Literature Review

Local and Traditional Knowledge In the Peel River Watershed

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trackingchange

UNIVERSITY OF ALBERTA
MRBB MACKENZIE RIVER BASIN BOARD
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SUMMARY POINTS

This document is produced for the *Tracking Change…* project, is a collaborative research initiative led by the University of Alberta involving many Aboriginal organizations, co-management boards, and universities, as well as the Government of Alberta, the Government of the Northwest Territories and the Mackenzie River Basin Board. Funding for the project has been provided by the Social Sciences and Humanities Research Council, the University of Alberta, the Government of the Northwest Territories, the Mackenzie River Basin Board and in-kind contributions from numerous others.

The Peel River Basin is an important trans-boundary watershed that sits within the jurisdictions of the Government of the Yukon and the Government of the Northwest Territories. The watershed is recognized internationally as an important area of ecological biodiversity, but it is also home to many Gwich'in as well as northern Tutchone peoples, and is thus an important landscape with many integrated socio-economic, cultural, and ecological values.

The Peel River Watershed is a mountainous area that boasts numerous tributaries, such as Bonnetplume, which are currently valued and recognized by both Indigenous and non-Indigenous peoples for their beauty, pristine waters, and biodiversity. Unlike many other sub-basins of the Mackenzie, the Peel River Watershed has, until recently, been little disturbed by resource development. The recent decision of the Yukon Government to open up the area for mining exploration and development has thus been met with significant concern and opposition by those living in the region and internationally.

Early ethnographic work describes the importance of the Peel to local Indigenous communities, including the importance of many of the rivers as transportation corridors and the fish within these rivers as critical to the food security of families who lived and traveled throughout the area. A significant body of local and traditional knowledge has been documented by the Gwich'in Social and Cultural Institute that stems from the livelihood practices, observations and experiences of the Teetł'it t Gwich'in peoples. In addition to place names (documented and available as a teaching tool on their website: www.gwich'in.ca), there is a significant body of ethnographic material that has been documented and reported as well as archived though the offices of the Gwich'in Tribal Council. The Gwich'in Renewable Resources Board, also has also produced many reports which speak to the health of the aquatic ecosystem; a lesser extent of this knowledge pertains to the Peel River Watershed when compared to other areas of the Gwich'in Settlement Area. With growing recognition of the importance of the Peel River Watershed as a critical area of biodiversity, there are more opportunities for local Indigenous communities from both the Yukon and Northwest Territories to document their knowledge of this area. However, many gaps exist with respect to the availability of documented local and traditional knowledge in respect of all indicators of aquatic ecosystem health defined in this report.

Table 1: Summary of Knowledge by Indicator Theme

Indicator	LTK	Notable Sources, Programs, Projects
Traditional Land Use—Indigenous		Arctic Borderlands Knowledge Coop Gwich'in Social and Cultural Institute Gwich'in Renewable Resources Board Tr'ondëk Hwëch'in First Nation Government of the Yukon
Contemporary Use—Indigenous		
Subsistence Values/Historical—Fisheries		
Commercial Values/ Historical—Fisheries		
Subsistence Values/ Contemporary —Fisheries		
Commercial Values/ Contemporary —Fisheries		
Fish Diversity		
Fish Health		
Fish Movements and Migration		
Water Quality		
Water Flow, Levels		
Climate Change Effects		
Effects of Disturbance		
Traditional Stewardship Practices		

INTRODUCTION

The Peel River Watershed is an important trans-boundary basin that sits within the jurisdictions of the Government of the Yukon and the Government of the Northwest Territories. The watershed is recognized internationally as an important area of ecological biodiversity, but it also home to many Gwich'in as well northern Tutchone peoples, and is thus an important cultural landscape with many integrated socio-economic, cultural, and ecological values. The Peace River and its tributaries have always been an important travel corridor and source of subsistence for First Nations and was also an important corridor for travel during the gold rush of the early 20th century, which saw tens of thousands of men (and some women) traveling through the area in search of their fortunes. Compared to other areas of the Mackenzie River Basin, this mountainous watershed has been little disturbed by resource development until recent years.

METHODS

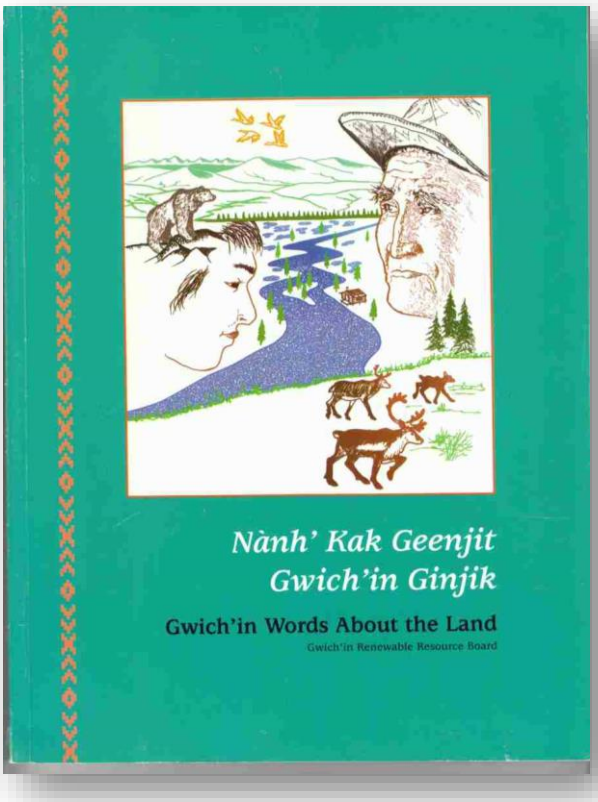
This report was developed for the *Tracking Change*… project with the aim of synthesizing and documenting existing local and traditional knowledge about social and ecological change in the Peel River Watershed.

The identification, synthesis, and reporting on Traditional Knowledge for this region is complex, owing to the fact that much of the rich oral history for the region has been little documented. When compared to western science, there is typically very little in the way of resources for communities to document and share their own knowledge, thus many gaps exist. Because of its relative remoteness to early explorers and present-day southern Canada, there is limited ethnographic material from missionaries, anthropologists and settler institutions. Capacity has also been limited for communities to carry out their own knowledge research, given the many other pressures on time and resources. This has changed since the 1990s owing to the settlement of land claims in the region and the creation of institutions like the Gwich'in Social and Cultural Institute, established through the *Gwich'in and Metis Comprehensive Land Claim Agreement*.

Still, many socio-economic and political inequities and tensions exist between regional and provincial governments and Indigenous groups in the region; litigation against the territorial government around natural resource management problems (e.g., caribou harvesting and the court challenge over the opening up of the Peel River Watershed to mining exploration), has lessened trust and interest in processes related to local and traditional knowledge research in some communities.

Traditional Knowledge is generated differently from 'western science' and is tied to a unique set of values, perspectives, and historical/contemporary experiences; it is important that the following is acknowledged:

- Traditional Knowledge has many meanings; it is generally broader and more holistic of other ecological and socio-cultural variables than conventional scientific definitions of 'aquatic ecosystem';
- Documented and public sources of Traditional Knowledge only recognize a small percentage of existing Traditional Knowledge;
- The collection of Traditional Knowledge should increase the capacity of First Nations and Métis communities to participate in the planning, monitoring and management of the Peel River Watershed.



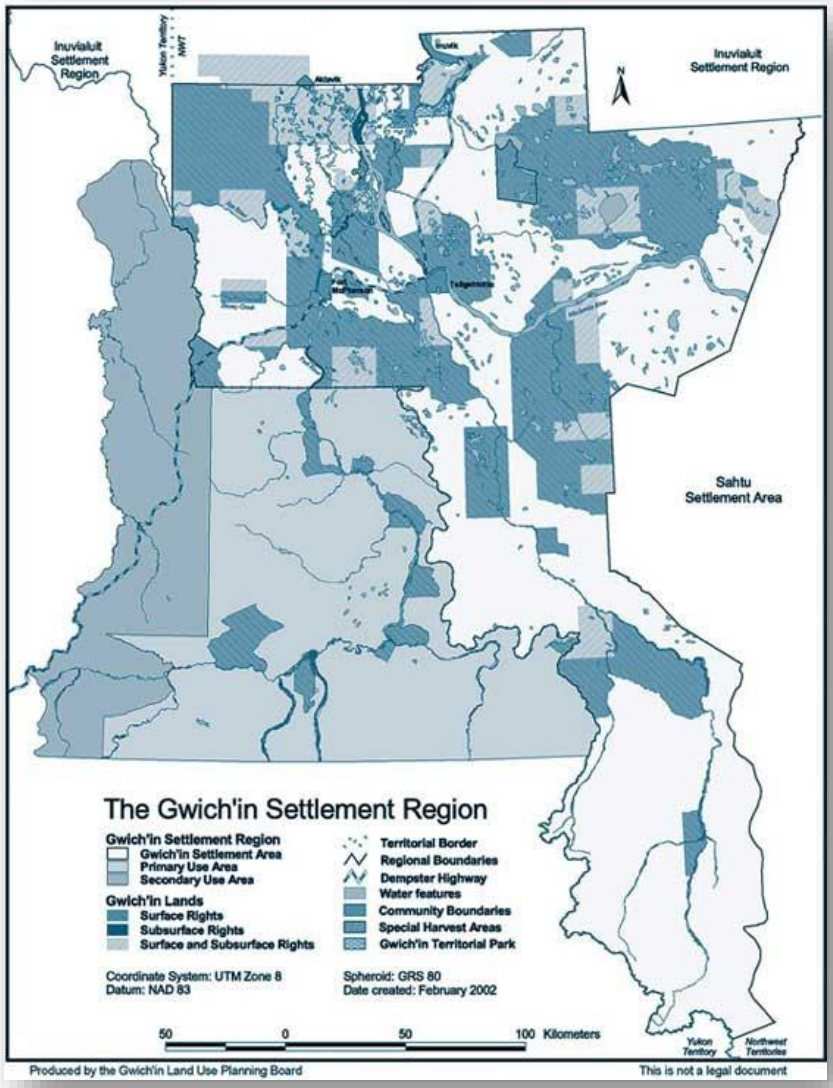
Searching for Secondary Sources of Publicly Available Traditional Knowledge

A search of publicly available sources of Traditional Knowledge was undertaken between January 2016 and June 2016. This report accounts for six different kinds of secondary sources of Traditional Knowledge and related community studies gathered through the Peel River Watershed. The majority of information was found through the following public database searches including:

- Academic Search Elite Database (University of Alberta)
- Google/Google Scholar;
- Royal Commission on Aboriginal Peoples Database (Our Legacy);
- National Energy Board (NEB) of Canada/Energy Resources Conservation Board (ERCB) of Alberta
- Northern River Basins Study (Database);
- Personal Communications/Sharing of Reports.
- Through this research, the following kinds of documents were found:

Early Ethnographic Data

Early ethnographers and anthropologists have documented the cultural practices of peoples in the Peel region and provided valuable insights about the resources available for subsistence including fish stocks, navigable waters (water levels/access), as well as related information about the significance of fish stocks (seasonally to Gwich'in, northern Tutchone peoples as well as settlers (e.g., gold rush miners).



Traditional Knowledge and Oral Histories

Traditional Knowledge is most closely associated with oral histories about the land, water and wildlife in specific regions. Consequently, much Traditional Knowledge documented to date in the region has focused on understanding the distinct worldview, values, and way of life of Aboriginal peoples.

Traditional Land Use Studies and Traditional Place Names

Land and resource use studies are fundamental to our understanding of Traditional Knowledge in the area. For many communities and scholars, traditional land use practices like hunting, fishing, trapping, and plant harvesting are the means by which Aboriginal people have come to know about ecosystems and ecosystem change. In other words, Aboriginal people have come to know about the land, not by some detached method of investigation but by living or dwelling within ecosystems. Any changes or decline in ecosystem health, in that sense, are not viewed as data but as a threat to the socio-economic and cultural well-being of communities. Such dwelling has also created a strong emotional and spiritual connection to the land that may make Traditional Knowledge holders particularly attuned to ecosystem change. The majority of the traditional land use research for this region was done leading up to the negotiation of the Yukon *Final Umbrella Agreement* (1993) and the *Gwich'in and Metis Comprehensive Land Claim Agreement* (1992).

Ecological Knowledge Studies

Traditional Knowledge is of increasing interest to policy-makers and environmental managers, in large part because of the potential expertise and insight that can be gained about environment and environmental change. In that context, communities, in collaboration with anthropologists, ecologists and others, have focused attention on documenting many aspects of ecosystems and ecosystem change. Relevant to this research is knowledge related to sustainable management, including ways of respecting the land, water, and wildlife (ex., rules, practices, and tools).

Assessment/Impact Specific Studies

Traditional Knowledge studies conducted in the Peel River Watershed that relate to specific human activities or effects (such as agriculture, oil sands mining, hydroelectric dams, etc.) have been somewhat common in the Peel River. Considered within this context are studies related to community risk perceptions and studies guided by communities that seek to communicate about environmental risks. As noted by scholars such as Usher *et al.* (1992), perceptions that something is *wrong* with a given resource can be profoundly disturbing to land-based communities whose livelihoods depend upon the continued health and sustainability of those resources. The Northern Contaminants Project, as well as other work done through agencies such as the Centre for Indigenous Peoples' Nutrition and the Environment (CINE), provide valuable guidance on documenting risk perception in northern communities.

Monitoring Data

An emergent area of Traditional Knowledge documentation and sharing is through community-based monitoring and regional monitoring initiatives such as the *Guardians* program in Fort Chipewyan, that is being led by Mikisew Cree First Nation and Athabasca Chipewyan First Nation.

Other

Given there are significant gaps in the availability of Traditional Knowledge in the Peel River Watershed, this report has also made room for other kinds of knowledge and information that would be considered outside the definition of 'Traditional Knowledge.' These include studies that address the following concerns:

- Did the study involve documenting sources of Traditional Knowledge (i.e., documentation of the values, knowledge, practices and institutions of a particular Aboriginal group?)
- Was the study focus defined by Traditional Knowledge? (i.e., selection of issues or valued ecosystem components being studied)?
- Was the study led or guided by an Aboriginal community?
- Did the study have some other relevance to Aboriginal communities?

Studies defined or guided by Aboriginal organizations or communities were recognized as important to our understanding of community perspectives on the state of the aquatic ecosystem. The inclusion of other kinds of knowledge and information is important to many communities who see themselves as informed by many sources of knowledge and information.

A complete listing of the sources can be found in the reference section to this report.

THE PEEL RIVER WATERSHED

People of the Peel River Watershed

Teetł'it Gwich'in

The Teetł'it Gwich'in traditionally lived in the upper Peel Watershed and its tributaries. The Tukudh Gwich'in peoples are also thought to have frequented the area (Balicki 1963). Teetł'it Gwich'in" translates directly as 'people who live in the upper Peel River'—their area of traditional use is thought to have extended from the Ogilvie River into the Richardson Mountains, but shifted after the fur trade to the lower Peel Region and the trading post at old Fort McPherson (Slobodin 1962; Kritsch *et al*. 2000).

> The Teetł'it Gwich'in Community—are an indigenous people whose territory extends from northeastern Alaska to the Mackenzie Delta of the Northwest Territories… . Gwich'in have occupied the Peel River Watershed for thousands of years, traveling seasonally on foot and with birch bark canoes to hunt, trap, fish, and harvest foods, medicines, and materials and have an especially close relationship with caribou (Gill and Lantz 2014:296-297).

> In the summer, after break-up and while the weather is warm, Gwich'in disperse to various locations along the Peel and Mackenzie Rivers, and in the myriad channels of the Mackenzie Delta, to fish for river-running broad whitefish, hump-backed whitefish and coney (Johnson 2010:123).

For a more detailed summary of the history of the Teetł'it Gwich'in in the Peel River Watershed, see Kritisch *et al*. 2000 via: www.gwich'in.nt.ca).

Vuntut Gwich'in

The Vuntut Gwich'in**,** known as 'people of the lakes,' have travelled through many areas of the Peel River Watershed and are heavily dependent on its resources for their livelihood and subsistence. Among the traditional use areas recognized in the *Yukon Umbrella Agreement* is along the Ogilvie River, between the river and the Dempster Highway.

Tr'on dëk Hwëch'in

The Tr'on dëk Hwëch'in are a Han language group with traditional ties to the Hart River Watershed and the Ogilvie and Blackstone river watersheds.

Northern Tuctchone

Northern Tuctchone people of Nacho Nyak Dun First Nation are also known to have traditionally used the upper Peel River Watershed. Although they depended significantly on the resources of the Stewart River Watershed, they traveled and hunted caribou (Porcupine Herd) in many parts of the Peel, including the Bonnetplume and Wind rivers (Slobodin 1962). Their rights to the Peel River Watershed according to the *Yukon Umbrella Agreement* focus on the area along Nash Creek in the Wind River region.

LIVING ON THE LAND AND WELL-BEING

Early anthropological records, as well as journals of white explorers (e.g., Bell 1840) detail the importance of many areas of the Peel River Watershed to the Gwich'in, often referred to in early records by the French description Loucheux (Coates 1986; Helm and Kurtz 1984; Osgood 1934). The most well-documented oral histories for the Peel River Watershed have been done through the Gwich'in Social and Cultural Institute pertaining to the Teetł'it Gwich'in. Less has been documented in relation to other communities.

Figure 1*: Peel Watershed Planning Region.*

A variety of research, including that which led to the negotiation and settlement of the *Gwich'in and Metis Comprehensive Land Claim Agreement* and the *Yukon Final Agreement*, has led to a clear understanding of the patterns and rhythms of traditional harvesting practices in the Peel River. For example, The Tr'ondëk Hwëch'in, whose traditional territory falls within the Peel River Watershed, have a seasonal round which includes fishing at important periods during the year.

> The fish, wildlife, birds and plants which can be found within the Tr'ondëk Hwëch'in Traditional Territory are an integral component of whom the Han people are, people that are better known today as the Tr'ondëk Hwëch'in. The Tr'ondëk Hwëch'in continue to harvest heavily from the land, and Tr'ondëk Hwëch'in citizens can be seen wandering about on the land throughout all seasons of the year, as each season produces a distinctive harvest period. Harvesting and preserving fish, wildlife and plants is a tradition which has never been lost throughout the hundred or so years

> of integration and alienation within the Tr'ondëk Hwëch'in Traditional Territory (Dawson Planning Commission 2011:4).

The harvesting of food is not simply an economic activity to the Tr'ondëk Hwëch'in but has other cultural and social values.

> Harvesting fish, wildlife, birds and plants is not only for the food value—for First Nations individuals and communities, it extends deeper than that, as harvesting times are considerably holistic. Harvesting is also a time for re-connecting with the land and its environment, bonding with family, and teaching through oral knowledge and history (Dawson City Planning Commission 2011:5).

Fishing in the Peel River Watershed has always been an important subsistence practice, to other Gwich'in peoples of the Peel, particularly during periods when there was limited big game.

> The water, wildlife and fisheries resources produced in the Peel Basin are used to support the traditional culture and subsistence lifestyle (hunting, trapping, fishing) of numerous residents within the area... [that]... include the Teetł'it Gwich'in in Fort McPherson, the Inuvialuit in Aklavik, the Na-Cho Ny'a'k Dun in Mayo and the Tr'on Dek Hwech'in of Dawson City (Czarnecki and Beaver 2002)." (Czarneck 2012:2.2)

Spring and summer fishing periods were particularly important and brought many Gwich'in families out of the mountains to gather at important sites named in Gwich'in for their values as good fishing sites such as 'Fish Trap Head,' which is located 108 miles from the mouth of the Peel (Slobodin 1962).

These seasonal patterns and uses of fish and other resources of the Peel are well-documented in narrative as well as in traditional land use mapping processes.

TRADITIONAL LAND USE AND PLACE NAMES

Traditional place names research has been extensive in the Gwich'in region of the Northwest Territories, including the Peel River Watershed. Some of this work was led by early anthropologists, some in connection with the settlement of the *Gwich'in and Metis Comprehensive Land Claim*, and the negotiation and designation of heritage and protected areas. Still other work has been more closely tied to management and policy issues, such as caribou harvesting and climate change. In this region, as elsewhere, there is an interest in the documentation of traditional place naming as a process of cultural revitalization and as an act of sovereignty.

The process of documenting such place names has been done both through digital technology and through conventional pen and paper mapping: "In fact, a paper map with names and trails is often as useful and as rich in its integration of broader narratives and experiences as a web-based interactive atlas. Rather, a cyber cartographic atlas is useful in two other ways: (1) as a repository of datasets of different kinds, and (2) as a facilitator of learning among younger generations" (Aporta *et al.* 2014:242).

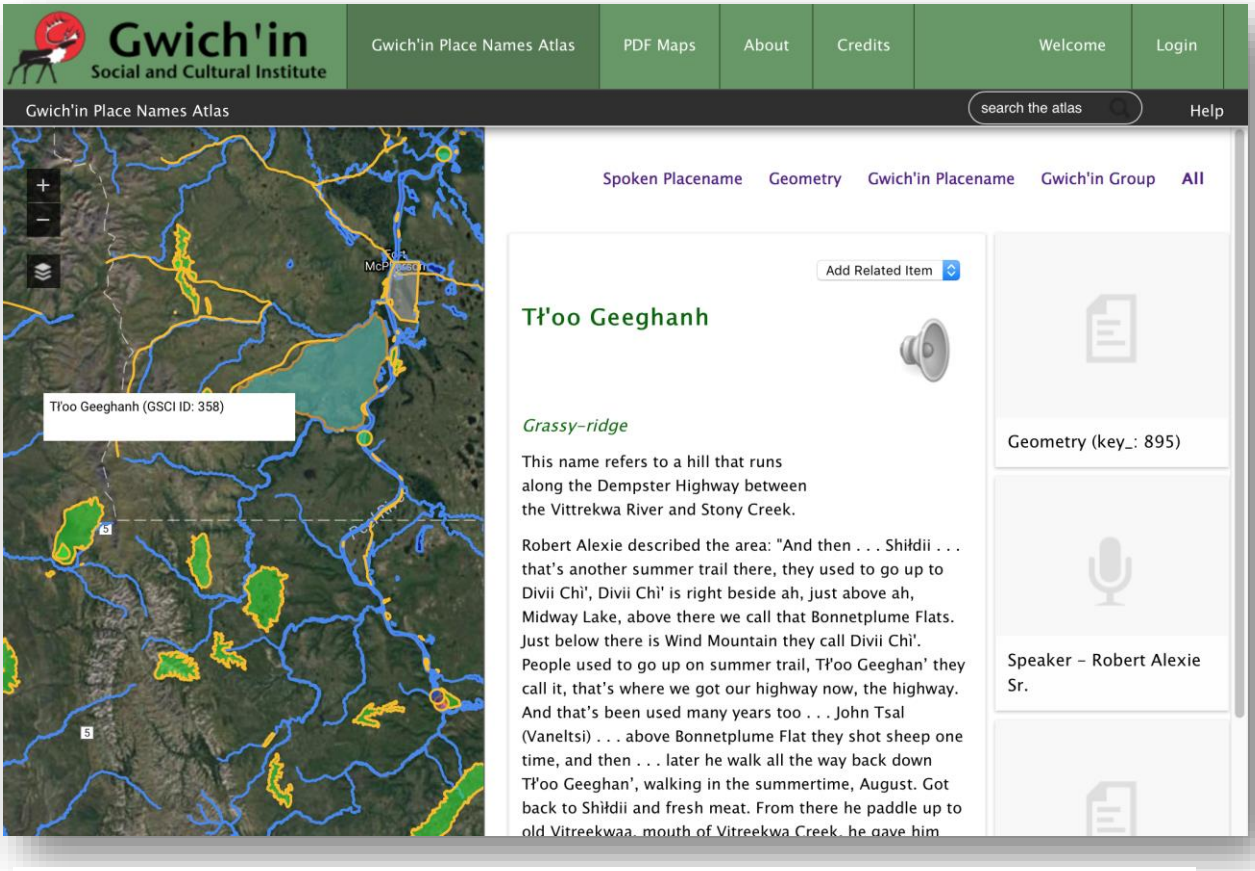


Figure 2: *Gwich'in Social and Cultural Institute—'Talking Map.'*

Gwich'in place names are important sources of ecological insight. In addition to the critical socio-economic and cultural knowledge they communicate (including historical use and management practices), place names documented by the Gwich'in today speak to the physical characteristics of place, and ecological processes (Aporta *et al.* 2014; Kritsch *et al*. 1994).

> In Gwich'in, for example, the name for the mouth of a river is often differentiated from the rest of the waterway by a different suffix and this is reflected in the extents. The mouth of the Road River in the Peel River Watershed, for instance, is called Vihtł'òo Tshik, whereas the length of the river beyond the mouth is called Vihtł'òo Njik. In most cases, 'tshik' refers to the mouth and 'njik' for the length of the river, although where one begins and the other ends is not always straightforward and speaks to the difficulty of 'bounding' places (Aporta *et al*. 2014:238)

Travel through the Peel was particularly critical for those following the Porcupine caribou but a diversity of other resources were also important during months when the caribou did not come to the area.

The existence of the Vuntut Gwitch'in in a challenging subarctic climate is dependent on seasonal activities and practices that tie them to each other, as well as socially, economically, politically, and spiritually to the land itself (Slobodin 1981).

Extensive trails can be found through the Peel River Watershed and their meaning and use can be understood in relation to the vast number of traditional place names that have been documented by anthropologists and others for the region. John Ritter, for example, documented over 300 traditional Teetł'it Gwich'in places (Ritter 1970). The Gwich'in Social and Cultural Institute has documented many more such names which can be seen (and heard) online through their *Talking Map* www.gwich'in.ca

As noted by Kritsch *et al.* 2000, these names have information attached to them which reveal many things about the community's cultural practices, economy, as well as rule-system for managing local lands and resources. Some of the place names are extremely old, dating back to thousands of years ago when the people–animals communicated (Kritsch *et al.* 2000:6); others are more recent, and reflect new kinds of uses and change in the landscapes (e.g., names related to permafrost slumping) (Gill and Lantz 2014; Andrews *et al.* 2016).

In addition to the trails through the mountains, travel on the river system was key to survival. Mooseskin boats were used to travel throughout the region. The construction of a moose skin boat was a major undertaking. They could be constructed with multiple hides, pulled tight over a birch wood frame. But there were many benefits.

> Moose skin boats were very versatile canoes. They were very light but durable boats and, depending on their size, they could usually carry one or two families. This boat made from two raw moose hides, was the traditional boat used for travel and transport of large game. The raw hides were sewn together and stretched over a spruce frame then latched on with sinew and babiche (semi-tanned rawhide strips). The seams of the hide were sealed with spruce pitch and moose or bear grease. These boats could be built in a day and were a convenient alternative to other types of canoes that were painstakingly constructed over days or weeks (Yukon Museum Guide: http://www.yukonmuseums.ca/treasures/gj/17.html).

Figure 3: *: Adhòh tr'ih choo (Moosehide canoe: Model made by Brian Francis. (Photo Downloaded from: Gwadàl' Zheii www.historymuseums.ca*

> Some boats were smaller and held only one or two people, others were larger such as the one described by Gwich'in elder Christie Thompson: "These boats were about sixty feet long, maybe more. They held about eight or ten families with all their belongings, and also their dogs" (Christie Thompson in *Gwadàl' Zheii: Belongings from the Land* 2003).

LIVELIHOOD AND WELL-BEING

The livelihood of the Gwich'in and other communities of the Peel River Watershed depended on the availability of fish and game that could sustain them over many months. This notion of subsistence is a cornerstone of livelihood, but there are many other aspects of livelihood that matter to the way of life of Peel River communities. 'Being on the land' was, and continues to be, important to well-being. As described by Elizabeth Colin, working with fish out there on the land just feels good.

> And yet, when I come up here there's wood to be put in the stoves, there's water that I have to work with. Make everything ready for morning, make kindling for morning. And sweep the floor, wash the dishes, cook. No end. There's fish to work with, there's meat too, there's no complaints from me. My body just feels so good. Sometimes I don't feel good down there [Fort McPherson] and I come up here… the minute I open my door, nothing. I think when you are out on the land, you can't sit. There's something to do and you're doing it and your body feels so good. That's life. That's the real life that you are used to (Elizabeth Colin in Alexie 2015).

WATER QUALITY AND WATER LEVELS

Water quality and changes in water levels in the Peel River Watershed have been little documented based on local and traditional knowledge. In recent years, however, due to concerns about the impacts of climate change, a greater degree of consideration of local observations of slumping, river bank erosion, and fluctuations in water levels have been noted by environmental and social scientists alike.

> There is a large fluctuation in water level and velocity throughout the year due to rain and snow runoff from the mountains (Dryden *et al*. 1973). During the spring flood, water levels rise several meters, and flooding of camps located atop the steep banks is sometimes a result. During the fall, the water level drops, exposing mud and gravel bars resulting in dangerous travel by boat (Toyne and Tallman 2000:4). (Irvine *et al.* 2009:6).

The impacts of flooding on fish habitat has also been a focus of concern in some areas of the Peel, with both scientists and community members noting the ways in which flood dynamics influence the abundance of fish in some areas.

> Frequent and severe floods can physically remove fish from small streams by flushing them into larger rivers. Such floods can also limit fish abundance by

> reducing food supplies and destroying habitat required for cover and spawning (Barker *et al.* 2011)

Community observations of limited precipitation and lower water levels have been noted through some studies such as that undertaken by the Arctic Borderlands Knowledge Coop. The decreasing levels of water observed are of particular concern in areas of the Peel where water levels are already low. As noted by scientists, this affects the location where fish overwinter, their winter survival, and their ability to recolonize.

> In the sub-arctic Peel Watershed, streams with low water volumes and groundwater inputs can freeze solid in winter. To survive the winter, fish must travel to overwintering areas, where sufficient volumes of water remain unfrozen. In spring, fish must travel back from overwintering areas to recolonize streams that were frozen (Barker *et al.* 2011).

> Small streams, particularly those surrounded by large areas of exposed rock, are prone to drying completely during dry summer periods. After a drying event, fish must travel back to the stream from refuge areas. The drying model incorporated upstream extent as a proxy for water volume, which relates to fishes' ability to recolonize following drying events (Barker *et al.* 2011).

FISH AND FISH HABITAT

Upper Peel Watershed

Many upstream areas of the Peel River Watershed are not easily accessible for fishing; thus only some areas have been a focus of research in which local and traditional knowledge was documented. As a consequence, there is limited availability of information about fish species and habitats from a local and traditional knowledge perspective.

> …either suitable slimy sculpin overwintering habitat exists in many low-order upper Peel Watershed streams, or slimy sculpin make annual migrations from downstream winter refugia to upstream sites (Barker *et al*. 2011:24-25).

The upstream waters are known to contribute significantly to the abundance and distribution of healthy fish populations in the lower Peel, and further downstream in the Mackenzie River. The Peel River stocks of whitefish, for example, influence the availability of stocks in the Tuktoyaktuk Peninsula.

> The whitefish that inhabit the Peel River migrate upstream in the fall to spawn in gravel beds with shallow, fast flowing water (Chang-Kue and Jessop 1997). The eggs develop under the ice throughout the winter and hatch in the spring. They are then washed downstream with the spring flood and swept largely into the Tuktoyaktuk Peninsula and it's tributaries… (Toyne and Tallman 2000:1).

Of increasing concern however, is the fragmentation of habitats and the future integrity of sensitive areas of the watershed.

> Many wilderness characteristics of the Wind, Bonnet Plume and, to a lesser extent, Snake river basins also have high values, but their unfragmented extent and quality of wilderness have been reduce by past exploration for gas, oil, and minerals, while existing licences and planned access corridors threaten their future integrity (Green *et*

Figure 4: *Headwaters of the Peel River.*

Lower Peel Watershed

The Peel River Watershed and the Mackenzie Delta have a high subsistence, commercial, and sport fisheries. There are many species of fish, including the following valued by the Gwichya and Teetł'it Gwich'in:

Table 3 –Gwich'in Names for Fish Species of the Peel River Watershed

Common Name	Latin Name	Gwich'in Names
Lake Trout	*Salvelinus clupeaformis*	*Vit* (TG), *Vèt* (GG)
Dolly Varden Char	*Salvelinus malma*	*Dhik'ii*
Lake Whitefish (Crooked Back)	*Coregonus clupeaformis*	*Dalts'in* (TG), *Dalts'an* (GG)
Coney (Inconnu)	*Stenodus leucichthyes*	*Sryuh* (TG, GG)
Loche	*Lota lota*	*Chehluh*
Jackfish (Northern Pike)		*Eltin* (TG) *Eltyin* (GG)
Broad Whitefish	*Coregonus nasus*	*Łuk Dagaii* (TG, GG) *Chii Chaa Łuk* (TG) *Łuk digaii* (Unknown) *Łuk zheii* (Unknown)
Arctic Grayling (Bluefish)	*Thymallus arcticus*	*Sriijaa* (TG, GG).
Arctic Cisco (Herring)	*Coregonus autumnailis*	*Treeluk*

(Adapted from GSCI 1999 and GRRB 2015).

The fish populations of the lower Peel and Mackenzie watersheds are a major focus of subsistence; particularly, the broad and hump-backed whitefish, coney, herring, loche and northern pike are caught. Whitefish species and coney are the most abundant. The populations of the Peel are, however, considered genetically distinct from those of the Mackenzie a fact that is supported by Gwich'in oral histories about the Peel River, as well as genetic evidence from scientists (Bodaly and Lindsey 1977).

While many of these fish stocks are considered stable and abundant, one study based on local and traditional knowledge points to a decline in charr populations.

> Fish populations seem stable for whitefish and for coney. Arctic Charr populations have declined in recent decades. Declining numbers of Arctic Charr have led to an Arctic Charr monitoring program and management plan which involves the Gwich'in Renewable Resource Board and the Fisheries Joint Management Committee (Johnson and Andre 2000:3).

> Species taken in lakes include trout, both species of whitefish, loche, and northern pike. During the fall fishery on the Mackenzie, broad and hump-backed whitefish, coney, herring, loche and northern pike are caught. The whitefish species and coney are the most abundant species (Johnson and Andre 2000:3).

> Broad whitefish (*Coregonus nasus*) can be found in most rivers and lakes in the Northwest Territories, Nunavut and Yukon, and are fished extensively by Gwich'in, Inuvialuit, Sahtu and Inuit communities for food and commercial purposes… (Toyne and Tallman 2000:1).

> At present, little concentrated fall fishing is done, because changes in lifestyle associated with concentration in villages and with adoption of gas-powered snowmobiles has eliminated the need for a large dog feed fishery. Herring are no longer seriously fished for the same reason, and the 51/2" mesh usually used for fishing does not catch significant numbers of herring (Johnson and Andre 2000:3).

> Broad whitefish is an important species in the Mackenzie Delta because many aboriginal communities rely on these fish for consumption, local sale and cultural tradition… . However, management of this species is difficult because different life history types may exist… and anadromous populations traverse multiple Aboriginal Settlement Areas (VanGerwen-Toyne *et al.* 2012:170).

> Broad whitefish caught in Travaillant Lake appear to be different than the anadromous populations in the Peel River and Arctic Red River. While the sizes for Peel River fish were always smaller than those for Travaillant Lake, younger fish from the Arctic Red River and Travaillant Lake had similar sizes, but the trend in size-at-age diverged at later ages with fish from Travaillant Lake having a larger estimated size than the anadromous populations (VanGerwen-Toyne *et al.* 2012:168)

> They occasionally catch Dolly Varden, likely from the Vittrekwa River, in nets set in the Peel River (N. Millar, Yukon Department of the Environment, pers. comm. 2008). The red meat is considered a delicacy and is usually dried and smoked (Gwich'in Elders 1997). (Stewart *et al*. 2010:38)

> Dolly Varden stocks in the Rat and Big Fish rivers of the Northwest Territories and the Babbage and Firth rivers of the Yukon are genetically distinct from one another (Stewart *et al.* 2010:2).

> Management of northern Dolly Varden stocks in Canada and Alaska is made difficult by: the existence of numerous discrete genetic stocks; their dependence on specialized, geographically discrete habitats such as freshwater springs, small streams, and brackish coastal waters; their vulnerability to harvest by multiple, often mixed-stock, fisheries; their seasonal movements between jurisdictions, including crossing the international boundary between Canada and Alaska and moving between land claim and fisheries management areas within Canada; and proposed regional economic development activities in both countries… (Stewart 2010:31).

DUCKS AND GEESE

Ducks and geese populations are an important dimension of the subsistence economy of the Gwich'in people of the Peel River Watershed.

> Few raptor species and locations of them have been recorded for the Hart River Basin. Whether this is indicative of lower raptor diversity or reflects paucity of information is not known… . The beaver is found only in the northeastern corner of the northern Peel River Basin (Green *et al.* 2008:25).

DISTURBANCE OF THE WATERSHED

Resource development in the Peel River Watershed is a major socio-political issue, which has spurred the documentation of much local and traditional knowledge in recent years.

> The Gwich'in community has expressed concerns that potential developments near the Peel River could cause declines in their fish stocks. These concerns were the basis for the development of the Peel River Fish Study, a monitoring program for the Peel River broad whitefish (a.k.a. whitefish: *Coregonus nasus*), lake whitefish (a.k.a. crooked back: *Coregonus autumnalis*), inconnu (a.k.a. coney: *Stenodus leucicthyes*) and others, by the Gwich'in Renewable Resource Board (GRRB) in conjunction with the Department of Fisheries and Oceans (Toyne and Tallman 2000:3).
>
> Consultation with community members can decide whether the environmental-related problems encountered upstream are normal or isolated events (Toyne and Tallman 2000:27).
>
> Many of the activities, such as logging, farming, and mining that have affected southern-form Dolly Varden are unlikely to affect northern-form Dolly Varden in the Northwest Territories in the foreseeable future. Activities with the most immediate potential for impacts are those associated with oil and gas development and transport. Harvesting and climate change are also important considerations when assessing cumulative effects on populations (Stewart 2010:32).
>
> Changes in where people live and, in the ease of access to fisheries, through the use of motorized transport, have had a major impact on fishing activities for Dolly Varden (Cosens and Martin 2003; Papik *et al.* 2003). The size and location of populations and access to harvesting sites will continue to change. These shifts will be an important consideration for resource managers as they strive to eliminate or mitigate changes in harvesting pressure on stocks of Dolly Virden (Stewart 2010:37).
>
> …. oil and gas development in the Eagle Plains Basin will likely generate significant economic benefits as well as pose potential ecological risks. Wilderness tourism and big game hunting in the Peel region have the potential to grow as well (PWPC 2011a). Taken together, these trends indicate the economic value of the Peel Watershed is likely to increase, and so too will the need to determine how to manage growing economic values in relation to social and ecological ones. We predict that unless the identified flaws in the decision process are addressed, the Peel Watershed debate will only continue to be drawn out, with different participants, perspectives, and values repeatedly coming into conflict (Staples *et al.* 2013:156).

According to Green *et al.* (2008) the basin is significantly imprinted by historic exploration activities such as seismic lines.

> Of all the river basins, wilderness within the Northern Peel is the most fragmented, to the extent that the landscape is scarred by a network of seismic lines and scores

> comparatively low for many characteristics of wilderness. However, it is the predominant part of the Peel Watershed that features Canadian Boreal Taiga, a WWF Global 200 ecoregion that is prioritized for conservation action. One percent of the entire distribution of this ecoregion is located within the Peel Watershed, most of it in the Northern drainage (Green *et al.* 2008:27).

A major area of concern is with respect to the consumption of fish and whether or not the fish are healthy enough to eat. These concerns, informed by local and traditional knowledge, have led to the undertaking of numerous kinds of studies funded through the Northern Contaminants Program, Health Canada, the Government of the Northwest Territories, and others. Among these have been studies on the levels of toxaphene in burbot (burbot is considered a good indicator of fish health and is a source of nutrients for many fishers, including those in the Peel River Watershed).

> Toxaphene was the major chlorinated hydrocarbon detected in burbot liver… . The pattern of toxaphene-related peaks showed extensive transformation with two major components eluting in Florisil fraction 1, although 90% of the toxaphene analytical standard eluted in Florisil fraction 2 under the chromatographic conditions employed (Muir *et al.* 1990:532-534).

> The results suggest that fish from remote lakes and rivers can serve as indicators of atmospheric contamination by organochlorines when other sources can be ruled out and when age and size class of the fish are taken into consideration. Burbot are particularly well-suited for this kind of survey because of the high lipid content of their liver, their position at the top of the aquatic food chain, and their sedentary nature (Muir *et al.* 1990:540).

CLIMATE CHANGE

Climate change effects are visible in many areas of the north, including the Peel River Watershed, according to local and traditional knowledge holders. Concerns about warming temperatures by communities in the Peel River and surrounding regions have led to a variety of studies that have both documented local and traditional knowledge, as well as explored causes and implications of observed warming temperatures. Among these have been impacts on fish habitat due to river bank erosion and studies on valued species such as Dolly Varden Char.

> The combination of warmer air temperatures and heavy rainfall events was highlighted as a cause of permafrost melting and resultant riverbank erosion and lake drainage: Robert Alexie explained that mud slides occur when there is ‘‘too much rain, and [when it is] too hot’’ (Gill and Lantz 2014:305).

> Global warming has the potential to cause profound changes in the life history of northern-form Dolly Varden (Crane *et al*. 2004). Populations of all life-history types are particularly vulnerable to hydrological changes that reduce groundwater inflow during the winter. Changes in the volume, seasonality, and/or temperature of these

> inflows could profoundly alter spawning success and winter survival (Stewart 2010:38)

Impacts climate change are anticipated by the Tr'ondëk Hwëch'in First Nation for their traditional territory, including the Peel River Watershed: snow depth changes, weather pattern changes, water volume and quality changes, as well as changes in accessibility of land and rivers (Government of the Yukon 2011:5).

> As Emma Kay recounted, ''We're not used to heat. Cause we were brought up, when we were kids, we were brought up 60, 70 below. Now today we sit in the shade'' because temperatures are warmer year-round (Gill and Lantz 2014:305).

> Climate change was referenced as an example of how environmental conditions have changed and was cited to explain why other environmental changes had occurred—all four elders recounted how much colder average and minimum temperatures used to be when they were growing up (Gill and Lantz 2014:305).

> In the Peel Watershed land use planning process, the need for an effective land use plan will become even more pressing as ecological, economic, social, and policy trends progress. While specific environmental changes are difficult to predict, the Peel Commission has stated that "climate trends and climate variability are expected to have a major influence on the Peel landscape" (Staples *et al.* 2013:56).

GOVERNANCE AND STEWARDSHIP

Historically, there were many aspects of the traditional way of life of First Nations which were eroded as a result of the development of state management systems. This is true in the Peel River Watershed, as it was in many other parts of the Mackenzie River Basin and Canada.

> For these First Nations, the Peel area has had physical, intrinsic, and spiritual value for thousands of years (Peepre 2007); their cultures and traditional economies depend on the area's healthy environment (PWPC 2011). Despite this, the government's relationship with First Nations in the territory is grounded historically in colonial policies that systematically denied First Nations their right to be full citizens in their own land (Horne 2010:5). For decades, First Nations were excluded from the state's decision-making processes, despite significant efforts on the part of First Nations to have their voices heard. It was not until the UFA [Umbrella Final Agreement] was signed in 1993 that federal, territorial, and First Nations authorities agreed upon a framework for land claims negotiation (Staples *et al*. 2013:48).

There are many rules and management practices that have been developed as part of traditional knowledge systems; research in this area by Sherry and Myers for example, challenge assumptions that traditional environmental knowledge and management systems (TEKMS) are anecdotal, non-quantitative, non-ecological, narrowly pragmatic, irrational, unsubstantiated, or in the process of disappearing.

> Traditional practices can be summarized into four areas: 1) Respect for the land, wildlife, and each other; 2) Sharing of food from harvests and information about the land and wildlife; 3) Teaching of traditional ways for harvesting and use wildlife and taking care of the land; and, 4) the role of Elders, community leaders and parents in using and passing on traditional practices to the next generation (Clarkson and Andre 2002).
>
> Aboriginal management systems rely on social sanctions and extensive teaching to reinforce expectations about wise resource use. Observation, management, and harvesting are inseparable enterprises, and acquired knowledge is shared constantly within the community. Continuity and flexibility are fundamental characteristics of any traditional knowledge system. Aboriginal management is validated and revised both daily and seasonally through the annual cycle of activities (Sherry and Myers 2002:348).
>
> The strong Gwich'in ethic of sharing meat and fish helps to ensure that the variations in catch are evened out among members of the community, despite variations in the productivity of different areas at different times (Johnson and Andre 2000:7).
>
> An example of such management practices related to fishing:
>
> A pervasive rule is that harvesting must occur at a level accordant with the abundance of a resource and with individual or group needs. This constrains human use of the environment and promotes sustainability. In the past, for example, there was no law limiting the number of fish a person could take, but if a fisher took too many fish for the size of his group or status of the resource, there were community sanctions as well as more intangible consequences such as a 'loss of luck' (Sherry and Myers 2002:350).
>
> Land management—Control and manipulation of the environment to meet societal goals is the pre-occupation of Western resource managers. By contrast, Vuntut Gwitchin feel that their use of the environment is a privilege, not a right, governed by the maxim, 'take only what you need and use everything that you take' (Sherry and Myers 2002:350).

Not all the management practices and rules were tangible or material in nature. Others are more spiritual.

> Sacred narratives commonly describe humans and animals communicating, transforming into one other, intermarrying, cohabiting, and having offspring. For instance, humans visited the world of animals and, in the case of the caribou, traded places (Sherry and Myers 2002:350).
>
> In some cases, this is expressed as luck:

> The concept of luck illustrates Gwitchin stewardship ethics; luck is achieved and maintained through a complex set of actions, including *chyirzi* (sharing), showing proper *yinjigwihile* (respect), demonstrating humility, and communicating deference. Lucky hunters are described as *vitive gwinzi* (his ways are well) (Sherry and Myers 2002:352).

These management practices pertain to particular rights and responsibilities which are exercised in different ways. Some of the rights are expressed as territorial rights by Sherry and Myers 2002:

> In the Vuntut Gwitchin system … continuous occupancy of a fishing site or a hunting ground gave groups limited territorial rights in the form of continued use (in case of interrupted occupation, another group could move in) (Sherry and Myers 2002:351).

These management practices were traditionally very important for managing access to many kinds of natural resources such as caribou as well as for fish species. Today many challenges and complexities arise (due to territorial borders) that did not exist prior to European settlement and the creation of these boundaries.

> The Peel, Rat, Big Fish, and Firth river systems span jurisdictional boundaries, complicating stock management. The Peel, Rat, and Big Fish rivers drain from the Yukon via the Northwest Territories into the Mackenzie River. Within the Peel River system, Dolly Varden have been reported from the mainstem, Stony Creek, and the Vittrekwa rivers in the Northwest Territories and from the mainstem and the Ogilvie, Blackstone, Hart, Bonnet Plume, Snake, Wind, and Vittrekwa rivers in the Yukon, where they may also occur in a small unnamed lake (Stewart *et al.* 2010).

> While Gwich'in land users expressed apprehension and uncertainty about environmental challenges, their ideas and efforts also reflected the community's capacity for adaptation and flexibility. Novel ways to accomplish tasks and interact with the land emerged during our trips, and participants learned from each other throughout the process. For example, when the Peel River jammed up with ice, Christine Firth exclaimed after watching Abe Peterson navigate his boat through the ice, ''it was good to know that we could get out of there, like I've never in my life did this, but now I know I could get out of ice jams as long as it's high water.'' (Gill and Lantz 2014:306).

> Through an informal network of conversation within communities, people communicate who will be fishing in what areas, and where people will set up their fish camps. Campsites seem to be a form of property, and permission is required to use a site established and improved by someone else who is not a relative (Johnson and Andre 2000:3)

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