passengers:</i> None.</p>		
2.3 Exploration & Surveying	<p><i>European explorers:</i> Alexander Mackenzie travelled by the mouth of the Arctic Red River in 1789 during his exploration of the Mackenzie River.</p> <p>The region was further explored when the Hudson's Bay Company began looking to establish a post. John Bell of the Hudson's Bay Company explored up the Peel River in 1839 where he met Teetl'it Gwich'in near Trail River who suggested the post be established there, but HBC established the first Peel River Post around 4 miles upriver from present day Fort McPherson in 1840 so they could take advantage of trade with Gwichya Gwich'in and Siglit. Alexander Isbister, also of the Hudson's Bay Company, travelled overland from Fort McPherson in April 1841 and connected with the Arctic Red River, 32 kilometres from its mouth, becoming the first non-Aboriginal person known to have travelled on the river.</p> <p>Another early explorer was E. Petitot in 1878, who noted that the Gwich'in came together twice a year at the mouth of the Arctic Red River with Hudson's Bay Company traders and Eskimos from the coast.</p> <p>Comte de Sainville, from France, may have also explored the Arctic Red River during his explorations in the Mackenzie River delta and the adjacent Peel River in the 1890's. Hehnjuu Deet'yah Tshik (Bernard Creek) is officially named Sainville River.</p> <p>Christian missionaries also came to the area, with Father Seguin establishing a Catholic church presence in 1868 at the Old Arctic Red townsite.</p> <p><i>Migration and settlement:</i> The Arctic Red River was a migration route and the Gwich'in established cabins, campsites, and a small townsite along it, with cabins and campsites still in use today. However aside from</p>	None	None

CHRS Cultural Framework Themes	Cultural Heritage Value(s)	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
	Tsiigehnjik at the river mouth, no other permanent settlements were established along the river.		
3. RIPARIAN SETTLEMENT			
3.1 Siting of Dwellings	<p><i>Seasonal campsites:</i> Seasonal campsites and cabins were historically, and are still, located along the Arctic Red River and used by the Gwichya Gwich'in.</p> <p><i>Isolated homesteads or farms:</i> None known. Most cabins were and still are grouped at certain creek mouths.</p> <p><i>Permanent riverside dwellings:</i> In the area around Martin Zeh (Martin House) an archaeological reconnaissance found several hearth sites and collapsed 20th century cabins. Martin Zeh is named after a trapper who lived in a cabin here in the 1920's, and there were many other cabins in the area and people referred to it as a town. There also used to be a number of cabins located around Eltyin choo chihvyah k'yit (the mouth of Jackfish Creek), and at Hehnyuu deet'yah tshik (the mouth of Bernard Creek) where there was another small town and trading post in the 1900s. One cabin still stands at Bernard Creek today.</p> <p><i>Dispersed dwellings:</i> Dwellings along the Arctic Red River were not organized according to any type of formal plan but tended to be grouped around certain creek mouths where fish and other resources were known.</p>	None	None
3.2 River-based Communities	<p><i>Permanent Aboriginal settlements:</i> Tsiigehnjik is the only settlement in the Arctic Red River watershed, located at the confluence of the Arctic Red River with the Mackenzie River. It is located at the site of a traditional fish camp that became the site of trading posts in 1901 and 1902. The Gwich'in established a permanent settlement adjacent to the trading posts. The Catholic Church also moved their mission from the "Old Arctic Red" townsite (located 10 kilometres downstream on the Mackenzie River), encouraging the development of this settlement.</p>	None	None

CHRS Cultural Framework Themes	Cultural Heritage Value(s)	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
	<p><i>Fortification-based communities:</i> None.</p> <p><i>River Industry-based communities:</i> Tsiigehchtchic became a permanent settlement due to the trading posts that were established there for the fur trade.</p> <p><i>River crossing-based communities:</i> None. While there is a ferry which crosses the mouth of the Arctic Red River for access to Tsiigehchtchic from the Dempster Highway, the community origin is not based on it having been a river crossing location on a land-based travel route.</p>		
3.3 River-influenced Transportation	<p><i>Ferries:</i> None. The ferry "Louis Cardinal" carries vehicles and passengers across the mouth of the Arctic Red River into the community of Tsiigehchtchic, as well as across the Mackenzie River as part of the Dempster Highway, however this is a development of recent times.</p> <p><i>Fords, Road bridges, and/or Rail bridges:</i> None</p> <p><i>River-influences roads and railways:</i> None. The Dempster Highway does not follow the Arctic Red River valley.</p>	None	None
4. CULTURE & RECREATION			
4.1 Spiritual Associations	<p><i>Sacred or spiritual sites:</i> Nèhtrùh Chì' is a place where it is said that a giant wolverine burrowed underneath the ground and went into the Arctic Red River, breaking up a hill on its way. The giant wolverine is considered wicked and will kill any person it encounters, so Elders who know of this place are still cautious around there^{xl}.</p> <p><i>Ritual and ceremonial structures and sites:</i> The historic Roman Catholic mission and church located in Tsiigehchtchic at the mouth of the Arctic Red River are representative of the coming of Christianity to the lower Mackenzie Valley.</p> <p><i>Aboriginal burial places:</i></p>	None.	None

CHRS Cultural Framework Themes	Cultural Heritage Value(s)	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
	<p>There are many locations along the river where Gwichya Gwich'in were buried considering the long history of use of the river. Sites are noted at Bernard Creek and Martin House.</p> <p>Ghost Lake, located adjacent to Tsiigehtchic at the mouth of the Arctic Red River, is known locally as the lake in which the Gwich'in deposited the bodies of "Eskimos" (Siglit) killed during a conflict between the two groups long ago. The conflict took place on the flats at the confluence of the Arctic Red and Mackenzie rivers.</p> <p><i>European burial places:</i> Some priests and other Europeans may be buried in the cemetery in Tsiigehtchic.</p>		
4.2 Cultural Expression	<p><i>River-based cultural landscape:</i> The Arctic Red River has been a travel route for the Gwichya Gwich'in for harvesting between the Mackenzie River and the Mackenzie Mountains for centuries.</p> <p><i>Culturally associated sites:</i> There are sites along the river associated with Gwichya Gwich'in culture.</p> <p>Nèhtrùh Chì' is a location in the Martin Zheh (Martin House) area which elders talk about as being inhabited long ago by a giant wolverine which killed anyone it encountered. The wolverine burrowed underneath the ground, breaking it up as it travelled from a lake to the Arctic Red River. This created the land as it appear today, which looks as though it has been ripped apart.</p> <p><i>Buildings directly tied to river heritage:</i> None.</p> <p><i>Riverside museums and art galleries:</i> None.</p> <p><i>Architectural responses to river locations:</i> None.</p>	None	None
4.3 Early Recreation	<p><i>Recreational boating:</i> None. Boating on the Arctic Red River would have been to fish or</p>	None	None

CHRS Cultural Framework Themes	Cultural Heritage Value(s)	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
	<p>acquire other resources. There was no early tourism in the area.</p> <p><i>Angling:</i> None. Fishing would have been for subsistence, not recreational, purposes, and there was no early tourism in the area.</p> <p><i>Land-based touring:</i> None.</p> <p><i>Organized recreation facilities and clubs:</i> None.</p>		
5. JURISDICTIONAL USES			
5.1 Conflict & Military Associations	<p><i>Aboriginal:</i> Ghost Lake, located adjacent to Tsiigehnjik at the mouth of the Arctic Red River, is known locally as the lake in which the Gwich'in deposited the bodies of "Eskimos" (Inuvialuit) killed during a conflict between the two groups long ago. The conflict took place on the flats at the confluence of the Arctic Red and Mackenzie rivers.</p> <p><i>European:</i> None.</p> <p><i>Military expeditions:</i> None.</p>	None	None
5.2 Boundaries	<p><i>International border:</i> No.</p> <p><i>Inter-provincial/Inter-territorial boundary:</i> The river itself is not a boundary; however, the western boundary of the Arctic Red River watershed defines the border between Yukon Territory and the Northwest Territories.</p> <p><i>Historic land use boundary:</i> No.</p> <p><i>Transboundary river:</i> No.</p>	None	None

CHRS Cultural Framework Themes	Cultural Heritage Value(s)	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
5.3 Environmental Regulation	<p><i>Flood control structures:</i> None.</p> <p><i>Improvements to water management:</i> None.</p> <p><i>Improvements to aquatic ecosystems:</i> None.</p> <p><i>Regulation of access and use:</i> The Peel River Preserve occupies the northwest corner of the Arctic Red River watershed, with the west bank of the river forming part of its boundary. The Preserve was established in 1921 and provided hunting rights to the Gwich'in within its boundaries. The Preserve is still in place, but today, traditional hunting rights are guaranteed by the Gwich'in Land Claim.</p>	None	None

Assessment of Recreation Values since Designation (in 1993)

CHRS Recreational Capability Themes	Description of Current Situation	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
1. BOATING			
1.1 White-water Canoe, Kayak & Raft	Very limited whitewater anywhere along the river. Canoeist trip reports note rapids are mostly Class 1 and 2 ^{xli} .	None	None
1.2 Extended Canoe Tripping (motor & non- motor)	The river is navigable by small motorized craft for 200 kilometres upstream of its mouth. Navigation upstream of the confluence with the Cranswick river is difficult because of decreased flow, and the first serious impediment to upstream travel occurs 250 kilometres upstream when a drop of a metre occurs over a shale shelf and any boat would need to portage. The river is navigable downstream by canoe, kayak and raft for around 390 kilometres but there are limitations, for example, access is difficult (e.g. there are only a couple of nearby lakes that a float plane can land on).	A group of paddlers travelled the length of the Arctic Red River in 2009 and posted an account of the trip on a blog on the internet ^{xlii} . Another group paddled the river in 2011 and posted a trip log on Canadian canoe routes website ^{xliii} .	None
1.3 Day Paddling & Rowing	Tsiigehtchic holds the annual "Canoe Days" festival to celebrate the end of summer, hosted on the shores of the Arctic Red River with canoe races on the river. 2014 was the 23 rd year for the event.	None	None
1.4 High Speed Boating	Not applicable as only small motorized craft can navigate the river.	None	None
1.5 Motorized Pleasure Cruising / Houseboats	Not applicable as only small motorized craft can navigate the river.	None	None
1.6 Commercial Tour Boats	None operating.	None	None
1.7 Sailing	Not applicable.	None	None
2. ANGLING			

CHRS Recreational Capability Themes	Description of Current Situation	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
<p><u>Note:</u> Angling on the Arctic Red River is generally undertaken for subsistence, not recreation. Recreational fishing opportunities do exist, due to the ease of motorboat access upstream and species of recreational interest (including Northern Pike, Arctic Grayling and Inconnu) generally found in the creeks that flow into the Arctic Red River, but recreational fishing is currently not a significant use of the river. People canoeing down the river may fish for shore lunch or dinner.</p>			
2.1 Day Angling	Not applicable.	None	None
2.2 Weekend Angling	Not applicable.	None	None
2.3 Extended Angling Vacation	Not applicable.	None	None
2.4 Fly Fishing	Not applicable.	None	None
2.5 Ice Fishing	Not applicable.	None	None
2.6 Specific Fish Species	Not applicable.	None	None
3. WATER CONTACT/CONTENT			
3.1 Swimming	Not applicable.	None	None
3.2 Water Skiing	Not applicable.	None	None
3.3 Snorkel/Scuba	Not applicable.	None	None
4. WATER-ASSOCIATED ACTIVITIES			
4.1 Trail Use (hiking, walking, cycling)	There are no trails. There is excellent wilderness hiking in the Mackenzie Mountains.	None	None
4.2 Camping	Camping is required as part of any canoe trip down the Arctic Red River.	None	None

CHRS Recreational Capability Themes	Description of Current Situation	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
4.3 Hunting	<p>Recreational hunting occurs in the upper portion of the watershed, in the north Mackenzie Mountains, for Dall's Sheep, caribou and moose.</p> <p>Arctic Red River Outfitters Ltd. are the only hunting guides with a base in the Arctic Red River watershed. They offer backpack or horseback hunting within a 10,000 square mile outfitting area that encompasses part of the Arctic Red River watershed.^{xliv}</p>	None	None
5. WINTER ACTIVITIES			
5.1 Snowmobiling/Dog Sledding	Not undertaken recreationally. These modes of winter transportation would be used by people accessing cabins along the river for winter trapline activities.	None	None
5.2 Cross-country Skiing	Not applicable.	None	None
5.3 Skating	Not applicable.	None	None
6. NATURAL HERITAGE APPRECIATION			
6.1 Wildlife	There are many opportunities for wildlife viewing and appreciation along the river as it descends through the various physiographic regions, from the Mackenzie Mountains, through the Peel Plateau, to the Peel Plain. This is considered part of the appeal of a canoe trip down the river.	None	None
6.2 Vegetation	The change in vegetation from the headwaters to the mouth of the river as it descends through the various physiographic regions, from the Mackenzie Mountains, through the Peel Plateau, to the Peel Plain, is part of the appeal of a canoe trip down the river. The trees in the riparian valley through the Peel Plateau represent some of the largest trees growing north of the Arctic Circle in Canada.	GNWT Environment and Natural Resources has been monitoring the forested areas along the river for spruce budworm.	Spruce budworm has established along the Arctic Red River, with the first records in 2008 (although due to gaps in monitoring it could possibly have entered the area as early as 2006). The area and severity of defoliation have increased since then. Several consecutive years of defoliation has resulted in tree mortality in the stands along the river. These stands may regenerate.

CHRS Recreational Capability Themes	Description of Current Situation	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
6.3 Vistas/Scenic Quality	<p>The river traverses a variety of landscapes including non-glaciated plateaux, landscapes shaped by alpine glaciation and landscapes formed by continental glaciation.</p> <p>The scenery is considered to be outstanding in two locations: the mountains of the Source Peaks area which have rugged peaks and impressive glaciers, and the canyon area between Sven Lake and 'the Grand Bend' with steep sedimentary cliffs, impressive land slumps and rapids.</p>	None	None
6.4 Geological Features/Water Features	<p>There are outstanding examples of the geological processes which created the Mackenzie Mountains, including folded sedimentary mountain features such as synclinal and antisyndinal cliff faces.</p> <p>The river originates from glacial meltwaters in the 'Source Peaks' area where glaciers can be seen.</p> <p>In lower reaches, the river cuts away the permafrost from the valley walls and large fissures of ground ice are visible in many of the river cut-banks.</p> <p>The "Smoking Hills" exist immediately adjacent to the river and appear as smouldering rocks, from which smoke slowly rises. These are an unusual geologic phenomenon involving permanently burning sulphide formations.</p> <p>Fossils are noted in rock outcrops near Martin House.</p> <p>At Łiidlajj (The Forks), where the Cranswick River and Arctic Red River meet, a variety of colours are visible within the black shale cliffs^{xlv}.</p> <p>In the lower reaches examples of the kinds of impacts resulting from period flooding are still visible from the major flood in 1970.</p> <p>The river also displays the powerful hydrologic forces associated with the annual spring ice-breakup. River</p>	None	None

CHRS Recreational Capability Themes	Description of Current Situation	Significant Actions, Research or Studies	Changes or Threats to Nomination Value(s)
	flow reversal and river bottom ice scouring is a unique hydrological phenomenon. Evidence of the annual rise of the Arctic Red River is visible on the bark of trees on river banks, up to 5 metres above summer levels.		
7. HUMAN HERITAGE APPRECIATION			
7.1 Historic Sites	There are several old cabins and cabin sites located along the river, for example around Martin Zehh (Martin House) and Bernard Creek. At the mouth of the river, the community of Tsiigehchtchic became a permanent settlement due to the trading posts that were established there for the fur trade, and the old Catholic Church, mission buildings and cemetery built up on the hill overlook the Arctic Red River.	None	None
7.2 Cultural Landscapes	The Arctic Red River is a cultural landscape of the Gwichya Gwich'in.	None	None
7.3 Sporting Events/Activities	Tsiigehchtchic holds the annual "Canoe Days" festival to celebrate the end of summer, hosted on the shores of the Arctic Red River with canoe races on the river and other games and contests. 2014 was the 23 rd year for the event.	None	None
7.4 Cultural Events/Activities	Tsiigehchtchic holds the annual "Canoe Days" festival to celebrate the end of summer, hosted on the shores of the Arctic Red River with canoe races on the river and other games and contests. 2014 was the 23 rd year for the event.	None	None

Integrity Guidelines since Designation (in 1993)

CHRS Principles, Procedures and Operational Guidelines	Integrity Values	Changes or Threats to Integrity Values 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 value.	The entire length of the river is included in the designation, from Archie Lake to the mouth of the river at Tsiigehtchic. The designation indicated the management area extends 1 kilometre on either side of the river.	The Gwich'in Land Use Plan came into effect in August 2003. Most of the length of the river is zoned as either Special Management Zone or Conservation Zone/Heritage Conservation Zone in the Gwich'in Land Use Plan. One section in the upper reaches of the river is zoned as General Use. The Special Management Zone includes a 1 km buffer around the river, and the whole headwaters area is within a Special Management Zone. The sections zoned as Conservation Zones extend the buffer further than 1km. All land uses are possible in General Use Zones (with the necessary approvals), and in Special Management Zones subject to additional conditions outlined in the Land Use Plan. Conservation Zones and Heritage Conservation Zones prohibit certain land uses.
1.2 The nominated area contains those ecosystem components required for the continuity of the species, features or objects.	There are three biophysical regions represented along the river length, and the river valley is the most productive area.	None
1.3 There are no human-made impoundments within the nominated area.	No human-made impoundments.	None
1.4 All key elements and ecosystem components are unaffected by impoundments located outside the nominated area.	The entire river is within the designated area. No human-made impoundments on the river or within its' watershed.	None
1.5 Natural values for which the river is nominated have not been created by impoundments.	No human-made impoundments on the river or within its' watershed.	None
1.6 The water of the nominated area of the river is uncontaminated to the extent that its natural aquatic ecosystem is intact.	No developments or resource use occur in the watershed other than hunting, fishing, trapping and collection of firewood for personal use. No alterations of the watercourse have been undertaken.	None
1.7 The natural aesthetic value of the river is not compromised by human developments.	No developments or resource use occur in the watershed other than hunting, fishing, trapping and collection of firewood for personal use. Cut lines (4m wide swaths) from the 1970's oil and gas seismic exploration are still visible as the	None

CHRS Principles, Procedures and Operational Guidelines	Integrity Values	Changes or Threats to Integrity Values since Nomination
	vegetation slowly regenerates.	
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.	<p>The river has been, and continues to be used both as a corridor for transportation and as a focus for resource utilization by the Gwichya Gwich'in. The river provides access to the resources of the Mackenzie Mountains. During seasonal migrations up the river, the Gwichya Gwich'in would also utilize the wildlife, fish and vegetation resources along the river.</p> <p>The entire length of the river is included in the designation, and the management area extends 1 kilometre on either side of the river.</p>	<p>The Gwich'in Land Use Plan came into effect in August 2003. Most of the length of the river is zoned as either Special Management Zone or Conservation Zone/Heritage Conservation Zone in the Gwich'in Land Use Plan. One section in the upper reaches of the river is zoned as General Use.</p> <p>The Heritage Conservation Zones are identified at Eltyin choo chihvyah k'yit (the mouth of Jackfish Creek), Hehnjuu deet'yah tshik (the mouth of Bernard Creek), and Martin Zheh (Martin House), which are sites where cabins and a small town and trading post were historically located.</p>
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.	Most of the river still appears the same as it has for centuries, with exception of the 1970's seismic cut lines from oil and gas exploration that are still regenerating. No developments or resource use occur in the watershed other than hunting, fishing, trapping and collection of firewood for personal use.	None
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.	The historic cabin sites along the river are undisturbed. The Catholic Church and mission buildings situated at the mouth of river are representative of the coming of Christianity to the population of the lower Mackenzie valley, and remain intact. There are no impoundments and present human land uses are limited to harvesting activities and cabins to support those activities.	None
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.	Water quality has not changed.	None

CHRS Principles, Procedures and Operational Guidelines	Integrity Values	Changes or Threats to Integrity Values since Nomination
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.	Water quality has not changed and remains suitable for canoe trips and boating.	None
3.2 The river's visual appearance is capable of providing river travelers with a continuous natural experience, or a combined natural and cultural experience, without significant interruption by modern human intrusions.	Most of the river still appears the same as it has for centuries, with exception of the 1970's seismic cut lines from oil and gas exploration that are still regenerating.	None
3.3 The river is capable of supporting recreational uses without significant loss or impact on its natural, cultural or aesthetic values.	There is very little pressure from recreational use. Only a few people (at most) paddle the river in a season, and the outfitter operating in the Mackenzie Mountains does backpack and horseback hunting which have minimal impact.	None

Management Plan Recommendations and Current Status

Management Plan Recommendation	Degree of Achievement (Not yet initiated; Initiated/underway; Completed/addressed; On-going)	Actions/Notes
Water Resources		
Continue to monitor water flow and water quality	On-going	<p>The Water Survey of Canada hydrometric station located on the Arctic Red River near the mouth (Station number 10LA002) has been in operation since 1968 measuring water flow, and sediment load data was collected between 1972 and 1975.</p> <p>The 2005 Phase I Ecological Assessment of the Arctic Red River Headwaters noted that there are no immediate threats facing water quality in the headwaters area, and that water quality data had been collected from Weldon Creek and the mouth of the Arctic Red River.</p> <p>The Community-based Water Quality Monitoring Program began collecting water quality data for the Arctic Red River at Tsiighehtchic in 2013.</p>
Identify sites requiring clean-up and develop a clean-up strategy	Initiated/underway	<p>Suspected contaminated sites were identified in the vicinity of the Arctic Red River, and assessed through the Federal Contaminated Sites program between 2010 and 2014. Four sites are listed in the Federal Contaminated Sites Inventory as having been suspected as contaminated sites and were subsequently evaluated:</p> <ul style="list-style-type: none"> Vicinity of the mouth of the Arctic Red River at the Mackenzie River (Site 00016194) – site was suspected (Step 1), an historical review undertaken (Step 2), initial testing completed (Step 3) and the site was classified (Step 4). Soil and sediment were found to be contaminated with metals from marine transportation. The site was classified as “Insufficient Information”, meaning that although a Phase I Environmental Site Assessment was conducted there appears to be insufficient information to classify the site as to whether it is considered to be a contaminated site or not (i.e. to be considered as a contaminated site, the concentration of metals is higher than expected for the region or poses a risk to human health or the environment). Additional information is required to address data gaps. Ernest Lakes (Site 00000099) – site adjacent to the Arctic Red River was suspected (Step 1), and it was determined that a historical review was not required. The site is not a contaminated site and no further action is

Management Plan Recommendation	Degree of Achievement (Not yet initiated; Initiated/underway; Completed/addressed; On-going)	Actions/Notes
		<p>required.</p> <ul style="list-style-type: none"> • Martin House (Site 00023867) – site is near the Arctic Red River, approximately 2km away. Site was suspected (Step 1), an historical review undertaken (Step 2), and then initial testing completed (Step 3). Soil found to be contaminated with hydrocarbons from past use of the area as a fuel drum cache. However, the concentration is either not higher than expected for the region or does not pose a risk to human health or the environment, therefore the site is not considered a contaminated site and no further action is required. • Tabasco Lake (Site 00023869) – site is near the Arctic Red River, approximately 3km away, upstream on a tributary. Was suspected (Step 1), determined that a historical review was not required. The site is not a contaminated site and no further action is required.
In the event of future development that could potentially affect the hydrological integrity of the Arctic Red River, ensure that all relevant water management agencies are made aware of the importance of the Arctic Red River's unique hydrology	Not yet initiated	Developments that could potentially affect the hydrological integrity of the river have not been proposed.
Integrate the water resource management objectives for the Arctic Red River into any future water management planning initiatives in the watershed	Not yet initiated	Water management planning initiatives in the watershed have not been proposed.
Vegetation		
Undertake an inventory and assessment of the unique vegetation communities within the management area	Initiated/underway	<p>A Phase I Ecological Assessment was completed for the headwaters area in the Arctic Red River watershed in 2005 which provided the state of knowledge of ecological features, but did not undertake an inventory or assessment. It was noted that a Phase II Ecological Assessment would require an inventory of plants, however it was never completed.</p> <p>A forest vegetation inventory was completed for the lower reach of the river (extending from the river mouth to approximately 65 km upstream) from 1:20,000 scale black and white photography acquired in 1995. The inventory provides stand level forest information on land cover classification, species composition, density, height, age, understory as well as site variables such as moisture and productivity. Although the inventory is now 20 years old, the slow growth of forests and relatively small impact from forest fires means that the inventory should still be relevant.</p>

Management Plan Recommendation	Degree of Achievement (Not yet initiated; Initiated/underway; Completed/addressed; On-going)	Actions/Notes
		The forested areas along the river have been monitored for spruce budworm since 2008. The extent and severity of defoliation are mapped each year.
Wildlife and Fish		
Conduct a "Harvest Study", which will determine the harvesting needs of the Gwich'in population. This information will allow the Gwich'in to maintain their sustainable harvesting practices.	Completed/addressed	The Gwich'in Harvest Study is a requirement of the Gwich'in Comprehensive Land Claim Agreement and was conducted in the Gwich'in Settlement Area. Data collection was from September 1995 to July 2004 and counted the number of animals, fish and birds harvested by Gwich'in participants in the Settlement Area. The Gwich'in Harvest Study Final Report was published in 2009 by the Gwich'in Renewable Resources Board. The report summarizes harvest information from residents of Tsiigehtchic. Data specific to harvesting reported from along the Arctic Red River could be requested from the GRRB. The Gwich'in Harvest Study was then continued/re-initiated in 2009. Data collection was undertaken from 2009-2010, 2011-2012 and 2013-2014. A report was published by the Gwich'in Renewable Resources Board in 2014.
Identify critical spawning areas for major fish species utilizing the Arctic Red River. Ensure relevant agencies and boards are made aware of these areas and give special consideration to them in making land and water use decisions.	On-going	Studies investigating migration patterns for inconnu were undertaken in the mid-1990's for the lower Mackenzie River system, which included fish from the Arctic Red River. These studies identified some migration patterns for inconnu which spawn in the Arctic Red River. The Arctic Red River stock of inconnu are anadromous and were found to overwinter in the east side and middle of the Mackenzie Delta towards Tuktoyaktuk ^{xlvi} . The studies also suggested a spawning area for inconnu downstream of the confluence with the Cranswick River. An Index Netting Study was undertaken on the Arctic Red River in 2003. Traditional knowledge of fish migration and spawning patterns in Tsiigehnjik (Arctic Red River) was compiled by the GRRB in 2007.
An inventory study of peregrine falcon nesting be undertaken in the management area.	Not yet initiated	None.
Undertake an inventory and assessment study of other important wildlife species, their ranges and critical habitats.	On-going	Moose surveys were undertaken along the Arctic Red River in 1999, 2006 and 2011. A survey for Woodland Caribou was done in the headwaters area in the Mackenzie Mountain in 2000. Traditional Knowledge of Woodland Caribou was compiled by the Gwich'in Social and Cultural Institute in 2011. Traditional knowledge of wolverine and grizzly bears was compiled by the GRRB in

Management Plan Recommendation	Degree of Achievement (Not yet initiated; Initiated/underway; Completed/addressed; On-going)	Actions/Notes
		2014. A Bank Swallow survey was initiated in 2014.
Landscape		
Monitor visual impacts of land and resource uses within the management area and initiative mitigating action where necessary.	On-going	<p>No developments or resource use occur in the watershed other than hunting, fishing, trapping and collection of firewood for personal use.</p> <p>A workshop was conducted to obtain traditional knowledge information of the land and water systems of the Richardson Mountains within the GSR. Report was published by GTC In March 2011</p> <p>While not a result of land or resource use, an increase in slumps has led to a number of studies investigating the impacts of these slumps on terrestrial and aquatic ecosystems on the adjacent Peel Plateau.</p>
Bring the unique landscape features of the management area to the attention of the land use permitting agency. Encourage this agency or board to protect these features, and to adopt controls over future developments in order to avert adverse impacts.	Initiated/underway	<p>The Gwich'in Land Use Plan includes zones along the Arctic Red River that encompass most of the management area. The Conservation Zones are located in the landscapes of the Peel Plain and Peel Plateau, and certain land uses are prohibited within the Conservation Zones, so some of the unique landscape features in these areas are likely protected or developments are controlled to avoid adverse impacts to the landscape features. Much of the river management area is zoned as Special Management, which applies conditions relating mainly to fish, forestry, water quality and heritage resources, so they do not necessarily highlight the unique landscape features of the management area.</p> <p>A report entitled, repatriating Gwich'in Traditional Knowledge from the Dene Mapping Project along with a database of maps, tapes and written records was published by Down North Consulting in March 2006.</p> <p>The GSCI restored copies of this material by digitizing cassette tapes and transcribing them, photocopying papers, and conserving paper maps. Report was published in March 2009</p> <p>The project completed the conservation and digitization of maps including information of important cultural and heritage information onto the GIS database and the digitization and transcription of the tapes. Report was published in March</p>

Management Plan Recommendation	Degree of Achievement (Not yet initiated; Initiated/underway; Completed/addressed; On-going)	Actions/Notes
		2010.
Precontact and Postcontact Resources		
Create a list of culturally significant sites in the management area so boards will take these areas into account in granting licences and permits.	Completed/addressed	<p>Culturally significant sites have been identified in the Gwich'in Land Use Plan in the zones along the Arctic Red River. For Conservation Zones and Heritage Conservation zones, the Land Use Plan includes a list of activities and land uses that are not permitted, and regulatory agencies may not issue a licence or permit for them. The Heritage Conservation Zones along the Arctic Red River are at Eltyin choo chihvyah k'yit (Jackfish Creek), Martin Zeh (Martin House), and Hehnjuu deet'yah tshik (Bernard Creek). The Arctic Red River Conservation Zone notes three additional heritage sites: Teetshik gwichoo (Weldon Creek), Jùuk'an (the smoking hills), and Łudlaji (the Forks at the confluence with the Cranswick River). The Arctic Red River Special Management Zone also indicates that significant heritage resources are known to exist in that zone, and includes a condition that proposed activities in that zone must assess their impacts on known heritage resources.</p> <p>Additionally, the Gwich'in Social and Cultural Institute provides information to the Gwich'in Land and Water Board related to culturally significant places during the land use permitting process.</p>
Ensure that appropriate archaeological surveys precede any facility development and that such development does not result in the loss of significant archaeological or historic resources.	On-going	<p>The Department of Education, Culture, and Employment (ECE) provides expert advice to the Gwich'in Land and Water Board (GLWB) on the protection of archaeological sites for all land use permit applications. The Gwich'in Social and Cultural Institute (GSCI) also provides information to the GLWB related to culturally significant places during the land use permitting process.</p> <p>In addition to archaeological surveys, a professional and comprehensive study of the palaeontological resources along the river should be undertaken.</p>
Complete the excavations at the confluence of the Arctic Red River and the Mackenzie River. Examine ways of protecting this archaeological site.	Not yet initiated	Excavations started during Northern Oil and Gas Action Programme in the 1980s and early 1990s, but no excavations have taken place at this site since 1993.
Encourage the acquisition of baseline information on Arctic Red River's cultural resources, including the inventory and assessment of identified archaeological and historic sites.	On-going	In August 1994 an Ethno-Archaeological project was undertaken by the Gwich'in Social and Cultural Institute on the Arctic Red River between its mouth and Weldon Creek (approximately 170 km upstream). The study began with interviews with Elders on their use of the Arctic Red River, and then the archaeological field crew visited the sites identified by the Elders to document what remained from their

Management Plan Recommendation	Degree of Achievement (Not yet initiated; Initiated/underway; Completed/addressed; On-going)	Actions/Notes
		<p>earlier use. The Ethno-Archaeological study was continued the following year, in 1995, as the Middle Arctic Red River Ethnoarchaeological Survey which resulted in four archaeological sites being recorded.</p> <p>In 1995, the Gwich'in Social and Cultural Institute conducted the Martin Zheh Ethno-Archaeology Field School, focused on excavating one of several archaeological sites identified at Martin Zheh. The Archaeology Permit Report for the project notes that 175 artifacts were recovered, including traditional bone and antler tools, lithic debitage, cut birch bark, glass beads, firearms ammunition, square nails, buttons and worked copper, and that these artifacts document a shift through the 19th century from a traditional material culture to one which incorporated Euro-Canadian technologies. Excavations at Martin Zheh continued in 1996 by Damkjar.</p> <p>In 2007, the Gwich'in Social and Cultural Institute conducted interviews and an initial archaeological survey in the headwaters of the Arctic Red River to identify the potential for further survey and archaeological testing.</p> <p>There is a need for more ethnoarchaeological research along the river and in the headwaters. A helicopter survey is critical to success in the headwaters area.</p>
Continue to protect and maintain the Arctic Red River church in light of its role as a unique cultural resource for the community.	On-going	<p>The church is no longer in use and is in need of repairs.</p> <p>An assessment was undertaken on the stability of the slope of "Church Hill". The report, issued in 2011, indicates that the likelihood of a landslide reaching the old church is high and provides some options to mitigate the risk of slope failure.</p> <p>Church Hill was designated in 2010 as Vik'ooyendik Territorial Historic Site, but no formal protections or resources for conservation come with the designation.</p>
Maintain both the old and new cemeteries in the community of Tsiigehtchic.	On-going	<p>The old cemetery is no longer used for burials due to erosion from melting permafrost.</p> <p>An assessment was undertaken on the stability of the slope of "Church Hill". The report, issued in 2011, indicates that the likelihood of a landslide reaching the old cemetery is high and provides some options to mitigate the risk of slope failure.</p> <p>The Tsiigehtchic Graveyard Project began in 2005 with assessment and mapping of the New Graveyard in Tsiigehtchic, located on Vik'ooyendik (Church Hill) overlooking the Arctic Red River, and continued in 2008-2009 with assessment and mapping of the Old Graveyard in Tsiigehtchic in the centre of the community. Recommendations resulting from the Project include that work continue to identify graves and</p>

Management Plan Recommendation	Degree of Achievement (Not yet initiated; Initiated/underway; Completed/addressed; On-going)	Actions/Notes
		historical information should be compiled about the deceased.
Traditional Use		
Examine the possibility of establishing a public dry fish demonstration within the community, to be used as an educational tool for both the youth of the community and visitors to the community.	Not yet initiated	None.
Examine the possibility of placing a cabin in the Weldon Creek or Cranswick River fork area as a destination point for local hunters and as an emergency shelter for river travellers.	Not yet initiated	None.
Consult the community of Tsiigehtchic before any tourism or recreational developments are put in place to ensure that these developments are harmonious with the aspirations of the community.	On-going	The Tsiigehtchic Tourism Society was established in 2014. The Society and the Charter Community have been operating the Tsiigehtchic Tourist Centre during July and August since 2014 and will continue to do so.
Develop a plan which addresses community needs in re-establishing traditional river related activities through education, demonstrations and re-enactments of Gwich'in traditions and lifestyles.	Not yet initiated	None.
Recreation		
Promote boating, fishing, dog sled and snowmobile touring and hunting opportunities along the Arctic Red River, and provide public information on these activities, and on access, river navigation and campsites.	On-going	Over the past 10 years there have been various efforts to promote recreational opportunities. There have been tourism operators licensed to lead water-based tours on the Arctic Red River, most recently including Timber Island Enterprises who offered half-day boat and cultural tours from Tsiigehtchic. Currently there are no operators licensed under the NWT's <i>Tourism Act</i> . The Tsiigehtchic Tourist Centre was opened in 2014 and operates during July and August. The centre offers shower and kitchen facilities to support paddlers of the Arctic Red and Mackenzie Rivers.
Monitor hunting activity within the management corridor and seek to minimize conflicts between different user groups.	On-going	The Gwich'in Harvest Study provided data on the number of animals, fish and birds harvested by Gwich'in participants in the Settlement Area. Arctic Red River Outfitters continues to operate guided hunting in the headwaters area of the Mackenzie Mountains, and provides wildlife observation and harvest data.
Examine sport fishing opportunities in the lower sections of	Not yet initiated	None.

Management Plan Recommendation	Degree of Achievement (Not yet initiated; Initiated/underway; Completed/addressed; On-going)	Actions/Notes
the Arctic Red River to enhance the viability of a possible boat touring operation that could carry visitors to the Jackfish Creek area.		
Take measures that will encourage safe travel on the Arctic Red River.	Not yet initiated	None.
Encourage commercial recreational uses of the Arctic Red River which are compatible with the terms of the Gwich'in Land Claim Agreement, particularly hunting, fishing, wilderness hiking and guided river touring activities.	On-going	Arctic Red River Outfitters continues to operate backpack and horseback guided hunting in the headwaters area of the Mackenzie Mountains.
Consider placing a cabin in the Weldon Creek/"the forks" area to serve as a centre for hunting activity and as an emergency shelter for river travellers.	Not yet initiated	None.
Access		
Produce a brochure indicating suitable access points in the upper section of the river for pontoon aircraft landings. Identify and provide public information on appropriate lakes and lands to serve as access points to the river.	Not yet initiated	Access points for pontoon aircraft are determined by each group paddling the river through trip reports by previous paddlers or by contacting local floatplane operators.
Interpretation		
Provide public information on the community of Tsiigehtchic, for the purposes of interpreting aspects of the river which can be seen from the community. This includes an interpretive display within the community of Tsiigehtchic.	Initiated/underway	<p>The Tsiigehtchic Tourist Centre was opened in 2014 and operates during the months of July and August.</p> <p>The Nagwicheonjik National Historic Site along the Mackenzie River, designated in 1997, includes the mouth of the Arctic Red River. A commemorative plaque was installed in Tsiigehtchic in 2003.</p> <p>The plaque celebrating the Arctic Red River as a Canadian Heritage River was installed around 1994 and was at risk of sliding down the hill due to slumping. For awhile the plaque had been removed, but it has been re-installed.</p>
Provide public information on natural and cultural heritage values and recreational opportunities of the Arctic Red River.	Not yet initiated	No information package, brochures, display, or other media have been developed for the public on the values and opportunities of the river. A booklet similar to " <i>The History and Archaeology of Fort McPherson</i> " would make a great resource for local schools, could be used for tourism purposes, and would raise awareness about the cultural significance of the Arctic Red River.

Summary of Benefits since Designation in 1993

Type of Benefit	Description
Environmental Benefits (ex: improved water quality; improved habitat; increases in fish / animal / plant populations, etc.)	
Cultural Benefits (ex: improved appreciation of river / watershed / aboriginal or other history of river use; increased identification and protection of culturally significant sites, etc.)	
Recreational benefits (increased or decreased use of river; changes in use of river; improved access to river, etc.)	
Improved Knowledge (ex: increased understanding of river wildlife / vegetation / history / traditional knowledge, etc.)	
Monetary benefits (increased access to funding; increased revenue, etc.)	
Increased Stewardship (increased involvement in stewardship activities, number of activities / events, etc.)	Designation of the Arctic Red River brought attention to the headwaters area, which was identified for further studies to determine whether it should be protected through zoning as a Conservation Zone in the Gwich'in Land Use Plan or through formal legal protection. Three studies were undertaken: ecological, cultural and traditional knowledge/archaeological assessments.
Community engagement and collaboration (increased dialogue with community and other partners and stakeholders; increased participation in river management discussions; increased involvement in river activities)	Community members from Tsiigehtchic participated in the cultural and traditional knowledge/archaeological assessments of the headwaters area.
Have any education programs related to the river, health of the river or watershed, use of the river, etc. been undertaken since designation?	
Have any communications products (signage, exhibits, photo contests, social media and web etc.) been developed to communicate the designation and its benefits?	
Have there been any downsides to obtaining the designation? (ex: perceived regulatory barriers, etc.)	
Please list any other benefits (include indirect and intangible benefits)	The designation of the Arctic Red River as a Canadian Heritage River is recognized in the Gwich'in Land Use Plan, further highlighting its importance to the Gwichya Gwich'in.

Overall Assessment and Recommendation Regarding Designation

There have been few changes to the natural and cultural values for which Tsiigehnjik/Arctic Red River was nominated to the Canadian Heritage Rivers System. The natural and cultural values of Tsiigehnjik/Arctic Red River are still in excellent condition.

It is recommended that Tsiigehnjik/Arctic Red River maintain its Canadian Heritage River designation.

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Notes

- i Future reports will refer to Arctic Red River as Tsiigehehnik.
- ii see Damkjar, 1996 & 1997, and Greer, et al., 1995
- iii the Water Survey of Canada hydrometric gauge 10LA002 is officially named “Arctic Red River near the mouth”, however its’ actual location is near Martin Zeh (Martin House)
- iv this study received funding from the Cumulative Impact Monitoring Program (CIMP 54)
- v this study received funding from the Cumulative Impact Monitoring Program (CIMP 53)
- vi this study received funding from the Cumulative Impact Monitoring Program (CIMP 96)
- vii these studies received funding from the Cumulative Impact Monitoring Program (CIMP 106 & 108)
- viii this study received funding from the Cumulative Impact Monitoring Program (CIMP 97)
- ix see Yang et al., 2015 - Variability and extreme of Mackenzie River daily discharge during 1973–2011.
- x see Kokelj, 2001 - Hydrologic Overview of the Gwich’in and Sahtu Settlement Areas.
- xi see <http://www.nwtgeoscience.ca/project/summary/shale-basin-evolution-central-nwt> for a map showing the Arctic Red River location within the Mackenzie Mountains and Peel Plain.
- xii see Gwich’in Land Use Planning Board, 2005 - Arctic Red River Headwaters – Phase I Ecological Assessment.
- xiii see Pavelka, 2015 - Canoeing The Arctic Red...In Proper Style.
- xiv See Davies, date unknown - Arctic Red River.
- xv see Gwich’in Land Use Planning Board, 2003 - Nành’ Geenjit Gwitr’it T’igwaa’in, Working for The Land, Gwich’in Land Use Plan.
- xvi Data from Jakub Olesinski, Ecosystem Forester, GNWT-ENR (pers.comm). A report is planned to be published at a future date.
- xvii see Gwich’in Land Use Planning Board, 2005 - Arctic Red River Headwaters – Phase I Ecological Assessment.
- xviii see Gwich’in Social and Cultural Institute, Gwich’in Renewable Resources Board and Environment Canada, 2011 – Aboriginal Traditional Knowledge Summary Reports on Woodland Caribou (*Rangifer tarandus caribou*), Boreal Population.
- xix see Shaw and Benn, 2001 - Mountain Caribou (*Rangifer tarandus caribou*) Survey in the Northern Mackenzie Mountains, Gwich’in Settlement Area, September 2000.
- xx see Benn, 1999 and Lambert, 2006
- xxi see Benson, 2014 - Gwich’in Traditional Knowledge: Nèhtrùh (Wolverine).
- xxii see Benson, 2014 - Gwich’in Knowledge of Grizzly Bears.
- xxiii see Chipertzak, 1998 - Preliminary results of scanning proton microscope analysis of strontium in inconnu otoliths from the Mackenzie River system.
- xxiv Study by Chipertzak et al. 1998 referenced in GRRB Wildlife Studies Fund Research (1993 – 2009). Also see Chipertzak, 1998 – Inconnu migration study summary.
- xxv see Greenland and Walker-Larsen, 2001 - Community Concerns and Knowledge about Broad Whitefish (*Coregonus masus*) in the Gwich’in Settlement Area.
- xxvi see Harris, 2004 - Arctic Red River Index Netting Study 2003.
- xxvii see Thompson and Millar, 2007 - Traditional knowledge of fish migration and spawning patterns in Tsiigehehnik (Arctic Red River) and Nagwichoonjik (Mackenzie River), Northwest Territories.

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- xxviii see Thompson, 2008 - Investigation into Loche (burbot, *Lota lota*) biology and liver quality in the Gwich'in Settlement Area, Northwest Territories.
- xxix see Gwich'in Social and Cultural Institute, Gwich'in Renewable Resources Board and Environment Canada, 2011 Aboriginal Traditional Knowledge Summary Reports on Woodland Caribou (*Rangifer tarandus caribou*), Boreal Population.
- xxx see Environment Canada, 2012 - Management Plan for the Northern Mountain Population of Woodland Caribou (*Rangifer tarandus caribou*) in Canada.
- xxxi see Department of Environment and Natural Resources, 2015 - Boreal Caribou: Status (website).
- xxxii see Shaw and Benn, 2001 - Mountain Caribou (*Rangifer tarandus caribou*) Survey in the Northern Mackenzie Mountains, Gwich'in Settlement Area, September 2000
- xxxiii see Larter, 2012 - Preliminary Analysis of Hunter Observations of Northern Mountain Caribou in the Mackenzie Mountains, 1991-2010.
- xxxiv In addition to the Gwich'in Place Names Atlas, see Greer, Andre and Kritsch, 1995.
- xxxv see Gwich'in Land Use Planning Board, 2003 - Nành' Geenjit Gwitr'it T'igwaa'in, Working for The Land, Gwich'in Land Use Plan, section 4.5.13: Tsiighnjik: Arctic Red River Special Management Zone.
- xxxvi see Thompson and Millar, 2007 - Traditional knowledge of fish migration and spawning patterns in Tsiigehehnik (Arctic Red River) and Nagwichoonjik (Mackenzie River), Northwest Territories.
- xxxvii see Gwich'in Land Use Planning Board, 2003 - Nành' Geenjit Gwitr'it T'igwaa'in, Working for The Land, Gwich'in Land Use Plan, Background Information for each Gwich'in Heritage Conservation Zone, Martin Zhen (H06).
- xxxviii see Gwich'in Social and Cultural Institute, 2015 - Aquatic Plants, Gwich'in Ethnobotany Database (website).
- xxxix see Gwich'in Land Use Planning Board, 2003 - Nành' Geenjit Gwitr'it T'igwaa'in, Working for The Land, Gwich'in Land Use Plan, Gwich'in Conservation Zone D: Arctic Red River.
- xl from the Gwich'in Place Names Atlas -
<http://atlas.gwichin.ca/index.html#eyJ0IjoieCislmkioiJnd2ljaGluLnBsYWNIbmFtZS4xMjkxIn0=>
- xli see Davies, Date unknown - Arctic Red River Trip Report posted on Canadian Canoe Routes website.
- xlii see Pavelka, 2015 - Canoeing The Arctic Red...In Proper Style.
- xliii see Davies, Date unknown - Arctic Red River Trip Report posted on Canadian Canoe Routes website.
- xliv see Arctic Red River Outfitters Ltd., 2015 - Welcome to Arctic Red River Outfitters Ltd! (website)
- xlvi From the Gwich'in Place Names Atlas –
<http://atlas.gwichin.ca/index.html#eyJ0IjoieCislmkioiJnd2ljaGluLnBsYWNIbmFtZS4xNTY4liwicyl6MTQ5OTIwMTA1ODI0MH0=>
- xlvi see Fisheries and Oceans Canada, 1998 - Mackenzie River Inconnu