



Athabasca River: 1999-2010

Canadian Heritage River Monitoring Report

April 2011

Canadian Heritage Rivers System

Le Réseau de rivières du patrimoine canadien

Parks Canada Parcs Canada

Canada

Cover Photos (left to right): Athabasca Falls, Jasper Lake Sand Dunes, Bridge at Old Fort Point

Photos by: Parks Canada (left), J. Deagle (middle, right)

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Foreword

I am pleased to submit to the Canadian Heritage Rivers Board, a ten-year monitoring report for the stretch of the Athabasca River located within Jasper National Park of Canada, Alberta. The designation of the Athabasca River as a Canadian Heritage River in 1989 reflects its important role in shaping the human history of Jasper National Park, in driving processes and sheltering species that ensure the park's ecological integrity, and as the stage for countless recreational and learning experiences for park visitors and Jasper residents.

The value that we place on the river is mirrored in the Parks Canada Agency's desire to raise its profile as a Canadian Heritage River, and to strengthen monitoring and reporting. This report, which evaluates the river's condition with respect to the natural heritage, cultural heritage and recreational values for which it was nominated, contributes to those objectives. The report's main finding, that the river's ecological, cultural and recreational integrity has been maintained, and in some cases improved, over the past 10 years, is a result of the collective efforts of Parks Canada and our many partners in government, academic and research institutions, industry, and the tourism and non-profit sectors. Parks Canada will continue to work diligently to protect the Athabasca River's heritage values, as well as to ensure that future generations of Canadians have opportunities to experience and form lasting connections with their river heritage.



Greg Fenton
Superintendent
Jasper National Park of Canada

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1.0 Executive Summary

In 1989, the 162-km section of the Athabasca River located within Jasper National Park was designated a Canadian Heritage River for its outstanding natural, cultural and recreational values. Every ten years, Parks Canada reports to the board of the Canadian Heritage Rivers System on the condition of the river with respect to those values. This report documents major events, management actions, research, monitoring and policy developments that have taken place in and around the Athabasca River over the past decade. It assesses the natural heritage, cultural heritage, recreational and integrity values of the river using criteria developed by the CHRS, and describes changes to those values.

The report concludes that there have been no significant changes to the values for which the river was designated. There have been slight improvements in several areas, notably water quality, aquatic connectivity, recreational facilities and supporting infrastructure, and interpretation of the river's human history. Appropriate tools are in place for managing recreational and other uses, and policy decisions taken in the past 10 years support the maintenance of the river's ecological and cultural integrity and the facilitation of exceptional visitor experiences.

2.0 Introduction



Athabasca River viewed from the Mount Christie day use area Photo: Parks Canada

The section of the Athabasca River located within Jasper National Park was nominated to the Canadian Heritage Rivers System (CHRS) by Parks Canada in 1984. It was the first river stretch within a national park to be nominated to the System and in 1989, it was designated a Canadian Heritage River for its outstanding natural and cultural values and recreational opportunities.

The Canadian Heritage River System (CHRS) is a national program that promotes river heritage conservation through the recognition of rivers deemed to be of outstanding Canadian value. A cooperative effort of federal, provincial and territorial governments, the CHRS promotes, protects and enhances Canada's river heritage, and ensures that Canada's leading rivers are managed in a sustainable manner. Designated rivers must retain the heritage and integrity values for which they were originally nominated.

Within the national system, the Athabasca River provides:

- representation of western mountain river environments
- representation of more than two hundred years of transportation history in western Canada
- an outstanding recreational experience for novice and intermediate canoeists, kayakers and other river tourists

Every ten years, the agency responsible for managing a heritage river must produce a monitoring report that evaluates the condition of the river with respect to the values for which it was nominated. The first monitoring report for the Athabasca River was written in 1999, and covered the time period from 1989 to 1998. It concluded that the river had remained in generally good condition, despite a significant increase in environmental stressors.



The Athabasca River downstream of 12-Mile Bridge (east of the confluence with the Snaring River). Photo: W. Hughson

This report will cover the subsequent time period, from 1999 to 2010. It has two main objectives:

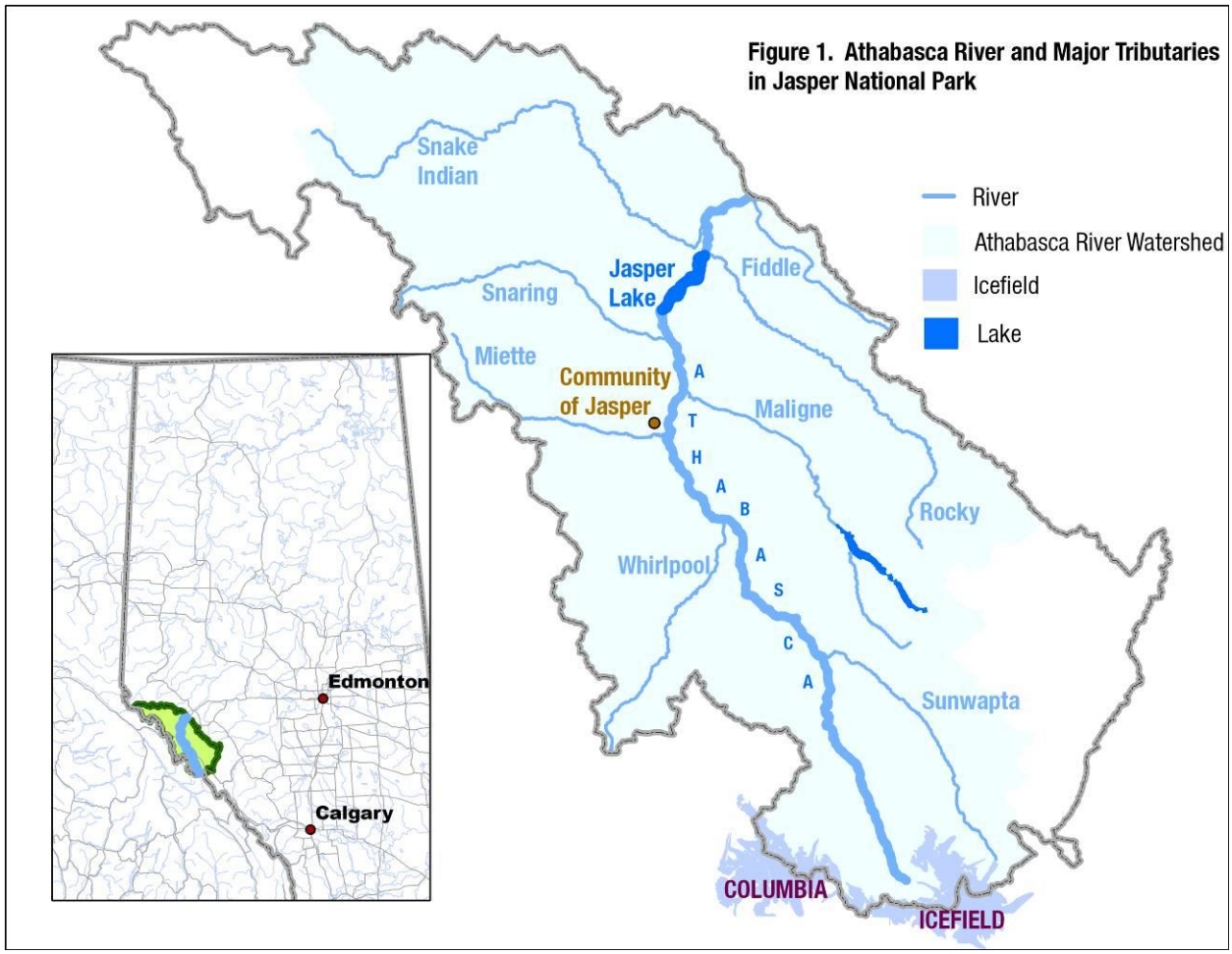
1) To provide a summary of:
   - major events that have affected the river
   - significant river-based research, monitoring and inventories conducted by Parks Canada and other agencies or institutions
   - major management actions implemented by Parks Canada in the watershed
   - policy developments related to river management

2) To assess the natural heritage, cultural heritage, recreational and integrity values of the river against criteria developed by the CHRS and document any significant changes to these values.

3.0 Background

The Athabasca River, measuring 1,538 km from its headwaters in Jasper National Park to Lake Athabasca in Wood Buffalo National Park, is the longest river in Alberta. Management of the entire 162 km of the designated section of the Athabasca River is the responsibility of Parks Canada, the federal government agency that manages Jasper National Park. The river's watershed occupies 83% of the park's land base (see Figure 1).

The river's nomination values are impacted by elements within a roughly defined corridor that runs along the river from its source at the Columbia Icefield, to the point where the river leaves the park on its north-eastern boundary. Management of these values on a watershed-wide level is made possible through Parks Canada's almost exclusive jurisdiction over the river's headwaters. The intent to "protect and manage the natural and historic resources of the Athabasca River as a Canadian Heritage River" was first signalled in the 1988 *Jasper National Park Management Plan*.



3.1 Policy Context

The Athabasca Heritage River is managed under the *Jasper National Park Management Plan* and the overarching policy and statutory framework of Parks Canada. The *Canada National Parks Act,* last amended in 2010*,* continues to be the primary piece of legislation governing management of the national parks. The Parks Canada Agency is the decision-making authority for the Athabasca River within Jasper National Park, and a variety of organizations work with the agency to further its management objectives for the river, including: the Municipality of Jasper, the Government of Alberta, other federal departments (e.g. Fisheries and Oceans Canada), utility companies (e.g. ATCO Pipelines, Kinder Morgan), academic and research institutions, non-profit organizations and commercial operators. Jasper National Park lies within the Canadian Rocky Mountains Parks World Heritage Site designated by the United Nations Educational, Scientific and Cultural Organization (UNESCO), reflecting the global community's recognition of its outstanding heritage value.

In the last ten years, a series of policy decisions have strengthened management direction for the river and the character and extent of development in areas adjacent to the river. In 1999, guidelines for the management of river use on five rivers in the park, including the Athabasca, were developed with the involvement of stakeholders. Non-motorised commercial boating is permitted on the upper and middle reaches of the Athabasca River (from the confluence with the Sunwapta River to Old Fort Point). Downstream of Old Fort Point, priority is given to non-commercial use. Initial implementation of the guidelines focused on the development of new access nodes on the Athabasca and Sunwapta rivers, to accommodate the re-allocation of river use (e.g. rafting) from the mid-Maligne River, which was closed to in-stream use in 2000.

Parks Canada reviewed the *Jasper National Park Guidelines for River Use Management* in 2003 and again in 2009 with public participation; no major changes to the *Guidelines* were required. Future implementation will focus on collaborating with river stakeholders to find ways to improve river-based visitor experiences and to identify and track a manageable set of indicators for ecological and social factors related to river use.

The 2000 park management plan contained a number of key actions related to aquatic health (e.g. improve aquatic connectivity, ensure viable native fish populations, ensure that in-stream flow needs of aquatic organisms are met, minimize the effects of road salt and other contaminants, increase public awareness of aquatic ecosystems). The plan also contained direction to increase awareness of the heritage values that led to the nomination of the Athabasca River and to implement the river use guidelines. Additionally, the plan prescribed targets for in-stream release of sewage effluent and a concrete action to reduce the amount of phosphorus entering the Athabasca River in sewage effluent.

The following year, the *Jasper Community Land Use Plan* (2001) was approved. In addition to setting limits to commercial growth within the Community of Jasper, describing a legislated

community boundary and establishing criteria for appropriate commercial uses, the plan directed the community to build a new sewage treatment plant that would move it towards the targets for wastewater discharge to the Athabasca River outlined in the park management plan.

Another important development in the early part of the decade was the declaration, in regulation, of approximately 97% of the park as wilderness areas, providing Canadians with more certainty that uses and development not consistent with its wilderness character would not be permitted. The Athabasca River upstream of Athabasca Falls lies largely within Declared Wilderness.



Pocahontas Ponds Photo: J. Deagle

In 2005, the park released its first *State of the Park Report* (SoPR). The SoPR assesses the condition of resources and program outcomes in key areas of Parks Canada's mandate: resource protection, visitor experience, and public outreach and education. The report contributes to the identification of issues that need to be addressed during the next park management plan review.

The 2005 SoPR contained several measures of aquatic ecosystem integrity. A second report followed in 2008; this time a set of measures common to the mountain national parks (Banff, Yoho, Kootenay, Waterton, Mt. Revelstoke, Glacier national park) was used to rate the state of the parks.

Once again, the report contained several measures of ecological conditions in the Athabasca River. Water quality in the river was rated as good and improving. Aquatic connectivity (the degree to which fish and other aquatic related wildlife are unimpeded by stream crossings) was rated as fair and improving. Fish community integrity was rated as fair, with an unknown trend, based on sampling in the Athabasca River watershed. The ecological integrity monitoring framework that forms the basis of the SoPR has been further refined in recent years. The next report is expected in 2013 or 2014.

The *Jasper National Park Management Plan* (2000) was reviewed in 2005, but no amendments were required.

The completion in 2007 of site-specific redevelopment guidelines for outlying commercial accommodations, including several located along the river, will ensure that future development

of these sites happens in a way that maintains important ecological, cultural and aesthetic values and improves ecological integrity (through, for example, improved wastewater treatment).

Three national historic sites and an event of national significance are directly related to the river. In 2008, a management plan for each of the three sites was written for the first time. It provides a strong framework for their improved protection and presentation.

Jasper's park management plan was updated in 2010. The limits to development negotiated over the past decade were reaffirmed in the new plan, as was existing direction concerning ecological integrity and cultural resources. Plan content related to visitor experience was strengthened. The new plan also contains direction to raise the profile of the Athabasca as a Canadian Heritage River, and strengthens monitoring and reporting. Parks Canada will continue to implement the *Guidelines for River Use Management in Jasper National Park*.

Anecdotal evidence suggests that use of Jasper Lake, a sensitive sand dune area, is increasing, despite the absence of formal access. A key action in the plan is to improve access to the lake and opportunities to learn about this unique ecosystem, while protecting sensitive features, minimizing impacts to wildlife and improving visitor safety. Another new action is to work with the province of Alberta to maintain or restore native populations of Athabasca rainbow trout and bull trout.

A new community plan, the *Jasper Community Sustainability Plan*, was finalized in 2010. The plan contains explicit goals to protect Jasper's water resources and water quality, and to practice and promote water conservation. Several indicators are identified to track progress in meeting these goals, including:

- the number of incidents in which concentrations of nutrients, bacteria and other key parameters in effluent from the municipal wastewater treatment plant exceed water quality guidelines
- concentrations of contaminants of concern in receiving waters
- per capita water consumption

3.2 Nomination Values

The Athabasca River's nomination values reflect its rich natural and human history, abundant examples of the geological and ecological processes that define the Rocky Mountains, its important historic role in the development of western Canada, its outstanding scenic values, and the array of recreational opportunities it supports. Table 1 lists the values for which the river was nominated in 1984. New CHRS frameworks for natural, cultural and recreational values have been developed since the Athabasca River was first nominated. In Sections 4 to 7, the river is assessed based on the new frameworks and values. The results of the assessment are summarized and presented in Section 8.

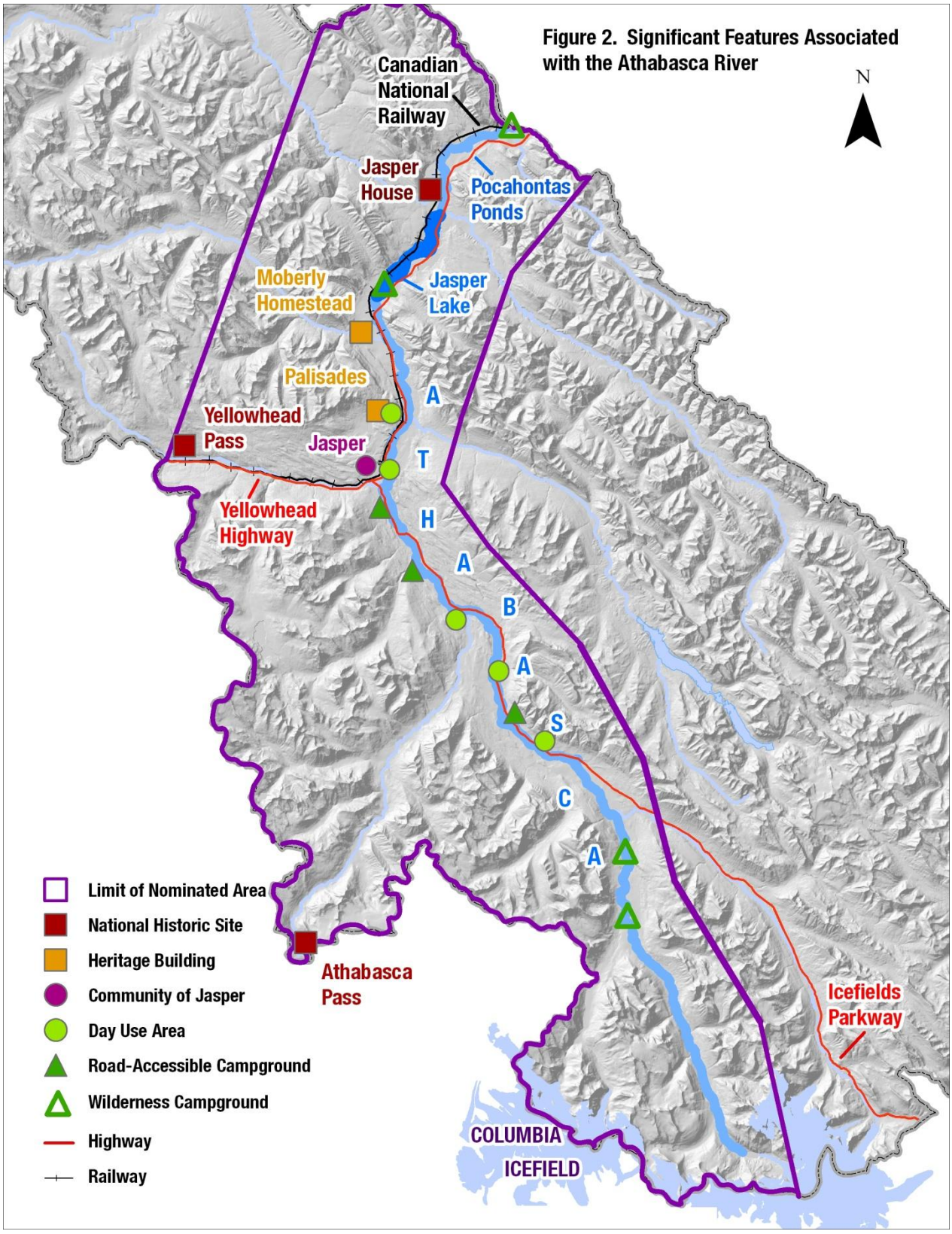

Figure 2. Significant Features Associated with the Athabasca River
N
Canadian National Railway
Jasper House
Pocahontas Ponds
Moberly Homestead
Jasper Lake
Palisades
Yellowhead Pass
Jasper
Yellowhead Highway
A
T
H
A
B
A
S
C
A
Athabasca Pass
Icefields Parkway
COLUMBIA ICEFIELD
Limit of Nominated Area
National Historic Site
Heritage Building
Community of Jasper
Day Use Area
Road-Accessible Campground
Wilderness Campground
Highway
Railway

Table 1. Nomination Values for the Athabasca River (1984)

Natural Heritage Values	
Representation of Earth History	The Athabasca contains several outstanding features related to the earth's evolutionary history including: • Representative stratigraphic sequences from a 600 million year period of Rocky Mountain evolutions • Outstanding examples of folding, faulting and thrust sheets in the Front Ranges • Excellent examples of glacial activities and landforms, notably in the area of the Columbia Icefield, the largest icefield in the Rocky Mountains
Representation of Ongoing Processes	The Athabasca contains outstanding features that represent ongoing processes including: • Fluvial erosion and deposition along the river • Aeolian processes as evidenced in the Jasper Lake sand dunes • Fluvial erosion at Athabasca Falls • Ongoing glacial activities, best exemplified by the Columbia Icefield and associated glaciers
Physiographic and Landscape Uniqueness	The river contains along its course outstanding examples of natural phenomena including: • The Rocky Mountains • The Columbia Icefield And two areas of exceptional natural beauty: • Jasper Lake • Athabasca Falls and gorge
Historical Heritage Values	
Canadian Development	The Athabasca played a key and continuous role in Canadian development serving: • For more than fifty years, as the major fur trade link between Oregon country and the Canadian interior • Later, as a transportation corridor for the Cariboo Goldrush of the Overlanders in 1862 • In the late nineteenth and early twentieth century, as a corridor for rail and road construction
Cultural Associations	The Athabasca River valley is strongly associated with several persons and events of Canadian significance including: • David Thompson and his discovery of the Athabasca Pass in 1811 • Dr. James Hector of the Palliser Expedition of 1859 who surveyed routes and settlement potential in the Jasper area • The Cariboo Goldrush of 1862 during which the Athabasca valley and Yellowhead Pass were witness to the only overland immigration to British

	Columbia before the railways
Theme Representation	The Athabasca contains representations of three major themes in Canadian history which are commemorated by four National Historic Site plaques within Jasper National Park: • Fur Trade Theme: Jasper House National Historic Site • Survey and Mapping Theme: David Thompson, Discoverer of the Athabasca Pass National Historic Site, and Henry House National Historic Site • Land Transportation Theme: Athabasca Pass NHS and the Overlanders of 1862 (an event of national historic significance)
Recreational Values	
Recreational Experience	The river provides the capability for outstanding recreational opportunities: • Opportunities for river touring, natural heritage appreciation, human heritage appreciation and shore-based activities such as hiking, camping and picnicking • Major landscape features which enhance the recreational experience and physical attributes which support recreational activity (e.g. accessibility, supporting facilities)
Environmental Impact	Environmental stressors such as transportation corridors in the lower section of the river have a somewhat negative effect on the natural values of the area that support non-motorized recreational opportunities, such as hiking and paddling. In spite of this, the Athabasca River appears to be capable of supporting fairly intensive recreational use, without major impact on its heritage values.
Integrity	
Size	The segment of the Athabasca River designated a Canadian Heritage River contains the river's source, a good representation of the Athabasca's Rocky Mountain environmental component, and several outstanding examples of western mountain river processes and products.
Viability	The Athabasca also contains ecosystem components for species continuity. The river's integrity is protected by virtue of the location of its watershed within a national park, and by the additional protection provided by two adjacent provincial parks.
Water Quality	The water quality of the river within the park suffers from localized contamination (mostly nutrient addition from sewage effluent), but as a whole, the river's water quality meets the integrity guidelines.

4.0 Chronology of Events

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

1999

- Implementation of the *Jasper National Park Guidelines for River Use Management* begins
- Draft revised park management plan prepared with public participation

2000

- The Moab fire burns 1,029 ha in the Whirlpool River drainage (a major tributary of the Athabasca River)
- Stone weir at Lac Beauvert outlet removed, allowing fish to move between the river and the lake
- Social science research examines perceptions of crowding among commercial rafting clients on the Athabasca and Sunwapta rivers
- New *Jasper National Park Management Plan* approved, including new wastewater effluent treatment standards
- Most of the park (~97%) is designated Declared Wilderness under regulation

2001

- Bank armouring for one kilometre near Disaster Point to protect Trans Mountain Pipeline right-of-way
- New access nodes on the Athabasca and Sunwapta rivers developed to accommodate re-allocation of commercial rafting use from Maligne River
- Salt contamination discovered at Parks Canada maintenance compound; plume is slowly moving towards Athabasca River
- *Jasper Community Land Use Plan* approved

2002

- Parks Canada installs magnesium chloride pre-wetting system to reduce the amount of salt used on winter roads
- Municipal wastewater treatment plant upgrade begins
- Pine Bungalows (an Outlying Commercial Accommodation located next to the river) connects to municipal water supply and wastewater treatment plant
- Changes to fishing regulations increase protection of native fish. The Athabasca River was previously open to angling year round. It is now divided into three management zones, each

with a different open season. Seasonal angling closures for rivers and streams used for spawning increases protection for bull trout and other native fish. Mile 9 Lake (off the Yellowhead Highway) is closed year round to protect northern pike and lake whitefish populations.

2003

- A prescribed burn followed by a wildfire on Syncline Ridge at the east end of Jasper Lake burn approximately 28,000 ha in the Rocky River drainage
- New wastewater treatment plant for the Community of Jasper becomes operational
- Restoration activities at Lac Beauvert (Lake Whitefish reintroduced) completed
- Jacques Lake closed to fishing in order to establish it as a benchmark lake and protect bull trout
- Restoration of Moberly Homestead and development of interpretive panels begins
- New signage erected at Jasper House National Historic Site to mark the site for river travellers

2004

- Genetic sampling of rainbow trout in the Athabasca River watershed conducted
- Upgrades to sewage lift station adjacent to the river and servicing two major campgrounds (Wapiti, Whistlers) and three outlying commercial accommodations (Alpine Village, Tekarra Lodge and Jasper House)
- Fencing and restoration of Cottonwood Creek stream bed (associated with wastewater treatment plant upgrade)
- Old Fort Point day use area redeveloped to address chronic parking and congestion problems through minor footprint adjustments, allocation of bus parking, pathway delineation, sign installation and creation of a pedestrian viewing area. Some shoreline/riparian vegetation restored through plantings of native shrubs and trees.
- Section of ATCO pipeline near 12-Mile Bridge relocated from the bank of the Athabasca River into the highway corridor
- First review of *Jasper National Park Guidelines for River Use Management* conducted

2005

- Pike population in Talbot Lake assessed as “vulnerable to collapse”
- Park-wide inventory of culverts and assessment of aquatic connectivity begins
- Cabin Creek culvert under Highway 16 remediated
- Moberly Homestead restoration and interpretive node project completed
- New river guide produced by the Alberta Recreational Canoeing Association
- Section of ATCO pipeline relocated from the bank of the Athabasca River into the highway corridor by Talbot Lake

- New lease issued to Pine Bungalows Outlying Commercial Accommodation. Some riparian areas that were previously part of the lease revert to crown land.
- First *State of the Park Report* for Jasper National Park released
- Five year review of park management plan conducted; no amendments required

2006

- Jackladder road between Yellowhead Highway and the Athabasca River decommissioned and reclaimed (approximately 4.5 ha of disturbed land restored to montane habitat)
- Parking improved at put-in below Athabasca Falls
- Pump-out toilet installed at Poplar Flats put-in
- Athabasca Falls day use area redeveloped: new fencing and railings installed, additional parking for bus tours delineated, bathroom facilities, trails and sight lines improved, disturbed areas rehabilitated). New interpretive media provides up-to-date messages to visitors.
- Boat launch at Talbot Lake improved
- ATCO removes section of abandoned gas line from Athabasca River east bank
- Voyageur Canoes permitted to operate from confluence of the Maligne River to 12 Mile Bridge to decrease congestion at Old Fort Point and increase river safety
- Jasper Trails Project launched

2007

- Construction of Kinder Morgan-Anchor Loop Pipeline Project (TMX) begins
- Lobstick tree falls into river, but is retrieved and relocated to riverbank; new tree planted by family members of its maker on Sept. 17

2008

- Pygmy Whitefish survey conducted in Athabasca River
- Study initiated to examine effectiveness of 7 different treatment methods on Russian thistle, a non-native species invading river banks at the east end of the park
- Kinder Morgan-Anchor Loop Pipeline Project (TMX) is completed and enters reclamation phase
- Hanging culvert on Cottonwood Creek and concrete sluice under east train overpass removed
- Culverts removed and bridge installed at Pyramid Lake outlet
- Pioneer Plaza interpretive display installed in the Town of Jasper to raise profile of national historic sites, including Athabasca Pass, Jasper House and Henry House
- Contamination from old fuel tanks near Mildred Lake at the Fairmont Jasper Park Lodge detected
- Second *State of the Park Report* released

- New national historic sites management plans approved

2009

- Environment Canada conducts sampling to examine groundwater quality discharging to the Athabasca River for a broad suite of typical contaminants (e.g. selected petroleum hydrocarbons, chlorinated solvents, metals, other inorganics and nutrients)
- Parks Canada begins mass-balance monitoring of Athabasca Glacier in cooperation with the Geological Survey of Canada
- Work by Kinder-Morgan to reclaim the pipeline right-of-way enters its second year. Twelve culverts are replaced with bridges or larger open bottom culverts at various locations on tributaries of the Athabasca River. Four disturbed areas (former pits) adjacent to the river were reclaimed. Projects to improve fish habitat in Miette River and riparian habitat along Cottonwood Creek are also carried out.
- A 300 m trail and viewing platform are constructed, from which visitors can observe Jasper House NHS on the far side of the Athabasca River
- Sewer lines between Whistlers and Wapiti campgrounds and the Jasper townsite upgraded
- Diesel plume from historic contamination of Canadian National (CN) Jasper railyard approximately 200 m from Athabasca River; CN installs monitoring and recovery system
- Small commercial rafts permitted to use the former town water well site adjacent to Old Fort Point on a trial basis in 2009, and again in 2010, to reduce congestion at Old Fort Point
- Second review of *Jasper National Park Guidelines for River Use Management*
- Review of *Jasper National Park Management Plan* begins

2010

- Environment Canada conducts sampling to investigate the nature and extent of artificial sweeteners and pharmaceutical compounds in groundwater and groundwater discharging to surface water proximate to Jasper's wastewater treatment facilities.
- Fish passage at Talbot Lake outlet improved through installation of weir to backwater culvert
- Completion of Jasper House National Historic Site project; installation of interpretive panels to describe the site's national significance, and Aboriginal and European history
- Parks Canada begins to participate in a multi-stakeholder recovery team led by Alberta Sustainable Resource Development to prepare a recovery plan for rainbow trout
- Gathering of descendents of Jasper homesteaders at Moberly Homestead to celebrate 100th Anniversary of exodus from park
- Exhibit of artefacts from Swift refuse-pile created (artefacts uncovered at Palisades Ranch by Kinder-Morgan during pipeline twinning)
- ATCO removes section of abandoned gas line from Athabasca River east bank
- Revised *Jasper National Park Management Plan* approved

5.0 Natural Heritage Values

5.1 Background & Status

Visitors have been drawn to Jasper National Park for over a century to view its jagged, limestone peaks, densely forested slopes and silt-laden rivers. The three natural heritage values for which the Athabasca River was nominated—outstanding features related to the earth's evolutionary history, representation of ongoing geological processes and several unique landscapes—have changed little in that timeframe. The ecological processes that have shaped the landscape for millennia still function largely as they once did.

Although the river was not originally designated for habitats of rare or endangered plants or animals or for areas containing outstanding concentrations of plants or animals of Canadian significance, it does provide habitat for both common and rare animals. The river is home to 15 species of fish (see Table 2), two of which have been designated species-at-risk provincially. Five species of amphibian can be found in wetlands associated with the river. Less is known about aquatic invertebrates, an important community used to monitor water quality. Several bird species are closely associated with the river. Harlequin ducks, a species of Special Concern provincially, congregate on the river at certain key times (e.g. during sucker spawning).

The river also provides habitat for many land-based wildlife species. Lucky river users may catch a glimpse of a grizzly bear, a species that symbolizes wilderness for many Canadians and the driver for many management decisions in the mountain national parks. Or they may discover the tracks of a wolf, patrolling the river banks. Jasper National Park has a complete complement of carnivores, a trait that is becoming rarer in many parts of western North America. Elk are frequently seen resting on river islands and many females calve in the riparian areas bordering the river. Since the *State of the Park Report*, described in Section 3, provides a comprehensive overview of the status of many terrestrial species, this report focuses on aquatic species.

The river runs through all three ecoregions of the park: the alpine, characterized by open meadows; the subalpine, with its dense forests of lodgepole pine and Engelmann spruce; and the montane, with its open stands of Douglas fir and aspen, and wind-swept grasslands. Sand dunes located along the river in the eastern part of the park support a unique assemblage of vegetation and are identified in this report as a vegetation community of particular significance. Although there are no known rare or endangered species directly associated with the river, two COSEWIC-listed species, Haller's Apple Moss and Whitebark Pine, are found within the watershed. They are described in the SoPR or in documents posted on the *Species at Risk Act* (SARA) public registry, and so are not discussed further in this report.

The Athabasca River is assessed against the 2001 CHRS natural heritage values framework. Table 3 outlines the themes and sub-themes that comprise the values, changes or threats to

those values that have emerged since designation, and significant actions, research or studies related to each theme.

Table 2. Fishes of the Athabasca River in Jasper National Park

Common Name	Scientific Name	Currently Present	Notes
Native Species			
Minnow Family	***Cyprinidae***		
Lake chub	*Couesius plumbeus*	yes	
Spottail shiner	*Notropis hudsonius*	yes	
Longnose dace	*Rhinichthys cataractae*	yes	
Sucker Family	***Catostomidae***		
Longnose sucker	*Catostomus catostomus*	yes	
White sucker	*Catostomus commersoni*	yes	
Pike Family	***Esocidae***		
Northern pike	*Esox lucius*	yes	
Trout Family	***Salmonidae***		
Lake whitefish	*Coregonus clupeaformis*	yes	Lower Athabasca River, Lac Beauvert, Mile 9 Lake, Talbot Lake.
Pygmy whitefish	*Prosopium coulteri*	yes	Resident population confirmed in 2008.
Mountain whitefish	*Prosopium williamsoni*	yes	Travel from 900 km to spawn in park.
Rainbow trout	*Oncorhynchus mykiss*	yes	Both native and non-native Rainbow genotypes likely present.
Bull trout	*Salvelinus confluentus*	yes	
Trout Perch Family	***Percopsidae***		
Trout-perch	*Percopsis omiscomayus*	?	Sampled once (1969) Lac Beauvert outlet (D. Donald). Not observed since that time.
Cod Family			
Burbot	*Lota lota*	yes	
Sculpin Family	***Cottidae***		
Spoonhead sculpin	*Cottus ricei*	yes	
Non-Native Species			
Trout Family	**Salmonidae**		
Brook trout	*Salvelinus fontinalis*	yes	Compete with native fish for food & space.

Table 3. Natural Heritage Values of the Athabasca River

CHRS Natural Framework (2001) Themes and Sub-themes	Athabasca River Natural Heritage Values Description	Changes or Threats to Natural Heritage Values	Significant Actions, Research or Studies
1 Hydrology			
1.1 Drainage Basins	Arctic Ocean Basin; Stream number 2	No change	
1.2 Seasonal Variation	Period of highest flow is July; period of lowest flow is October-April	No change	The Water Survey of Canada monitors stream flow at two locations in the park: one on the Athabasca River and the other on the Miette River (see Figure 3)
1.3 Water Content	Sedimentation heaviest above Jasper townsite	No change	Chemical and physical water properties monitored by Environment Canada in two locations since 1973
1.4 River Size	Medium River - Mean discharge 100 m^3/sec at Old Fort Point. Total length is 1,538 km.	No change	
2 Physiography			
2.1 Physiographic Regions	Cordilleran Eastern Ranges	No change	
2.2 Geological Processes	Bedrock Formation: Outstanding examples of Folding, Sedimentation and Surficial Material Formation: Outstanding examples of Glacial Transport, Glacial Scouring And Wind Deposition	No change	Parks Canada and Geological Survey of Canada monitoring mass-balance of Athabasca Glacier
2.3 Hydrogeology	Porous sedimentary: sandstones, shales and glacial till	No change	
2.4 Topography	Steep: 11.43 m/km >1,000 m above sea level	No change	
3 River Morphology			
3.1 Valley Types	Concaved-walled valleys with	No change	

CHRS Natural Framework (2001) Themes and Sub-themes	Athabasca River Natural Heritage Values Description	Changes or Threats to Natural Heritage Values	Significant Actions, Research or Studies
	peaked interfluves; significant floodplain		
3.2 Channel Patterns	Stream Configuration: Tortuous	No change	
3.3 Channel Profile	Outstanding examples of ledges (e.g. Hardisty Ledges) and large waterfalls (Athabasca and Sunwapta falls) Many different white water elements	No change	
3.4 Fluvial Landforms	Excellent example of several different types of depositional and erosional landforms (e.g. alluvial fans, braiding, Athabasca gorge)	No change	
4 Biotic Environments			
4.1 Aquatic Ecosystems	Headwater zone; Marshes (Pocahontas Ponds)	No change	• Several fish inventories carried out • Invertebrate monitoring related to water quality started in 1999 • Invasive freshwater algae *Didymo* observed in park, research project initiated with University of Calgary
4.2 Terrestrial Ecosystems	Montane Cordillera – most extensive representation of montane ecoregion in national park system (7% of park)	General improvement	Five wildfires >1 ha and seven prescribed burns contributed to the maintenance/restoration of montane vegetation communities
5 Vegetation			
5.1 Significant Plant	Sand dunes communities	Condition unknown, but	Incursions of non-native plant species, primarily

CHRS Natural Framework (2001) Themes and Sub-themes	Athabasca River Natural Heritage Values Description	Changes or Threats to Natural Heritage Values	Significant Actions, Research or Studies
Communities		believed to be worsening	Russian Thistle, are affecting sand dunes/riverbank communities; manual control carried out in 2009 & 2010
5.2 Rare Plant Species	None	No change	
6 Fauna			
6.1 Significant Animal Populations	• Western Toad–listed as Special Concern under Schedule 1 of *SARA*, but ubiquitous in park • Harlequin ducks – provincial Special Concern	Unknown	A volunteer toad inventory was conducted by backcountry visitors in 2005 & 2006. Species appear abundant with a park wide distribution.
6.2 Rare Animal Species	• Pygmy Whitefish – ranked S1 by ANHIC • Bull trout – provincial Special Concern • Athabasca rainbow trout – ranked May be at Risk provincially; ESCC has recommended it be designated as Threatened	Unknown	• Pygmy whitefish inventory • Closure of Jacques Lake to angling (for bull trout); adjustment of angling regulations to better protect native fish • Collaboration with Alberta on rainbow trout recovery strategy

5.2 Condition of Natural Heritage Values Since Designation

Nutrient loading, fish stocking and impoundments, longstanding issues that were known to be affecting the river at the time of designation, have changed the composition of its biotic communities. The effects of nutrient loading and impoundments will be discussed in Section 8, Integrity Guidelines. This section concentrates on changes to geological features and processes, major ecological events, the status of native fish species in the river and two new invasive species that have become more prominent over the past decade.

Hydrology and Physiography

Although the river is a dynamic environment, its fundamental physical characteristics, such as river morphology, erosional and depositional dynamics and hydrological processes, have changed little since designation. Long-term monitoring of flows is conducted by the Water Survey of Canada (see Figure 3). Physical and chemical properties are monitored by Environment Canada and are described in more detail in Section 8, Integrity Guidelines.

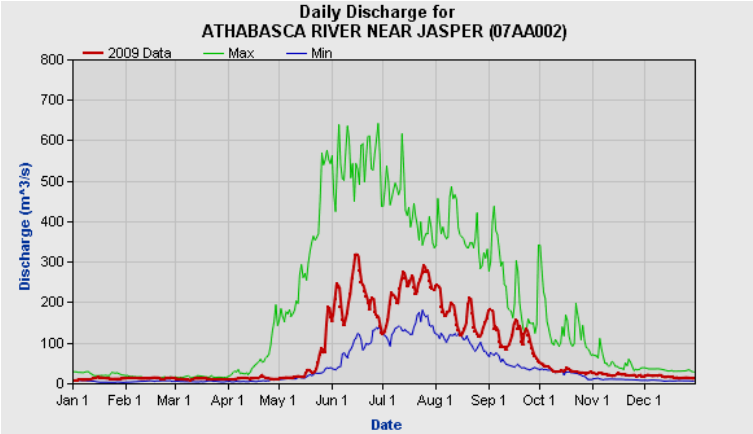


Figure 3. Daily Discharge for the Athabasca River at Water Survey of Canada Monitoring Station near Jasper Townsite

One aspect of the river's hydrological cycle that has attracted significant interest over the past ten years is the future of its glaciers. Markers along the trail to the toe of the Athabasca Glacier are a vivid reminder of how that glacier has receded over the past century. Other glaciers associated with the Columbia Icefield have also thinned and retreated in recent decades. In 2009, Parks Canada started to monitor the mass balance of the Athabasca Glacier in cooperation with the Geological Survey of Canada. Changes in mass balance (the difference between accumulation and melting) control a glacier's behaviour, making this the most sensitive climate indicator on a glacier. Additionally, research on moraine slope stability, hydrological changes, climate change and mass balance has been carried out in the recent past by institutions including the universities of Calgary, Northern British Columbia and Waterloo, and the Canadian Geological Survey.

Major Ecological Events

Several major wildfires occurred in the Athabasca Valley in the last ten years, the largest of which were the Syncline fire at the east end of Jasper Lake (27,300 ha) and the Moab fire on the Whirlpool River (1,029 ha). Wildfires introduce sediment and woody debris into water courses,

remove canopy cover, and cause other changes that may affect trophic structure. Since most Rocky Mountain ecosystems are fire-adapted, Parks Canada has been actively reintroducing fire into the park to ensure that vegetation patterns, and consequently wildlife abundance and distribution, fall within the range of natural variability. Prescribed burns in seven different areas within the Athabasca Valley have helped to achieve management objectives for the restoration of fire to the landscape.

Native Fish Populations

Although there are significant gaps in our knowledge of the status of native fish populations in the Athabasca River, several inventories over the last decade have narrowed those gaps. As indicated in the 2008 SoPR, further sampling is required before a trend can be established for "native fish community integrity", however its condition was rated as "fair". Changes to angling regulations in 2003 have improved protection for native fish species. Two species merit special mention in this report: pygmy whitefish and Athabasca rainbow trout.

Pygmy whitefish (*Prosopium coulterii*) are a glacial relict species that are known from restricted portions of two watersheds in Alberta, Upper Waterton Lake and the Athabasca River between Jasper and Hinton. In 2000, pygmy whitefish was designated as Data Deficient in Alberta. Until 2007, only nine specimens had been collected in Alberta and the species was still considered relatively unknown (Sullivan 2011).



Pygmy whitefish Photo: W. Hughson

Recent (2008) surveys conducted by Parks Canada and the Alberta Fish and Wildlife Division of Alberta Sustainable Resource Development (ASRD) have led to the collection and observation of many additional Athabasca River specimens within Jasper National Park from the Snaring River to the east park boundary. Additional specimens were caught in the Athabasca River downstream to the McLeod River confluence. Extensive and unsuccessful surveying specifically for this species in many other areas of Alberta suggests it has a very restricted distribution in the province. However, within the very small areas of its known habitat, it appears to be relatively common in Upper Waterton Lake, and relatively uncommon in the Athabasca River (Sullivan 2011).

Recent environmental impact assessment studies, particularly in the Pacific Northwest, have contributed to considerable advances in our knowledge of this previously little-known fish. A resident of very deep, cold boreal and montane lakes, this fish also has local populations resident in shallow, fast rivers. Its small size, rarity, and resemblance to more common whitefish species likely contributed to its Data Deficient status. More intensive and careful

research has resulted in biologists recently recognizing “new” populations that have likely existed for millennia (Sullivan 2011).

Populations are known from drainages in the coastal mountains of the Pacific Northwest, from large lakes in the western sub-Arctic, lakes and rivers in Alaska and Siberia, one lake and one river in Alberta and Lake Superior. The unusual geographic distribution of this fascinating little fish suggests it can teach us much about the post-glacial history North America and Asia. The isolated and small populations in Alberta will undoubtedly be important for taxonomic and geographical studies (Sullivan 2011).

The sustainability of this species in Alberta is a significant concern, based largely on the small size of its habitat and populations. The Upper Waterton Lake population is relatively protected from local habitat disturbance, but faces threats from invasions of exotic species and potential habitat loss from climate change. The Athabasca River population also faces these threats, but is at further and significant risk from accidental spills of deleterious substances (e.g. fuel, chemical, fertilizer, and grain) along the major highway, railway and pipeline corridor that is immediately adjacent to its entire course in the Park. Mitigation of these threats could include preparation of measures to quickly block, divert, or capture accidental spills of deleterious substances in sensitive areas of this species’ habitat. Surveys of adjacent populations of pygmy whitefish should be conducted to determine if these populations are themselves robust enough and genetically suitable to serve as sources for re-introductions (Sullivan 2011).



Athabasca rainbow trout sampling Photo: W. Hughson

Athabasca Rainbow Trout are a sub-population of rainbow trout resident in headwater and foothill streams of the upper Athabasca drainage. These fish are significant because they make up one of only two known populations of rainbow trout native to the eastern side of the mountain cordillera and because they exist only within a small range that includes Jasper National Park.

In 2004, the Province of Alberta (ASRD) and Parks Canada (JNP) worked cooperatively to conduct genetic sampling of rainbow trout in the headwaters and foothill regions of the upper Athabasca. This sampling revealed that a genetically distinct Rainbow Trout population exists in the Athabasca headwaters.

In June 2009, Alberta’s Endangered Species Conservation Committee (ESCC) provided advice to Minister Ted Morton (ASRD) on conservation requirements for Athabasca Rainbow Trout.

Based on: its area of occupancy (<2000 km^2), decline in habitat quality, number of mature individuals and susceptibility to biotic and abiotic stresses, the ESCC recommended the Athabasca Rainbow Trout be provincially designated as "threatened".

Jasper National Park is participating as a member of the provincial recovery team that has been directed by the provincial minister to complete a recovery strategy document for Athabasca Rainbow trout within two years.

Invasive Species



Didymo sampling Photo: W. Hughson

In the last 10 years, the presence of an aggressive species of freshwater algae in water bodies in many parts of Alberta has generated concern. A survey of park water bodies shed some light on the prevalence of didymo (*Didymosphenia geminata*), a species of algae that can form large mats on the bottom of lakes, rivers and streams. The mats reduce habitat for fish, invertebrates and plants, can threaten fish populations and diminish the aesthetic appeal of streams. Nineteen sites were surveyed by Parks Canada staff and a University of Calgary researcher, including sites on the Athabasca River. Didymo was found at 17 of the 19 sites surveyed. Efforts to educate river users to avoid transporting didymo from one locationa to another are underway.

Significant infestations of Russian thistle (Salsola tragus L.), commonly known as tumbleweed, were identified on dunes and sandy shorelines of the Athabasca River, near the eastern boundary of Jasper National Park during operational surveys, and during recent research by University of Alberta M.Sc. student, Tim Antill. The infestations are scattered, dense, and of varied size.

Manual control was undertaken by Parks Canada personnel from the Non-Native Vegetation Control Program aided by volunteers in 2009 and 2010 to help prevent seed set, and subsequent expansion. Volunteers are being sought to expand the control program and prevent additional spread of this worrisome invasive species. A study led by the University of Alberta was initiated in 2008 to examine the effectiveness of 7 different control methods for controlling this species.

In conclusion, scientific knowledge of aquatic ecosystems has increased over the past ten years, but many gaps remain. Although progress has been made in some areas, such as the reintroduction of fire to park landscapes and inventories of rare fish species, new threats are challenging park specialists and are reminders of the dynamic and complex nature of ecosystems. More will be said about progress in mitigating direct human impacts on the river in Section 8.

6.0 Cultural Heritage Values

6.1 Background & Status

The Athabasca River has a rich human history, with strong ties to three national historic sites and a national historic event. Long used by Aboriginal people as a travel route through the mountains, it played an important role in the development of the fur trade in the 19th century. Later it would be chosen as the corridor for a transnational railway. Two major highways also follow its course. A century of protection as a national park has ensured that early fur-trade river routes, mountain passes, and land transportation corridors have changed little in appearance from the historical period for which the river is significant.

Table 4. Cultural Heritage Values of the Athabasca River

CHRS Cultural Framework (2000)	Athabasca River Cultural Heritage Values	Changes or Threats to Heritage Values	Significant Actions, Research or Studies
1 Resource Harvesting			
1.1 Fishing	Historic accounts exist of Aboriginal people fishing in the Athabasca River. Talbot Lake, which lies next to Jasper Lake, was an important fishing spot.	No change	
1.2 Shoreline Resource Harvesting	Multiple historic accounts of Aboriginal people hunting and trapping in the vicinity of the Athabasca River. Pre-contact sites have been located along the river.	No change	
1.3 Extraction of Water	Agricultural extraction likely related to homesteading (see Table 4, 3.1)	No change	
2 Water Transport			
2.1 Commercial Transportation	Aboriginal trade route for Snaring, Shuswap and Beaver tribes. European fur trade route (with links to Jasper House, Yellowhead Pass and Athabasca Pass national historic sites). Yellowhead Pass National Historic Site (NHS) commemorated for early	Improved presentation of Jasper House NHS	Management plans for national historic sites developed; implementation has started. Construction of viewing platform and trail for Jasper House NHS.

CHRS Cultural Framework (2000)	Athabasca River Cultural Heritage Values	Changes or Threats to Heritage Values	Significant Actions, Research or Studies
	railway and roadway development.		
2.2 Transportation Services	Jasper House fur trade post. Athabasca and Yellowhead passes, and Henry House are also commemorated for their roles in the fur trade. Swift homestead used for re-provisioning by parties travelling through the Rockies. The river was used to transport logs from the Whirlpool valley to a tie camp at Jackladder for construction of the new railways.	No change	Henry House determined to be an event rather than a location.
2.3 Exploration and Surveying	David Thompson (1811) Palliser Expedition (1859) Overlanders (1862) Lobstick used by railway surveyors (1872)	No change	Lobstick tree fell into river, has been retrieved and is now lying on the river bank; interpretation planned for summer 2011
3 Riparian Settlement			
3.1 Siting of Dwellings	Moberly Buildings (1898) Swift Homestead/Palisades Ranch	Improved protection and presentation of early homesteads	Restoration of one building at the Moberly Homestead complete. Increased work with descendants of homesteaders on commemoration and interpretation. Master Plan for Palisades Centre development completed – includes heritage preservation component. Artefacts left by Swit family uncovered during pipeline project.
3.2 River-based Communities	Not applicable	---	---

CHRS Cultural Framework (2000)	Athabasca River Cultural Heritage Values	Changes or Threats to Heritage Values	Significant Actions, Research or Studies
3.3 River-influenced Transportation	Transnational railway and highway run adjacent to river through much of park. World-renowned scenic highway (the Icefields Parkway) follows upper Athabasca from glacier to confluence with Miette.	None	
4 Culture & Recreation			
4.1 Spiritual Associations	Suzanne Karakonti Moberly gravesite Many sites of spiritual significance are likely associated with the river, however Parks Canada has very limited knowledge of potential sites at this point in time.	Improved protection and presentation of gravesite.	The spirit house and fence associated with the gravesite were repaired; the gravesite is now managed by Suzanne Karakonti Moberly's descendants
4.2 Cultural Expression	Not applicable	---	---
4.3 Early Recreation	Outfitting, Jasper Park Lodge, mountaineering, early motoring, campground and bungalow camp development (See *Jasper: A History of the Place and its People* (2010) by J. Taylor for an in-depth description of the development of recreation in the park)	No change	---
5 Jurisdictional Uses			
5.1 Conflict & Military Associations	Snake Indian massacre (1830)	No change	Site unknown
5.2 Boundaries	Not applicable	---	---
5.3 Environmental Regulation	Establishment of Jasper National Park (1907) (See *Jasper: A History of the Place and its People* (2010) by J. Taylor for an in-depth description of park establishment and subsequent management and regulation and *A History of Canada's National Parks Vol. I* (1976) by W.F. Lothian for a comprehensive overview of the establishment of national parks, including Jasper.)	No change	

6.2 Condition of Cultural Heritage Values Since Designation

There has been little change since designation in the condition of the majority of the cultural resources that contribute to the cultural heritage values of the Athabasca River. A major project to stabilize/restore one of the historic buildings at the Ewan Moberly Homestead was undertaken in 2005. The Moberly Homestead is one of six homesteads located along the banks of the Athabasca River, occupied around the turn of the last century by Métis families. They were asked to leave their homes by the federal government shortly after the park was established; compensation was paid for the value of land improvements.



The main residence at the Ewan and Madeline Moberly Homestead was restored from 2003-2005 Photo: M. Dillon

Increased work with Aboriginal groups, such as the Upper Athabasca Valley Elders Council (a group connected to the Métis homesteading families), has improved our knowledge of Aboriginal history related to the river. The descendants of Suzanne Karakonti Moberly, an Aboriginal woman buried at the Moberly Homestead have taken over management of her gravesite, which has been repaired.

The Lobstick tree fell into the river in 2007. It was retrieved and now lies on the river bank. Researchers are dating part of the tree to determine how old it is and Parks Canada is developing an interpretive panel that tells its story.

Some new artefacts were unearthed during the TMX project; they are now on display at the Palisades Centre. Dating from the Lewis Swift[1] era of the Palisades Centre, they are believed to be items that were discarded in the family's refuse pile. The Palisades Centre, currently owned by Parks Canada, is being redeveloped as a centre for environmental stewardship education. A master plan has been developed that ensures that the heritage character of the centre will be maintained.

[1] Lewis Swift was another early homesteader of the Athabasca Valley. He was married to a Métis woman, Charlotte Swift. They lived on the property now known as the Palisades Centre.

Perhaps the main change to the cultural heritage values of the river has been an increase in the interpretation of its human history. New projects that are raising awareness of that history are outlined in the next section.

7.0 Recreational Values

7.1 Background & Status

One of the most visited rivers in the CHRS, the Athabasca River supports a diverse array of recreational opportunities, from active interaction though activities such as rafting, canoeing, kayaking or angling, to enjoyment from its banks while picnicking, camping or using one of many riverside trails.



Rafting on the Athabasca River Photo: J.Deagle

Five commercial rafting companies offer short (two- to three-hour) excursions on the river. Parks Canada provides many staging areas for non-commercial canoeing and kayaking and two rustic campgrounds that can only be accessed from the river. Although angling can be challenging in the cold, fast waters of the river, access is easy and there are many locations to choose from.

Three road-accessible campgrounds, Wapiti, Wabasso and Kerkeslin, and five outlying commercial accommodations are located right beside the river. Numerous trails, especially close to the Jasper townsite, offer visitors and residents the chance to walk, run, bike or ride a horse on the banks of the river. Two wilderness campgrounds, Big Bend and Athabasca Crossing, are located on the upper reaches of the river, and can be reached via Chaba trail. Spectacular scenery abounds, and can be viewed from the river itself, numerous day use areas and adjacent roadways. The proximity of two major highways to the river means that even motorists who are just passing through can enjoy the river.

Table 5. Recreational Values of the Athabasca River

Recreational Capability Themes and Sub-Themes (HTFC 1997)	Nature of Recreational Opportunity	Changes or Threats to Recreational Opportunity	Significant Actions, Research or Studies
1 Boating			
1.1 Whitewater Canoe, Kayak and	• Many opportunities for all three types of boating	No change	• River use governed by *Jasper National*

Recreational Capability Themes and Sub-Themes (HTFC 1997)	Nature of Recreational Opportunity	Changes or Threats to Recreational Opportunity	Significant Actions, Research or Studies
Raft	• Five rafting companies cater to approximately 30,000 visitors annually • One voyageur canoe company operates • Canoe and kayaking mainly by private parties, although some courses and events offered		*Park Guidelines for River Use Management* • New river guide published by Alberta Recreational Canoeing Association • Various improvements to put-ins and pull-outs
1.2 Extended Canoe Tripping	Overnight trips supported by two canoe campgrounds located downstream of Jasper townsite	No change	
1.3 Day paddling & rowing (from urban centre)	Day trips possible, however canoe rentals limited to area lakes	No change	
1.4 High-speed boating	Not permitted (motorized boats are only permitted for park management purposes)	---	---
1.5 Motorized pleasure cruising/houseboats	Not permitted	---	---
1.6 Commercial tourboats	Not permitted	---	---
2 Angling			
2.1 Day angling (from urban centre)	Many opportunities for angling on river, tributaries and lakes within watershed	No change	
2.2 Weekend angling (from urban centre)	Multiple opportunities	No change	
2.3 Extended angling vacation	---	---	---
3 Water Content			

Recreational Capability Themes and Sub-Themes (HTFC 1997)	Nature of Recreational Opportunity	Changes or Threats to Recreational Opportunity	Significant Actions, Research or Studies
3.1 Swimming	• River too swift and cold for swimming in most locations • Opportunities for wading at Jasper Lake • Swimming possible at many road-accessible lakes within watershed	Increasing use at Jasper Lake has been noted in the summer months, but not quantified	
3.2 Water skiing	Not permitted	---	---
3.3 Snorkel/scuba	Scuba/snorkelling opportunities in some lakes and the river (several commercial scuba companies offer certification dives)	No change	
4 Water Associated Activities			
4.1 Trail use (hiking, walking, cycling, horseback riding)	Multiple opportunities	General improvement in trail-based opportunities	Improvements to the trail network near the Jasper townsite have been carried out under the auspices of the Jasper Trails Project
4.2 Camping	Multiple riverside campgrounds	General improvement	Modernization projects have resulted in improvements to infrastructure and services
4.3 Hunting	Not permitted	---	---
5 Winter Activities			
5.1 Snowmobiling/Dog Sledding	Snowmobiling not permitted; no dog sledding concession in park	---	---
5.2 Cross-country skiing	Multiple opportunities	No change	
5.3 Skating	No skating on river, but opportunities on many ponds and lakes in watershed	No change	
6 Natural Heritage Appreciation			
6.1 Wildlife	Outstanding opportunities complemented by interpretive	No change	

Recreational Capability Themes and Sub-Themes (HTFC 1997)	Nature of Recreational Opportunity	Changes or Threats to Recreational Opportunity	Significant Actions, Research or Studies
	programs, media, publications that focus on natural history		
6.2 Vegetation	Outstanding opportunities to view a variety of native vegetation communities	No change	Efforts to eradicate non-native invasive species and introduce fire to the landscape ensure that visitors continue to have opportunities to view native vegetation
6.3 Vistas/scenic quality	Outstanding vistas at many points along the river. Limits to development and stringent redevelopment guidelines ensure that scenic qualities will remain unimpaired.	No change	• Athabasca Falls day-use area redeveloped • Jasper House platform and trail developed
6.4 Geological features/water features	Many opportunities to view and learn about outstanding geological and water features	No change	Athabasca Falls day-use area redeveloped
7 Human Heritage Appreciation			
7.1 Historic Sites	Good opportunities to learn about human heritage of river	More opportunities to learn about river-based heritage	• Increased interpretation at Moberly homestead and Pioneer Plaza (in Town of Jasper) • Moberly Homestead event held in 2010 • Jasper House platform and trail features new interpretation
7.2 Cultural Landscapes	Athabasca Pass, Yellowhead Pass	No change	Project to improve interpretation of Yellowhead Pass in progress
7.3 Sporting Events/Activities	Occasional events, such as kayaking slalom, aquathon	No change	

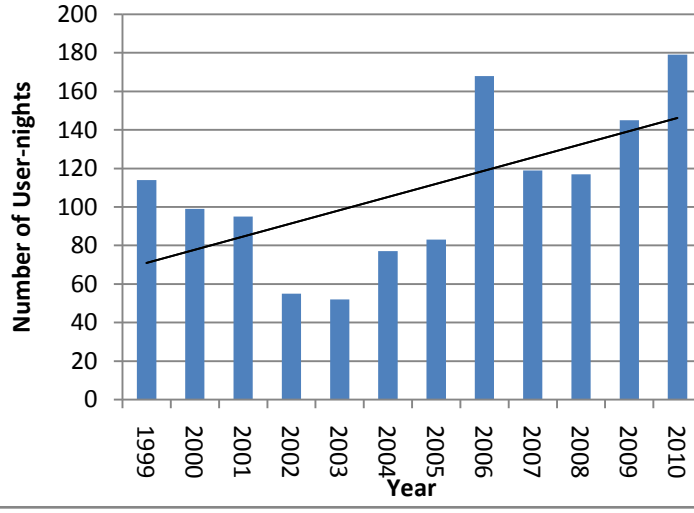
Recreational Capability Themes and Sub-Themes (HTFC 1997)	Nature of Recreational Opportunity	Changes or Threats to Recreational Opportunity	Significant Actions, Research or Studies
	(scuba) and rafting pentathalon		
7.4 Cultural events/activities			• Yellowhead Museum and Archives hold regular exhibits and events related to river history • David Thompson bicentennial will be celebrated in 2011; a number of events are planned in Jasper

7.2 Condition of Recreational Values Since Designation

While there have been improvements to the infrastructure, facilities and services that support visitor experiences along the river, the majority of the recreational opportunities associated with the river have not changed substantially over the last decade.

The number of visitors rafting with commercial operators on the river appears to be declining. Approximately 39,000 people took raft trips on the Athabasca River in 1999, whereas only 28,000 participated in 2009. Congestion at Old Fort Point, the main take-out point for rafts, has been an issue in the past; however, the use of an alternative take-out location (the old water well site) and the relocation of a commercial voyageur canoe operation further downstream seem to be easing the situation. Little is known

Figure 4. Number of User-nights at the Athabasca Island Canoe Campground, Jasper National Park



about the experience of rafting clients (i.e. satisfaction with their trip, opportunities to learn about the river), although a study in 2000 into perceptions of crowding among rafting clients found that they did not feel that there were too many people on the river. A number of projects have been carried out that have likely improved the rafting experience, such as a new toilet at Poplar Flats and parking improvements at the put-in below Athabasca Falls.

There are no numbers for non-commercial canoeing and kayaking on the river. In 2010, Parks Canada issued permits for 179 user-nights at the Athabasca Island backcountry canoe campground (one user-night represents one individual staying for one night at a campsite); overnight use has increased by about 7% per year over the past decade. Use of the other canoe campground, the Brule campground, has been stable at approximately 21 user-nights annually. A new guide to paddling the river was produced mid-decade by the Alberta Recreational Canoeing Association.

A major redevelopment of the day use area at Athabasca Falls and the development of a new trail and viewing platform for Jasper House NHS have improved interpretation of the natural and cultural heritage of the river. Athabasca Falls is one of the most popular day-use areas along the Icefields Parkway. New fencing, railings and interpretive panels, a new viewpoint, and improved washrooms, parking and walkways make it easier for visitors to safely enjoy and learn about this outstanding geological feature.





Jasper House National Historic Site viewing platform and trail Photos: R. Gruys

Motorists using Highway 16 have a new place to stretch their legs partway between the Jasper and the East Gate. Interpretive panels installed in spring 2010 put the finishing touches on a viewing platform overlooking the Jasper House National Historic Site. Highway improvements have made it easier for motorists to pull off the highway safely at the parking area for the trail leading to the platform.

In 2004 Parks Canada improved parking, created a viewing area and restored riparian vegetation at another key location for river experience, Old Fort Point. Popular with visitors and

residents alike due to its proximity to the community and access to several major trails, it is also the main take-out area for commercial rafts and a staging area for private boaters. It also has historic associations with the fur trade routes (land and water) and railway construction. This would be an excellent location to increase interpretation of the Athabasca's Canadian Heritage River status and its human history.

Several riverside and connector trails have been upgraded over the past six years as part of the Jasper Trails Project. The project looked at ways to reconfigure the network of trails in the Three Valley Confluence (the area where the Athabasca, Miette and Maligne rivers meet) to better meet the needs of recreational users, wildlife and other sensitive species by providing a variety of trails from easy to challenging in ecologically appropriate locations (e.g. areas already impacted by high levels of human use) and by re-routing or removing trails from ecologically sensitive areas.



New connector trail over the Athabasca River at Moberly Bridge Photo: C. McNutt

For example, the river trail between Moberly Bridge, Jasper Park Lodge and Old Fort Point was upgraded to reduce erosion, remove large obstacles and provide an "easy" recreational opportunity on a trail that is already heavily used. New trails connecting pedestrians and cyclists to Whistlers campground and to the Lake Annette/Lake Edith areas encourage non-motorized modes of transportation and bring visitors alongside or across the Athabasca River.

Increased work with Aboriginal groups with historic connections to the park has resulted in improved interpretation—panels at both the Jasper House viewing area and the Moberly Homestead were developed with input from Aboriginal groups. Descendants of the original homesteaders gathered together at the Moberly homestead this past summer to mark the 100th anniversary of their exodus from the park and share their Métis culture with park visitors.



New exhibit at Pioneer Plaza Photo: C. McNutt

Other new interpretation related to cultural resources includes an exhibit on national historic sites at Pioneer Plaza (next to the train station) in Jasper. The bicentennial of David Thompson's crossing of Athabasca Pass will be celebrated in 2011 with a variety of events and partners (e.g. Jasper Yellowhead Museum and Archives).

8.0 Integrity Guidelines

8.1 Background & Status

The Athabasca River's location within a national park affords it a high level of protection. The maintenance or restoration of ecological integrity is a priority in decision-making about the river and recreation is the only land use in the park. However, high numbers of visitors and the historic development of a transnational railway and highway, utilities including a major oil pipeline, and a community and outlying facilities to support tourism, have substantially altered aquatic environments. There are 52 sites between Jasper and the east gate where the railway, highway and pipeline have altered water flow, making aquatic connectivity a key challenge for Parks Canada.

Despite its relatively pristine setting, the nomination report and first ten-year monitoring report noted that water quality is affected by effluent from the Jasper townsite and likely by point discharges from contaminated sites, road salt and spills. More recently, awareness of the potential effects of stormwater has increased. Despite localized water quality issues, the previous reports affirmed that the river as a whole appeared to be meeting integrity guidelines for water quality.

The Athabasca River has a high degree of integrity with respect to cultural resources. As noted previously, the river's natural appearance has changed little since pre-contact use by Aboriginal people and the fur trade era. There has been minimal development along most stretches of the river; where development has occurred, it is governed by stringent architectural and redevelopment guidelines to ensure that it respects the wilderness character of the park.

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

Table 6. Integrity Values of the Athabasca River

Integrity Guidelines (CHRS Principles, Procedures & Operational Guidelines 2001)	Changes or Threats to River Integrity	Significant Actions, Research or Studies
Natural Integrity Guidelines		
The nominated section is of sufficient size to include significant representations of all the natural processes, features, or other phenomena which give the river its outstanding natural value	No change	
The nominated section includes those ecosystem components which contribute	No change	Progress made in re-introducing fire to

Integrity Guidelines (CHRS Principles, Procedures & Operational Guidelines 2001)	Changes or Threats to River Integrity	Significant Actions, Research or Studies
significantly to the provision of habitat for species in need of protection		the landscape
There are 52 sites where the railway, highway, and pipeline have altered water flow. There is a also a small impoundment on the Astoria River, a tributary of the Athabasca, however it does not affect flows into the Athabasca Natural values for which the river is nominated have not been created by impoundments.	Slight improvement	Aquatic connectivity has been improved in several locations
No impoundments are located upstream of the nominated section.	No change	
The water in the nominated section is uncontaminated to the extent that its natural aquatic ecosystem is intact	Slight improvement in water quality	• Municipal wastewater treatment plant has been upgraded • Invertebrate monitoring upstream and downstream of plant ongoing since 1999 • Water quality may be affected intermittently by road salt, spills, historic contamination and stormwater from the highways or the community of Jasper
The natural aesthetic character of the nominated section is free of, or not adversely affected by, human developments	No change	
Cultural Integrity Values		
The nominated area is of sufficient size and contains all or most of the key interrelated and interdependent elements to demonstrate the key aspects of the features, activities or other phenomena which give the river its outstanding cultural value	No change	
The visual appearance of the nominated section of river enables an appreciation of at least one of the periods of the river's historical	No change	

Integrity Guidelines (CHRS Principles, Procedures & Operational Guidelines 2001)	Changes or Threats to River Integrity	Significant Actions, Research or Studies
importance.		
The key artefacts and sites comprising the values for which the river is nominated are unimpaired by impoundments and human land uses.	No change	
The water quality of the nominated section does not detract from the aesthetic appearance or the cultural experience provided by its cultural values.	No change	
Recreational Integrity Values		
The river possesses water of a quality suitable for contact recreational activities, including those recreational opportunities for which it is nominated.	No change	
The river's visual appearance is capable of providing river travellers with a continuous natural experience, or a combined natural and cultural experience, without significant interruption by modern human intrusions.	No change	
The river is capable of supporting increased recreational uses without significant loss of or impact on its natural, cultural or aesthetic values.	No change	Park management plan contains target to increase park visitation by 2% per year until 2013/14

8.2 Condition of Integrity Values Since Designation

Kinder Morgan Canada – Anchor Loop Pipeline (TMX) Project

A number of small infrastructure projects have been carried out next to the river over the past ten years (e.g. ATCO Pipelines relocated two sections of an exposed pipeline that delivers natural gas to the community of Jasper from the river bank to the highway corridor, Kinder Morgan armoured a section of riverbank to protect its Trans Mountain Pipeline). However the Kinder Morgan Canada – Anchor Loop Pipeline Project (TMX) was undoubtedly the largest project to take place anywhere in the park in several decades.

The TMX project, which began in 2007, involved the construction of a new pipeline loop through the park. The new pipeline loop augments the capacity of its predecessor, the 1952 Trans Mountain Pipeline, and transports additional crude and refined petroleum products to the west coast for domestic and export markets.



TMX pipeline crossing the Athabasca River Photo: D. Bourdin

The TMX route runs for 81 km within the park and follows or abuts existing linear features such as Highway 16, the Trans Mountain Pipeline, abandoned rail grades and other linear right-of-ways. Since much of the route lies close to the Athabasca River, the project had the potential to create significant adverse effects for aquatic ecosystems. Kinder Morgan was held to a very high standard of environmental care by federal regulatory bodies (National Energy Board, Parks Canada, Department of Fisheries and Oceans and Transport Canada – Navigable Waters).

One major river crossing was required, 100 m downstream of the 1952 Trans Mountain Pipeline crossing near Disaster Point. The 940 m crossing, which spanned four side channels and the 100-metre-wide main channel of the river, was completed in January and February of 2008. The pipeline is buried 5 m below the main channel bottom. A 750 m drag and pull section of 36 inch pipe, coated in 125 mm of concrete, was lowered under the river bottom. This section weighed approximately 2.1 million pounds.

Construction was completed in 2008 and the project entered the reclamation phase, which will run until 2013. As part of the reclamation phase, Kinder Morgan has completed several terrestrial and aquatic net gain projects that will have positive long-term outcomes for aquatic ecosystems.

Twelve culverts were replaced with improved fish passage structures (bridges or open bottom culverts) on tributaries of the Athabasca River. Fish habitat was also enhanced in the Miette River and riparian habitat improved along Cottonwood Creek.

Terrestrial net gains were made through the restoration of four pits (Fiddle Pit, Roche Miette Pit, Trade Waste Pit and Sleepy Hollow Pit) adjacent to the Athabasca River.

Reclamation activities and associated monitoring programs are continuing in order to achieve the management objectives and desired end results set out by Parks Canada and committed to by Kinder Morgan. No significant adverse environmental effects on aquatic and terrestrial ecosystems are expected, if the desired end results are achieved. Currently, vegetation on the pipeline and staging area sites is growing well. The habitat enhancement and restoration projects, in combination with projects Parks Canada has undertaken recently (e.g. shoreline revegetation at Old Fort Point, reclamation of the municipal sewage lagoons and associated restoration of Cottonwood Creek, reclamation of Jackladder Road) will result in a small increase in riparian habitat.

Aquatic Connectivity



Concrete sluice under railway overpass east of Jasper townsite removed Photos: W. Hughson

Improvements to aquatic connectivity provided by the TMX culvert replacement projects will add to work Parks Canada has already carried out. Steep or hanging culverts hinder the passage of fish and other aquatic species and fragment aquatic ecosystems. Parks Canada initiated a culvert inventory in 2005, through which a number of priorities for corrective work were identified. In 2010, Department of Fisheries and Oceans engineers visited those culverts and provided designs for in-stream structures (e.g. rock weirs) that will improve connectivity. Parks Canada fixed a culvert at Talbot Lake this fall and more work is planned for next year. Corrective action has also been taken for culverts on Cottonwood, Cabin and Pyramid creeks.

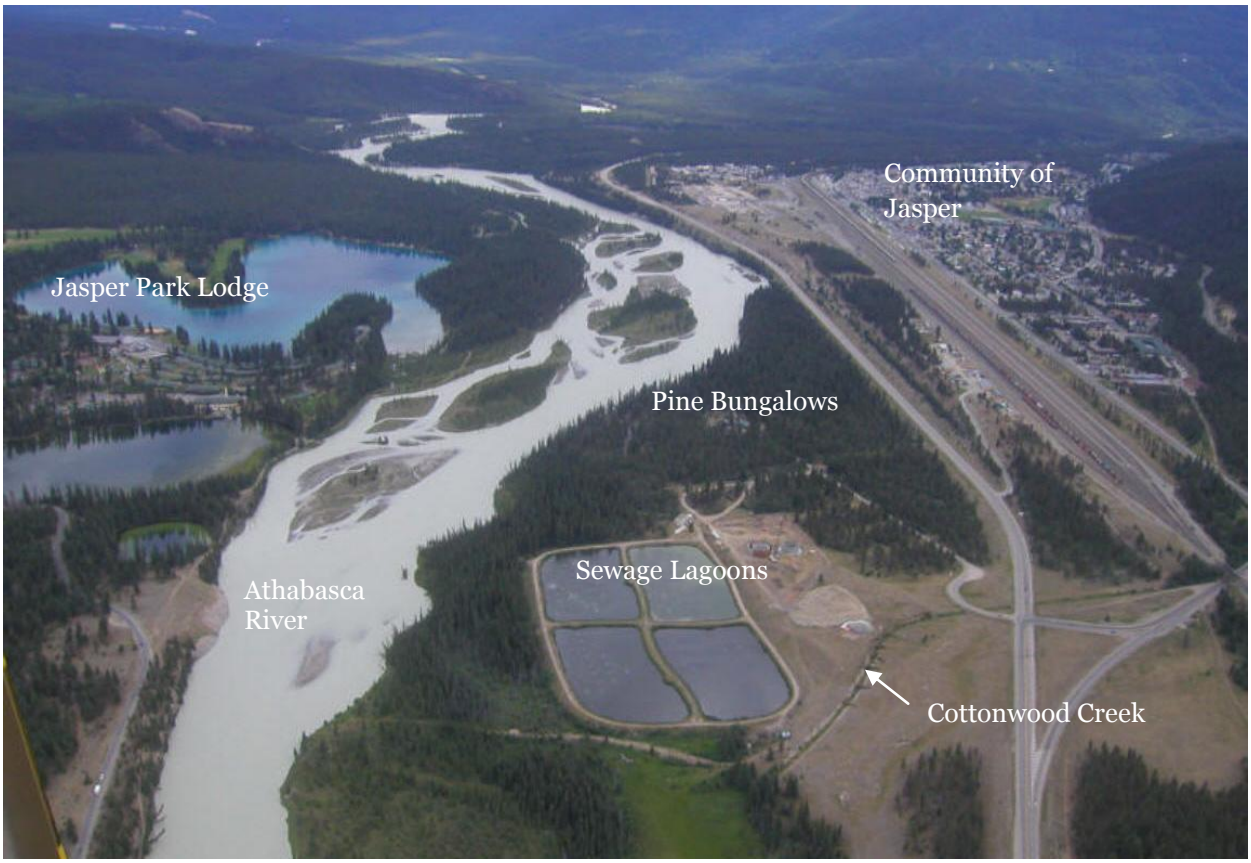
Water Quality

Sewage Treatment

Perhaps the most substantial change in the integrity of the river has been with respect to water quality. Nutrient loading of the river's nutrient-poor waters by the municipal wastewater treatment plant (WWTP) has long been identified as an issue requiring corrective action. Point source contamination from salt use on roads, spills and historic contamination have also been identified as issues.

In 2008, the WWTP discharged approximately 1,600,000 m^3 of effluent into the river. A major upgrade of the wastewater treatment system was carried out in 2003; four sewage lagoons were replaced with an activated sludge biological nutrient removal plant. One sewage lagoon is still used periodically in plant operations, however the other three lagoons have been rehabilitated. A portion of Cottonwood Creek located near the plant was restored as part of the plant upgrade.

The effluent from the plant is tested regularly to ensure that it meets provincial and federal regulatory guidelines. The municipality is currently reviewing the plant's performance to determine how to improve its consistency in meeting those guidelines. Long-term water quality



Community of Jasper and wastewater treatment plant before 2003 upgrade Photo: J. Deagle

monitoring conducted by Environment Canada (since 1973) and benthic invertebrate monitoring conducted by the University of Alberta (since 1999) give some indication of the effectiveness of upgrades.

Other smaller projects, such as lift station improvements, the replacement of sewer lines from Whistlers and Wapiti campgrounds into town and the connection of Pine Bungalows (a outlying commercial accommodation) to the treatment plant, may also have contributed to water quality improvements.

Environment Canada Long Term Monitoring Stations

Water quality monitoring conducted by Environment Canada is carried out at two locations along the Athabasca River. One monitoring point is located approximately 1 km upstream of Athabasca Falls and the other is approximately 20 km downstream of the community of Jasper. The upstream site is considered a reference site, as there are no substantial point source inputs above that point, while the downstream location allows evaluation of water quality exiting the park. This long-term monitoring program is jointly funded by Parks Canada and Environment Canada. Table 7 lists the water quality parameters that are monitored.

Table 7. List of Water Quality Parameters Analyzed by Environment Canada at Two Locations in Jasper National Park (Glozier 2004)

Physicals	Major Ions	Bacterial	Nutrients	Metals	
				Dissolved[1]	Total[2]
colour true	alkalinity total	coliform total	NH_3 – total	aluminum*	aluminum
oxygen, dissolved	bicarbonate - C	coliform fecal	NH_3 unionized – C	arsenic	barium
pH (F,L)	calcium	fecal streptococci	carbon dissolved organic	barium*	beryllium
residue, nonfilterable	chloride		carbon particulate organic	beryllium*	cadmium
specific conductance (F,L)	total dissolved solids - C		carbon total organic - C	boron	chromium
water temperature	sulphate		NO_3+NO_2	cadmium*	cobalt
turbidity (F,L)	hardness total		nitrogen particulate	chromium*	copper
	magnesium		nitrogen dissolved	cobalt*	lead
	potassium		nitrogen total – C	copper*	lithium
	silica reactive		phosphorous particulate-C	iron	manganese
	sodium		phosphorous dissolved	lead*	mercury[3]
	fluoride		phosphorous total	lithium*	molybdenum
				manganese	nickel
				molybdenum*	strontium
				nickel*	vanadium
				selenium	zinc
				strontium*	
				vanadium*	
				zinc*	

1. dissolved metals marked with an asterix have been analyzed since 1999 only.
2. total metals are analyzed at the downstream sites on the Bow and Athabasca rivers.
3. analysis for total mercury was discontinued in 1997 and results are not discussed.

C results for these parameters are calculated from other directly measured parameters.

F,L these parameters are measured in both the field (F) and the laboratory (L).

A consistent result evident throughout the current analysis is that significant improvement in water quality for the Athabasca river ecosystem has occurred over the past decade. The 5-year moving Water Quality Indices calculated for the river demonstrates the overall improvement in water quality. Improvements in concentrations of nutrient and bacteriological parameters were observed at the downstream site.

Metals are not a concern in this river reach as few exceedences to published guidelines were observed and those that did can be attributed to natural sources. Interestingly, the concentration of most major ions exhibited a consistent pattern of increasing trends. Environment Canada suggests that climatic and hydrologic trends be considered as explanatory causal agents for these trends, but this suggestion needs further examination.

Although the improvements in nutrient concentrations are substantial, nutrient enrichment remains the main concern for the Athabasca River within Jasper National Park. We anticipate that the downstream site on the Athabasca River will show further improvements with the completion of upgrades to the Jasper municipal treatment facility (tertiary treatment with phosphorous removal). As this upgrade is a major step towards maintaining and restoring water quality and aquatic biodiversity to the Athabasca River, documenting this transition in water quality and the relationship with key trophic levels (i.e., algal and invertebrate communities) is a priority for the Parks' water quality monitoring program. A monitoring program conducted by a post-doctoral student and funded by Parks Canada is assisting with the latter task.

Aquatic Community Response Monitoring

This program was initiated in 1998 to evaluate the effects of anthropogenic nutrient additions on the ecological integrity of the Athabasca River. Sites upstream and downstream of the wastewater outfall for the town of Jasper were monitored for riverine nutrient concentrations as well as benthic algae and macroinvertebrate composition. These indices were found to be the most responsive to human-made nutrient additions in the mountain parks (Bowman 2011).

Previous studies in the Athabasca River have also shown that the abundance of benthic algae is controlled by the amount of phosphorus available in the water. In turn, increased benthic algal abundance was typically associated with higher phosphorus content of algal tissue, relatively fewer sensitive mayflies, relatively more tolerant chironomids, and higher abundances of invertebrates overall (Bowman 2011).

Thus, these indicators were used to evaluate the effectiveness of improved treatment (including enhanced phosphorus removal) of wastewater in Jasper. The results of the monitoring program show that the sites in the Athabasca River upstream of wastewater input have consistently been in fair to good overall condition since the program was initiated. Conversely, the sites downstream of wastewater input were deemed poor to very poor (with one exception) prior to 2003. After upgrades to the Jasper Wastewater Treatment plant in 2002-3, the ecological

integrity ratings for downstream sites consistently improved from poor-very poor to good-poor (Bowman 2011).

Although there have been significant and lasting improvements in the ecological integrity of sites downstream of wastewater input, there is some evidence of recent (2008-2010) deterioration in upstream sites. Algal abundances in upstream sites were high in 2008-9 relative to previous years. In addition, the relative abundance of mayflies was very low and chironomids very high, at the site upstream of the Pine Bungalows Resort in 2009. These changes are correlated with blooms of the invasive algal Didymosphenia geminata but the cause of these recent blooms is not clear (Bowman 2011).

Other Water Quality Issues

With about 35 km of the Yellowhead Highway located within 50 m of the Athabasca River, the use of salt and abrasives to make the road surface safer in winter and spills of pollutants from motor vehicle accidents can have direct impacts on water quality.

On average, there are two to three motor vehicle accidents annually along the Athabasca River or its tributaries that result in spills of fuel, oil and other engine fluids onto the ground and occasionally into water. Parks Canada employees respond to these incidents, contain the spills and remove contaminated materials. Parks Canada is working with other agencies and corporate partners to ensure that employees receive appropriate training and that an adequate response capacity exists.



Spill containment following a motor vehicle accident Photo: J. Deagle

Environment Canada declared road salt a toxic substance in 2001. There is some evidence of salt damage to roadside vegetation in the park. The installation of a pre-wetting system of magnesium chloride on several snow-plows and sanders in 2002 has reduced the amount of salt required on roadways. Salt contamination at the Parks Canada maintenance compound in Jasper was discovered in 2001 and is being monitored. The salt has leached into the groundwater and is gradually moving towards the river.

Run-off from streets and hardened areas of Jasper is collected in storm sewers and discharges directly into tributaries of the Athabasca River, Cabin Creek and Cottonwood Creek, and North Twin Lake. This run off was analysed in 2007 and contains elevated sediment levels. Stormwater may also contain other contaminants such as fuel, metals and salts. Due to the

sensitivity of the receiving environment and the absence of treatment or retention prior to run-off entering surface water, additional monitoring and study is warranted.

Historic contamination continues to be of concern at two contaminated sites originally identified in 1996. After decommissioning bulk fuel storage facilities in the Jasper railyard, Canadian National Railways (CNR) discovered a large plume of diesel fuel under the railyard. The plume is slowly making its way towards, and is now approximately 200 m from, the river. CNR has installed a monitoring system to track the diesel plume's movements and has tested a number of small recovery systems on-site. Parks Canada and other government departments are monitoring the plume and water quality in the river and are discussing potential remediation requirements with CN.

Fairmont Jasper Park Lodge is also the site of historic contamination from underground storage tanks. Despite a clean-up in 1996, further contamination was uncovered in 2008. More investigative work is being undertaken to determine next steps.

The Groundwater Quality & Assessment Section of Environment Canada conducted two related sampling programs in Jasper National Park in the summers of 2009 and 2010. Sections along the Athabasca River near the Town of Jasper were included as part of several larger studies examining the discharge of contaminants from groundwater to urban rivers in Canada. The presence of the CN rail yard and Jasper's municipal wastewater facilities, situated in an otherwise pristine area, provided a unique setting to include in these studies.

The objective of the 2009 sampling was to examine groundwater quality discharging to the Athabasca River for a broad suite of typical contaminants (e.g. selected petroleum hydrocarbons, chlorinated solvents, metals, other inorganics and nutrients). The 2010 sampling focussed on investigating the nature and extent of artificial sweeteners and pharmaceutical compounds in groundwater and groundwater discharging to surface water proximate to Jasper's wastewater treatment facilities.

Samples were taken from two different sections, one near the railyard and the other near the wastewater treatment plant. The artificial sweetener acesulfame was detected in the majority of groundwater samples and saccharin and cyclamate were also commonly detected in samples taken from wastewater treatment plant location. Results from Jasper and other locations included in the Environment Canada studies on artificial sweeteners in groundwater (Van Stempvoort et al., 2010) represent the first reported detections of saccharin and cyclamate in groundwater. The presence of sweeteners in groundwater may be more common than previously anticipated and may prove to be useful tracers of human wastewater, especially in urban settings with complex hydrology. Environment Canada is expecting that the data collected from the 2009 and 2010 sampling events in Jasper will also be included in several future publications related to groundwater quality discharging to surface water.

In conclusion, water quality as it relates to maintaining or restoring aquatic communities has improved slightly downstream of the wastewater treatment plant. Water quality meets the standards required for recreational activities and does not detract from the cultural experience offered by the river.

Aesthetics and Recreational Capacity

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



Bull trout, an apex predator in the Athabasca RIver Photo: W. Hughson

In terms of the amount of use the river can sustain, much depends on the timing, location, amount and type of use proposed. Current levels and types of use appear to be sustainable. The new park management plan contains a goal to increase visitation to the park by urban Canadians, new Canadians and youth. Increased visitation will be directed to ecologically robust areas and facilities designed for that use. The *Jasper National Park Guidelines for River Use Management* is the key document for managing river use and Parks Canada will continue to undertake five-year reviews of that document to ensure that objectives for river use are met.

9.0 Summary and Conclusions

There has been little change over the past 10 years in the values for which the Athabasca River was designated. Its location in a national park ensures a level of protection found in few jurisdictions. The condition of ecological integrity, cultural resources and visitor experiences in Jasper National Park is assessed every five years in a *State of the Park Report*.

There has been little change in the hydrology, physiography and morphology of the river since it was designated. It is probable that climate change is influencing these aspects of the natural heritage of the river, but on a time scale that is beyond the scope of this report. Parks Canada and other government agencies are monitoring key variables (e.g. glacier mass balance, water flows) that, in future, may tell us more about the effect of climate change on these values.

We know more about the biotic environment than we did ten years ago, and important steps have been taken to improve its integrity, however aquatic and terrestrial ecosystems are still being stressed by longstanding issues, such as impoundments created by the highway, railway and utilities, invasive non-native species (e.g. brook trout introduced through stocking, Russian thistle), and nutrients and contaminants introduced into the river by human activity. Nonetheless, aquatic connectivity has been improved in several locations, water quality and the

management of deleterious substances has improved, and management actions have been undertaken to control the spread of some invasive species. However, sustained efforts are required to maintain or restore the integrity of aquatic ecosystems.

Cultural heritage values have changed little since designation. River travellers experience a landscape that is similar to that experienced in past centuries by fur traders and railway workers. One heritage building with important links to the river has been restored. Interpretation has improved on many fronts – particularly with respect to Aboriginal history.

Recreational use of the river has also remained fairly constant over the last ten years. There have been upgrades to several facilities that allow visitors to experience the river and learn about its natural and cultural heritage. Appropriate tools are in place to manage recreational use and foster enjoyable visitor experiences, from angling regulations to policies like the *Jasper National Park Guidelines for River Use Management* and *Redevelopment Guidelines for Outlying Commercial Accommodation Guidelines and Hostels in the Rocky Mountains National Parks*.

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

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

Best practices implemented during the TMX and other projects, and forward-looking policies, such as the targets for wastewater effluent enshrined in the management plan, ensure that the river's integrity is sustained into the future.



Athabasca River exiting Jasper National Park on its eastern boundary Photo: W. Hughson

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11.0 Further Contacts

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