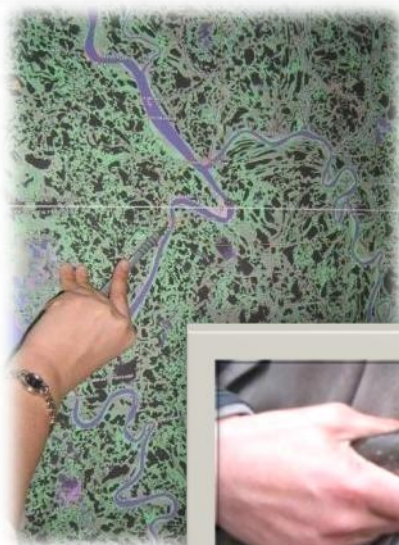




GWICH'IN TRADITIONAL KNOWLEDGE: RAT RIVER DOLLY VARDEN CHAR



*REPORT PREPARED FOR THE GWICH'IN RENEWABLE RESOURCES BOARD, INUVIK
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Photos/Images clockwise from top: Dolly Varden char – DFO, Slide on Fish Creek - S. Sandstrom; Amy Thompson and John Carmichael - GRRB; Dolly Varden Char - GRRB; Mapping in interview - GRRB.

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Introduction

The Rat River – Dhah Zhit Han as it is known in the Gwich'in language – flows east from the Richardson Mountains into the Mackenzie Delta, entering Eneekaii Han or Husky Channel. The river is associated with a key subsistence fishery for the Gwich'in of the Northwest Territories, the Rat River Dolly Varden char¹. Rat River Dolly Varden char (*Salvelinus malma*, in this report referred to as char and locally known as char and trout) are a largely anadromous population, migrating from the Arctic Ocean up through the Mackenzie Delta to overwinter in the spring-fed pools of water known as Fish Hole on the headwater tributary Łuk Njik, Fish Creek

(Gwich'in Renewable Resources Board and Gwich'in Elders 1997)².

The Gwich'in of Aklavik and Fort McPherson, NWT have harvested the fall run of char up the Mackenzie Delta to Fish Creek for generations – it is the only sizable char run in the Gwich'in Settlement area. It is a culturally vital and rich food source.



Dolly Varden char

Photo: GRRB

Narrative evidence suggests a decline in the char population for several decades. It seems that the historic harvest was sustained at higher levels than possible in the last twenty years. Concerns about the decline in the char stocks were voiced as early as the 1980s, and in response several population monitoring projects were initiated.³ For the last decade, though, the char stocks seem to have stabilized, except for a dramatic decline in 2004. Populations seem to have recovered for the 2007 and 2008 counts.

Dolly Varden Char

Rat River Dolly Varden char are a genetically distinct stock of anadromous (they migrate from salt water to breed/spawn in fresh water) char that spawn in the Rat River watershed. Adult char live in the ocean and return to the Fish Hole on Fish Creek to spawn. The young female and male char that do not migrate out of the river are usually referred to as resident char. Biologists working with char have found them throughout the Rat River and in Fish Creek. However, the only currently-known spawning and overwintering site for Rat River char is in Fish Creek, a spring-fed tributary of the Rat River high in the mountains (see Map 1, below). According to Haszard and Shaw (2000:23),

¹ Rat River Dolly Varden char are also used extensively by the Inuvialuit of Aklavik; this report focuses on Gwich'in use.

² Some Rat River Char stay in the river year round.

³ For more information on monitoring projects see Sandstrom, et al. 2008.



[Char migrate up the] western channels of the Mackenzie Delta in late August and early September to spawn and over-winter. The female digs a redd [spawning area, nest] in gravel areas of the stream and lays eggs, which are fertilized by the male. The eggs develop over winter and hatch in early spring. Juveniles live in the river for five to seven years before migrating back through the Mackenzie Delta to feed in the Beaufort Sea. Adult char feed on other fish, aquatic insect larvae and gastropods. Char are a sensitive species vulnerable to environmental disruption as they require clear, swift flowing water and clear gravel to spawn. During migration and spawning they are vulnerable to over fishing as their migration routes and spawning sites are predictable.

The flesh of the fish is red and the fish are traditionally smoked and dried for later use. More recently, char have been commercially harvested and are often frozen for later use. Map 1 shows the location of Fish Creek, Rat River, and Husky River (also called Husky Channel) in relation to the Gwich'in community of Fort McPherson and the Gwich'in and Inuvialuit community of Aklavik.

Previous Traditional Knowledge (TK) work

The Traditional Knowledge study conducted by the GRRB in 2008 was the first interview-based project to specifically focus on Gwich'in traditional knowledge of the Rat River char population. The Gwich'in Environmental Knowledge Project (GEKP) included interviews about char in general, much of the information relates to the Rat River Char. This information was included in the Gwich'in Words About the Land book as well (Gwich'in Renewable Resources Board and Gwich'in Elders 1997). Byers (1993) interviewed Inuvialuit and Gwich'in residents of Aklavik about the Big Fish River char stocks. Big Fish River is northwest of Aklavik in the Inuvialuit Settlement Region. Additionally, Papik *et al* (2003) conducted a traditional knowledge study for the West Side Working Group (Millar 2007: 3).

Dolly Varden char management

Concerns about the declining population of Rat River char led to the formation of the Rat River Working Group (RRWG), which originally included representation from the Ehdiitat Gwich'in Renewable Resources Council in Aklavik, the Aklavik Hunters and Trappers Committee, Teet'it Gwich'in Renewable Resources Council in Fort McPherson, Gwich'in Renewable Resources Board (GRRB), Fisheries Joint Management Committee (FJMC) and Department of Fisheries and Oceans Canada (DFO).⁴ At a January 2009 regional Renewable Resource Council meeting, the Nihtat Gwich'in Renewable Resource Council (of Inuvik) and Gwich'ya Gwich'in Renewable Resource Council (of Tsiigehtchic) expressed an interest in inclusion in the Rat Char meetings as recognized under the Gwich'in Comprehensive Land Claim Agreement. These groups were subsequently invited to participate in the March 2009 annual meeting. There was also a successful motion made at the West Side Working Group meeting in early 2009 to have the chair of the Rat River Working Group attend West Side Working Group meetings and vice versa.

⁴ The FJMC is the fisheries management body for the Inuvialuit Settlement Region and the GRRB is the management body for wildlife, including fisheries, for the Gwich'in Settlement Area.





Study Area: Mackenzie Delta and Rat River

Gwich'in Traditional Knowledge of Rat River Dolly Varden Char

Map: Gwich'in Social & Cultural Institute



Map 1. Map of Rat River and Mackenzie Delta



During 2006 to 2008, the Rat River Working Group (supported by the Gwich'in communities), closed the fishery as a voluntary closure, with a small allowable catch by char monitors only. For the 2010 fishing season, a voluntary allocation system may replace the voluntary closure due to increasing population counts.

Recently, the various bodies responsible for managing northern form Dolly Varden char, including the Rat River char population, have committed to an Integrated Fisheries Management Plan (IFMP) for Dolly Varden char. The plan will cover the Rat and Vittrekwa rivers in the Gwich'in Settlement Area and the Big Fish, Babbage, and Firth rivers in the Inuvialuit Settlement Region. The bodies responsible include the GRRB, FJMC, DFO and Parks Canada. This agreement will be an important reporting tool and a valuable source of information for all stakeholders in managing Dolly Varden char. It will detail how the fish will be managed, and include Gwich'in and Inuvialuit traditional knowledge.

Northern form Dolly Varden, including the Rat River char population, may also be placed on the federal Species at Risk list but first must be recommended by Committee on the Status of Endangered Wildlife in Canada (COSEWIC) to be a species at risk. In the case that it is, the Gwich'in and Inuvialuit wanted to ensure that traditional concerns are addressed and that the needs of those who use the resource for cultural and subsistence purposes continued to be met. According to COSEWIC's Status Reports Web site (http://www.cosewic.gc.ca/eng/sct2/sct2_6_e.cfm#bai), it is COSEWIC's responsibility to compile all existing information that is pertinent to assessing the status of a wildlife species, including scientific knowledge, community knowledge, and Aboriginal Traditional Knowledge that has been subjected to appropriate quality controls and can be obtained from literature sources or from the holders of the information. In addition, by implementing an IFMP before a formal assessment is complete they have ensured that Species at Risk will consider it as an existing plan and take it into account when issuing recommendations for the status of Dolly Varden.⁵

In response to these concerns and to address fisheries management data gaps (see below), the Gwich'in Renewable Resources Board (GRRB) conducted six interviews with Elders and fishers in the communities of Fort McPherson and Aklavik familiar with the Rat River char. The six interviews were preliminary and completed in anticipation of more interviews scheduled for 2009 and 2010 to fill data gaps. The project is funded by the GRRB Wildlife Studies Fund, Department of Fisheries and Oceans Canada, and the Oral Traditions & Cultural Enhancement Program Fund. Information about char biology, migration, behaviour, and traditional use from these interviews and previous information collected by the GRRB, the Gwich'in Social & Cultural Institute (GSCI) and other projects are included in this report. The six char TK interviews conducted in 2008 by the GRRB are referred to collectively as Char TK Study in this report.

Gwich'in Traditional Knowledge

⁵ Chelsea Hermus, acting GRRB fisheries biologist, from draft Dolly Varden IFMP (September 2009).



Traditional knowledge (TK) describes a body of knowledge generally held by indigenous people about their cultural, physical, and biophysical landscapes, among other things. It has been broadly defined as the cumulative body of knowledge, practice, and beliefs surrounding the relationships of living things and the environment (Berkes 1999). It is gained and maintained through family and other relationships (often through oral traditions – stories and alternate ways of teaching and learning), and familiarity and use of the land. It is not static; it is cumulative, diachronic, and dynamic. Information is constantly reviewed, updated, and compiled by practitioners. The Gwich'in Tribal Council (GTC) passed a Gwich'in Traditional Knowledge Policy in 2004. This policy was written because of the importance of TK to the Gwich'in. The policy describes and defines Gwich'in TK, and sets out how it will be collected and used.

*Gwich'in Traditional Knowledge is that body of knowledge, values, beliefs and practices passed from one generation to another by oral means or through learned experience, observation and spiritual teachings, and pertains to the identity, culture and heritage of the Gwich'in. This body of knowledge reflects many millennia of living on the land. It is a system of classification, a set of empirical observations about the local environment and a system of self-management that governs the use of resources and defines the relationship of living beings with one another and with their environment.*⁶

Gwich'in fishers are not unaware of science and scientific principles, having worked closely with fisheries scientists in their settlement area for many years. For example, Alfred Semple went out with fisheries scientists and the game warden as early as 1958 to show them Fish Hole; and many of the Char TK Study interviewees work with DFO as char monitors (see Appendix One). The Char Monitoring Program is a successful community-based program with local fishers trained to collect scientific information, consistently and over the long-term. Scientific information and principles are taken into Gwich'in TK along with other first-hand observations. Gwich'in harvesters generally specify if the information they are providing is first-hand or not. Often, they specify who they heard it from. This allows the listener to assess the information in context. Second-hand information is often prefaced with 'I don't know. I've heard...'.

Brief overview of Gwich'in traditional use of Rat River Dolly Varden char

The Gwich'in traditionally fished for char during the upstream migration in the late summer and fall, and at the spawning grounds of the char in Fish Creek (see Map 2 for fishing locations). The route up the Rat River and Fish Creek can be difficult, especially above Destruction City when the channels are shallow and canoe was traditionally used. Char travel up the Rat River to their overwintering location at the Fish Hole on Fish Creek, known in the Teet'it Gwich'in language as Ne'eedilee. The overwintering areas are

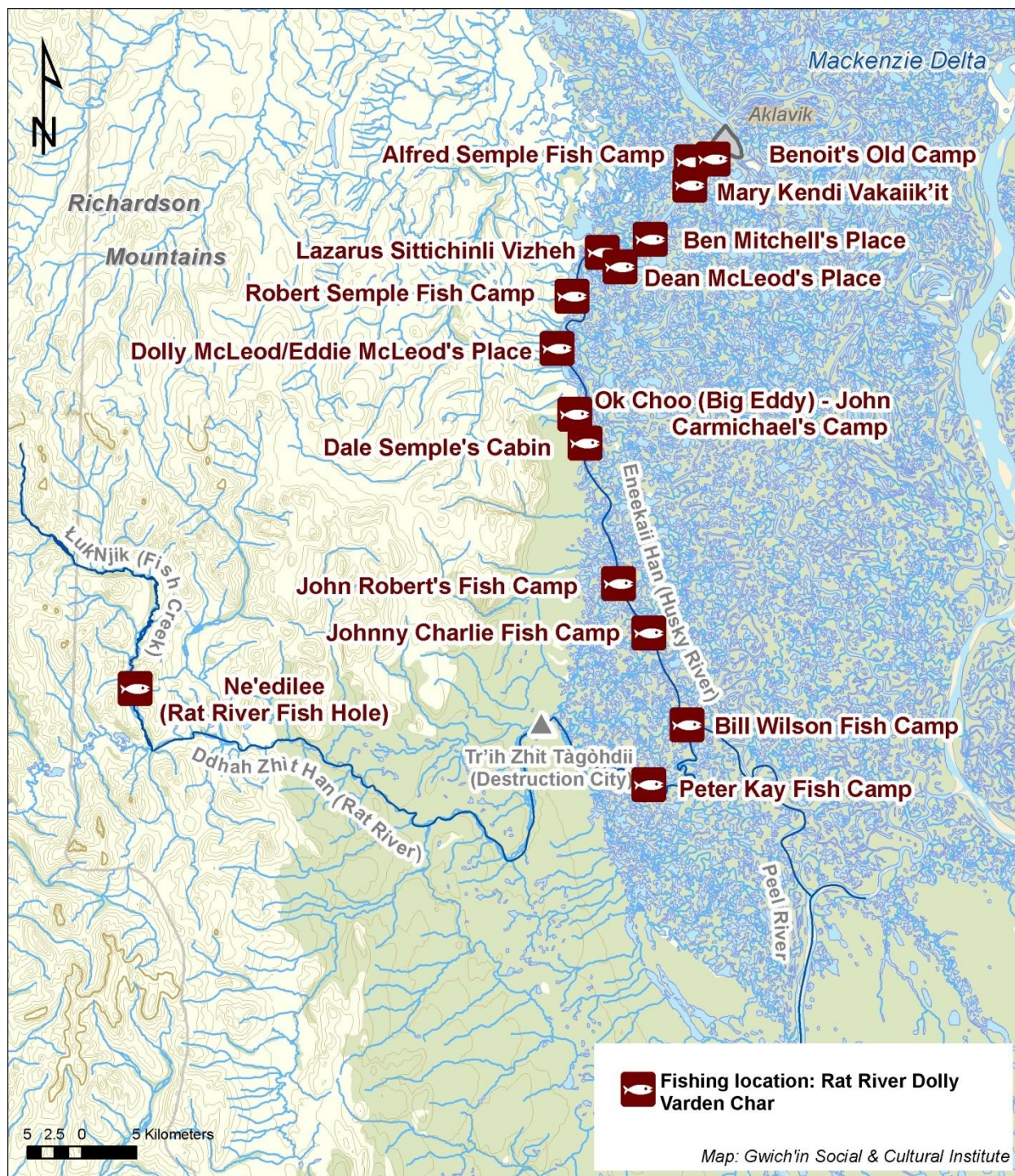
⁶ Gwich'in Tribal Council Traditional Knowledge Policy, approved by Gwich'in Tribal Council Board of Directors on June 22, 2004. Gwich'in Social & Cultural Institute. Available on the GSCI website at <http://www.gwichin.ca/TheGwichin/traditional.html>.



upwellings of warm ground water that do not freeze over the winter, protecting the char. Char leave the Fish Hole when the ice breaks up in the spring, but are rarely harvested at this time.

Char is a delicacy for the Gwich'in because it is a rich tasting fish, and it is difficult to come by compared with other fish. In the past, Gwich'in showed respect to all animals and fish, including char, through the Gwich'in values of sharing and preventing waste. Dolly Varden char and Arctic Char are both referred to as ***dhik'ii*** in the Teetl'it Gwich'in dialect spoken by Gwich'in residents of Aklavik and Fort McPherson (Gwich'in Renewable Resources Board and Gwich'in Elders 1997). The Gwich'in use the terms trout, char, and arctic char to refer to the Rat River Dolly Varden char.





Gwich'in fish for char at various locations along the upstream migration: Ok Choo (Big Eddy), at the mouth of Rat River where it enters Husky Channel, and at Tr'ih Zhit Tàgòhdi (Destruction City, see Map 2) when the water level in the river is low. The Gwich'in share the catch with the Inuvialuit; they largely fish north of the Gwich'in areas earlier in the run although both use the areas around Aklavik. In the past when the population was high, Char nets were checked at least twice a day because the fish can easily



become ‘drowned’ – the flesh becomes soft and the fish is spoiled for consumption. It is preferable to harvest live fish from the nets. In the past, Gwich’in would create pools along the river and keep the fish confined until they could process them. They may have used willow nets, sweep nets, fish traps, spears, or hand-made lures and lines to harvest char (Gwich’in Renewable Resources Board and Gwich’in Elders 1997).

Gwich’in Elders recalled that the first catch of the season was often cooked and eaten immediately. Eggs⁷ were mixed with berries and eaten as a treat; or dried for later use. Rendered fat from intestines was added to dog feed or used as a medicine, **“oil, the fish oil is very good, and when you’re short of hearing, you put little bit on and you drop in your ear, to soften the wax.”**⁸ Another treat was the liver mixed with berries, **“You cook liver and you put them among cranberries, and that is the way to use it. That is real good grub there.”**⁹

After being caught, char were generally smoked and dried right away as the flesh spoils easily. Even after drying and smoking, char must be frozen since it has a high fat content compared with other dryfish such as whitefish. In the past, some fish were kept in ‘ice-houses’ or caches excavated into the permafrost. Fish could also be allowed to ripen if it were not frozen. Char backbones were smoked and dried and used as bait in traps, and the skin might have been used as a poultice for burns and other wounds. After the fishing season, the camp was cleaned by raking waste and burning it, leaving the camp clean and ready for the next season.¹⁰ Today they are bagged and frozen fresh, dried or ‘half-dried’, a delicacy when cooked (Gwich’in Renewable Resources Board and Gwich’in Elders 1997). **“Well after [a] few days [the] trout, you know – half-dried, and they dig down to the permafrost, no shovel them days ...they dig it and cover it up with moss ...to keep it cool.”**¹¹ The permafrost cache would also prevent loss to scavengers, **“In the fall they get their trout and they just put that trout in the ice and they close it in ... so the bear won’t go in there and well, maybe they keep about three to four weeks.”**¹²

Families from as far away as Tsiigehtchic would travel to Fish Hole for char, **“even from Arctic Red they go to, Rat River. And then they have a big dance and stuff like that. Well, when you get meat you’re happy.”**¹³ In the past, **“in winter, ...people out caribou hunting used to stop by there and put a net in take fish, not a whole bunch but what people needed for supper or for their dogs because they travelled by dog team that time...yes that was way I’d say 40-50 years ago.”**¹⁴

⁷ The Gwich’in use the word ‘eggs’ to refer to fish roe; and fish that contain eggs are sometimes called ‘eggfish.’

⁸ Sarah Simon, GEKP interview, December 12, 1996, Fort McPherson.

⁹ Alfred Francis, GEKP interview, December 5, 1995, Fort McPherson.

¹⁰ Alfred Semple, GEKP interview, May 10, 1996, Aklavik.

¹¹ Alfred Semple, Ehditit Gwich’in Place Names Workshop Tape 17, January 1999.

¹² Ehditit Gwich’in Place Names Project, January 1999, Tape 16.

¹³ Woody Elias, ARI Wolves/caribou/lichen project, 2009

¹⁴ Anonymous, 2008, GRRB Char TK Study, Fort McPherson.



Char were more abundant in the past – for example in the 1920s, people fishing for char at Big Eddy had to check their nets three times a day (Gwich'in Renewable Resources Board and Gwich'in Elders 1997). Alfred Semple remembered large catches in the early to mid-1900s followed by a progressively smaller catch of char, **“that was 1940, ever since that, they slack down quite a bit.”**¹⁵

Gwich'in Legends

There are several legends that refer to Gwich'in traditional use of Rat River char and the surrounding area, indicating lengthy traditional use and cultural importance. One legend is included below. It is set around Ne'eedilee (Fish Hole), and was recorded for the COPE project (Committee on Original People's Entitlement, during the 1970s). The legend describes two powerful medicine men – one helpful, one bad.¹⁶

Medicine Man of Fish Creek

A long time ago, a group of people were hunting and fishing near a place called Fish Hole. The people were living near what is known today as Fish Creek. Further upstream at Fish Hole, a medicine man lived by himself, and downstream a few miles was where the group of people lived.

The people living below Fish Hole were catching a fair amount of fish - nobody complained - but upstream the medicine man was beginning to think up some bad things. He wanted all the fish to himself and didn't want to share it with the people below.

One day, one of the men from the camp was out hunting when he spotted a strange thing happening. Up above him on the mountain ridge, quite near the Fish Hole, he saw the medicine man performing witchcraft. The medicine man was dancing back and forth over the ridge all by himself. The hunter knew the man above him was up to something evil. The hunter went back to the camp and told the people of what he had seen up on the ridge. Soon after, a big mountain came tumbling down toward the Fish Creek, causing a tremendous flowing noise and a dam stopped water from going down past the people. The fish stopped coming, too.

After a few days passed, the people began to get worried. They had to have food for the coming winter which was near. They had to have fish. No one dared to go near the Fish Hole as the medicine man disliked people to bother him. Things were getting desperate so, one day, the uncle of the medicine man, also a medicine man, decided to try his powers on him.

The uncle left the camp and walked up to the dam. There he picked up a small fish, the size of a sardine, and a piece of flint. He also had on him a piece of sinew. He tied one end of the sinew on to the fish tail and the other end of the sinew was tied to the flint. He aimed for the mountain or dam and let go of the flint and fish. The dam disappeared and, once again, the

¹⁵ Alfred Semple GEKP interview May 10, 1996.

¹⁶ COPE Story by Paul Bonnetplume.



river flowed freely past the people below. The people were very happy now that the river was back to normal.

Up at Fish Hole, the medicine man finally noticed the dam had disappeared and was disappointed. He was very angry and knew his uncle was responsible for what had happened. He was thinking of getting rid of his uncle but the uncle was one step ahead of him. Before he could do anything, the uncle started his work. He took a dog and put a muzzle on its mouth. He then cut the throat and began to fill a dried caribou gut bag with the dog's blood. After the bag was filled, the uncle unfastened the muzzle and punched a small hole in the caribou gut bag. The blood started to drain slowly, drip by drip, until it was half gone. About the same time the uncle punched the hole in the bag and the blood began to seep out, the medicine man up at Fish Hole started having a nose bleed. When the blood in the bag was half gone, the uncle plugged the hole, giving the medicine man just enough time to straighten out. A few hours later, the uncle unplugged the bag and the blood proceeded to flow. And, up at Fish Hole, the medicine man was growing weaker now that his nose was bleeding again. The uncle did not bother to plug the bag again, and just before the medicine man died, he knew his uncle was doing this to him and he knew, too, why he was dying.

Fish Hole and Fish Creek, popular today for char, had always been plentiful of fish.

Other versions of this legend are also recorded in COPE texts. A "rock avalanche" on the left slope of the creek has been recorded, and according to radio-carbon dating the slide happened around three thousand years ago. This slide may relate to the Gwich'in legend; which would indicate it has great antiquity. The slide interrupted the flow of Fish Creek. Geologists specify that the slide may have been caused by an earthquake or other tectonic cause (Lauriol, B, *et al* n.d.). Today, the debris from the slide is visible on the east shore (left shore) of Fish Creek about two kilometers above the mouth of the creek where it flows into the Rat River.





Rock Slide on Fish Creek. Photo Credit: S. Sandstrom.

Many other Gwich'in legends and stories refer to the traditional use of Rat River and the abundant char run there. In another legend, an evil old woman forces two young girls to stay with her. One makes a daring escape with the help of a giant, who puts his legs out to help the girl cross a river. Eventually, the old lady's things are dropped into the water,

*The old lady's things fell out of her bag and went into the water. All the fish people came out to take her things. The fish were very busy taking things. The grayling took the tipi and was very happy with this, this is why the grayling's fins are very colourful. The loche took the fat, this is why loche liver is fatty. The jackfish took the fish spear this is why the jackfish is a long fish. **The char was around the outside and gathered up lots of things. The char took the bone axe, the wolverine foot, the moose hoof, the ice chisel, the caribou antler and all the knives. Now when the char's head is taken apart all these things that he took from the old lady's bag can be found in there.**¹⁷*

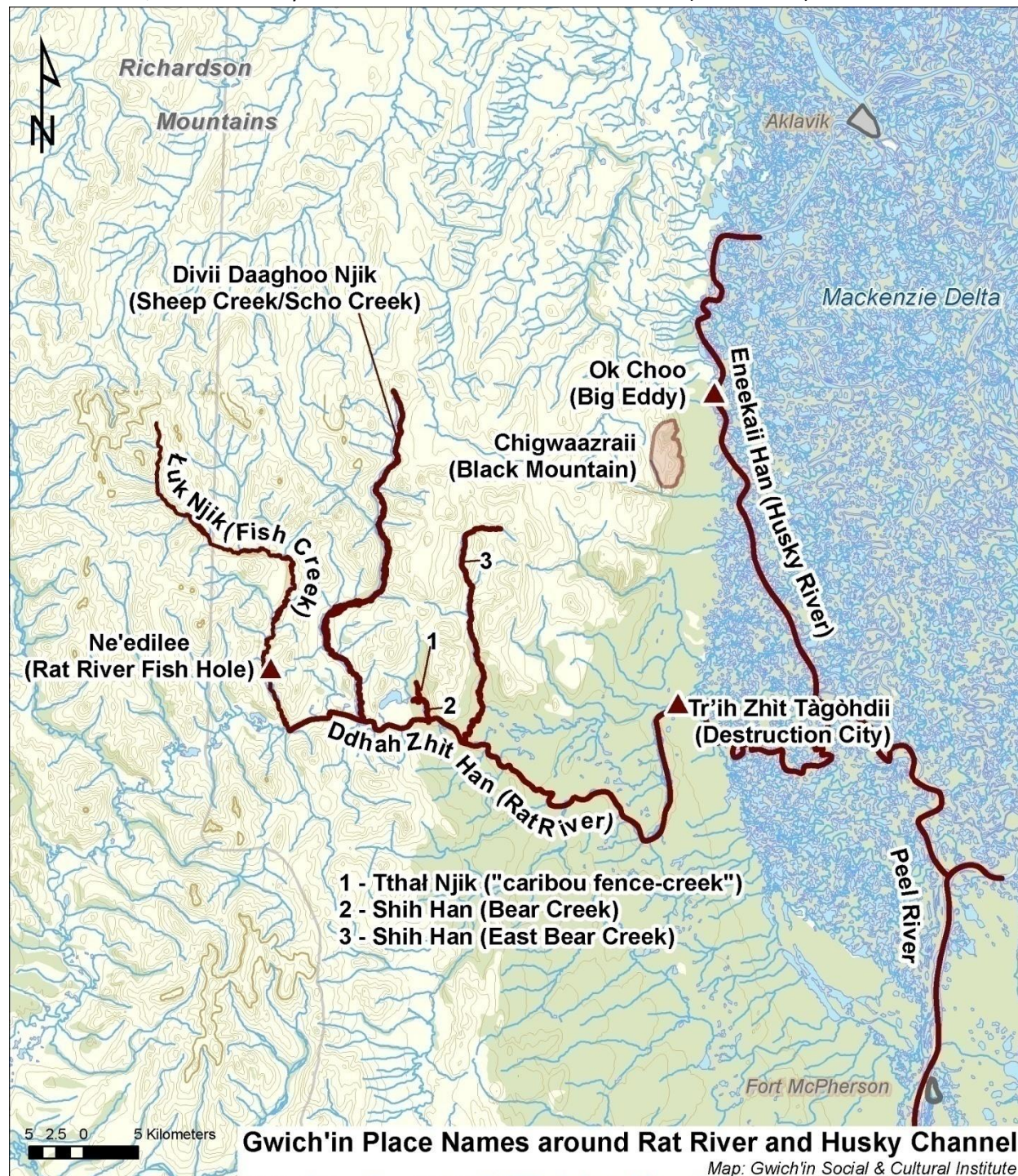
Place names and trails

Traditional Gwich'in names "tell us about how people lived, where they traveled, and their in-depth knowledge of the land. They are like windows into the traditional culture, history, and values" of the

¹⁷ "Fish treasures" – Gwich'in language centre, no date.



Gwich'in (Kritsch and Andre 1997: 130). The following table includes traditional Gwich'in named places near Rat River, as recorded by the Gwich'in Social & Cultural Institute (Greer 1999).



Map 3: Gwich'in place names.



Table 1. Select Gwich'in Traditional Place Names

Name(s)	Further Information
<u>Ddhah Zhīt Han</u> <i>Rat River</i>	<p>Name means 'River in mountains.' The char fishery has been used by the Gwich'in since before Aklavik was founded, and numerous cabins and old cabin sites are along its shores. People travelled through this area during the Klondike Gold Rush of 1898. Gwich'in hunters guided miners through the passes and provided meat for sale.¹⁸ The general area is known to be good for caribou. Sometimes camps would have many tents.</p> <p>Albert Johnson, the "Mad Trapper of Rat River" stayed and travelled through this area during the famous police search for him.</p> <p>People used to stay at <u>Ddhah Zhīt Han</u> for Christmas.¹⁹</p>
<u>Eneekaii Han</u> <i>Husky Channel, Husky River</i>	<p>Name means "Eskimo River." It is a channel of the Mackenzie Delta along the west side near the mountains. <u>Eneekaii Han</u> is a navigable channel, well used by the Gwich'in as part of their extensive trails network in both summer and winter.</p> <p>There used to be trading posts owned by Mr. Blake and Mike Krutko along the channel during the fur trade era.</p>
<u>Łuk Njik</u> <i>Fish Creek</i>	<p>Name translates as 'fish-creek.' The creek is associated with a medicine man legend (see above). Fish Hole is along this tributary of the Rat River. The area was also a caribou-hunting location. Char spawn in this creek during the fall.</p>
<u>Divii Daghoo Njik</u> <i>Sheep Creek Scho Creek</i>	<p>Name refers to the noise sheep make. Also known as <u>Divii Njik</u>, and locally as "Sheep Creek." Gazetted name is Scho Creek.</p> <p>Elders remember many people stayed here in the past, as it was a nice place to camp. There is a caribou fence in the area as well as in other nearby locations.</p>
<u>Tthał Njik</u>	<p>Name means "caribou fence-creek."</p> <p>This place name refers to a point where a caribou fence was built.</p>

¹⁸ Jim Edwards, COPE story, "Christmas Long Ago."

¹⁹ Ehdiitat Gwich'in Place Names Project Tape 9, Julia Edwards. January 27, 1999.



<p><u>Shih Han</u> <i>Bear Creek and East Bear Creek</i></p>	<p>Bear Creek and East Bear Creek are both known by this name, which translates as 'Grizzly bear-river.' The area was a 'nice place' for hunting and has numerous trails.</p> <p>People hunted caribou in this area in the winter, and stayed in large tent camps along the creek.²⁰ There used to be a caribou corral between Bear Creek and <u>Divii Daghoo Njik</u>.²¹ The area was accessed by dog packs and dog teams. The men would hunt caribou that were visible in the mountains nearby while the women would stay at camp and make drymeat from the caribou. Caribou corrals were used.</p>
<p><u>Ok Choo</u> <i>Big Eddy</i></p>	<p><u>Ok Choo</u> (name means big eddy) is an important char fishing area, a large eddy. The trailhead to an old-time hunting trail heading into the mountains is located there. <u>Ok Choo</u> is near the base of <u>Chigwaazraii</u> (Black Mountain, Mount Goodenough) and is the almost year-round home to Elder John Carmichael. It is known as a harvesting area for caribou, fish, and sheep. The importance of this place predates the muskrat trapping days. Alfred Semple remembers his grandmother speaking about <u>Ok Choo</u> in the days before firearms, "So that Big Eddy is a favourite place where, from generations, ... they use that Big Eddy. People used to come down, families, after years and years, every year just for Arctic char."²² Even then, it was a 'favourite place' because of the availability of Dolly Varden char and the access to the mountains for hunting. "Lots of families used to live around there, different times."²³</p>
<p><u>Ne'eedilee</u> <i>Fish Hole</i></p>	<p><u>Ne'eedilee</u> (local name: Fish Hole) is located on <u>Łuk Njik</u> (Fish Creek). The name <u>Ne'eedilee</u> refers to a place to stay over the winter. In the past it was a vitally important spot for fishing char. Char also spawn in this area. It was mainly used by Fort McPherson people. Although in the last decades the char stocks have dropped significantly, the use of <u>Ne'eedilee</u> historically is well documented.</p>

²⁰ Teetl'it Gwich'in Place Names Project 2008, March 1, 2008, Interview 10 Joseph Kay

²¹ Neil Colin, Delta Report, Dene Mapping Project, Tape 71.

²² Alfred Semple, April 12, 2007, Aklavik Heritage Zones Project, GSCI

²³ Tommy Wright, April 13, 2007, Aklavik Heritage Zones Project, GSCI

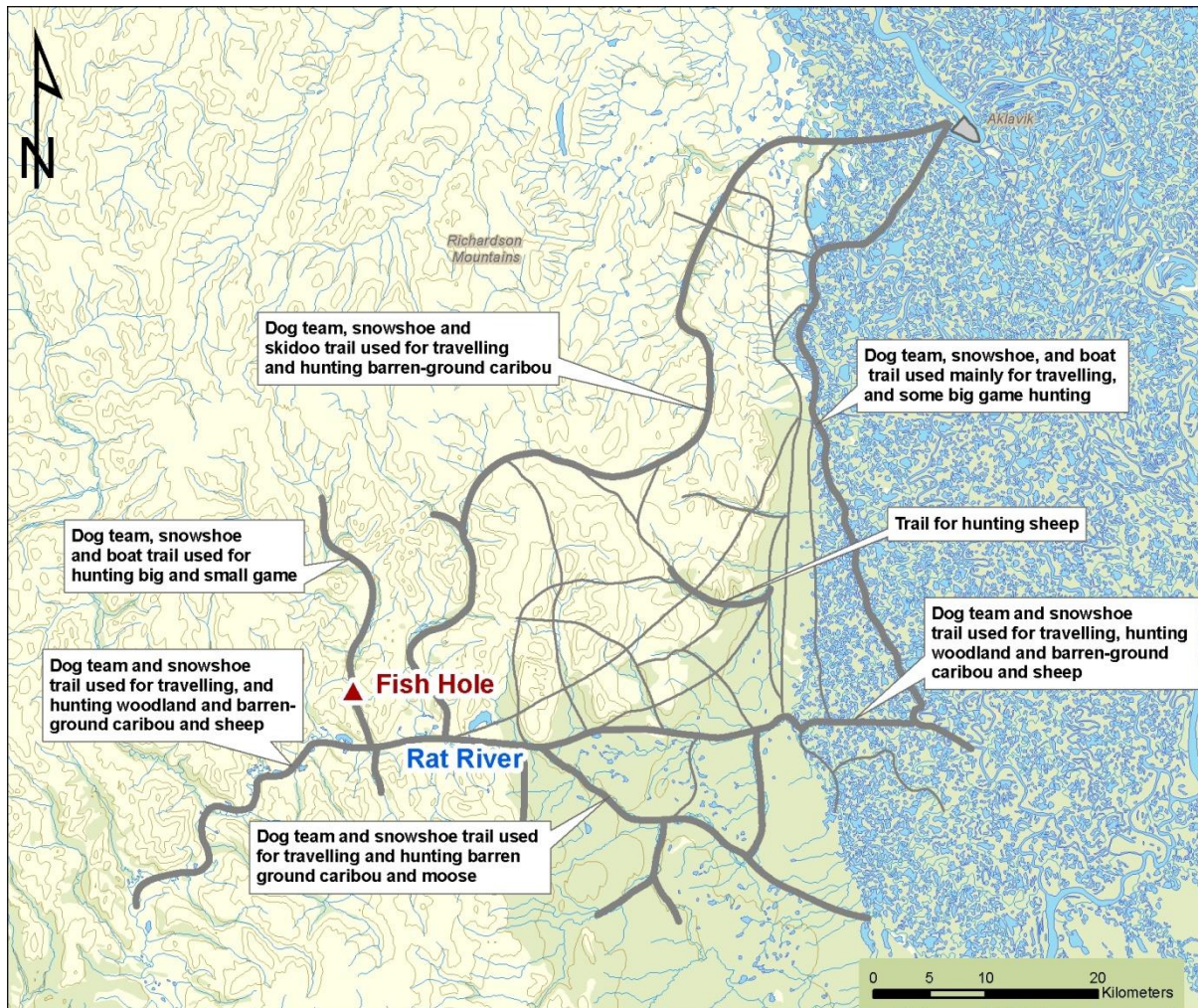


Tr'ih Zhìt Tàgòhdii
*Canoe Landing,
Destruction City*

Tr'ih Zhìt Tàgòhdii (local names: Canoe Landing, and more recently, Destruction City). Elders say that this spot is as far as it is possible to travel by boat - you can't go further due to rough waters. Traditionally a summer camp for the Gwich'in. Jim Edwards, discussing Gwich'in named places in the 1970s, indicated that the name Destruction City is a much newer name, "**Now this number one, is called Destruction City. Since 1898, that's only a few years back! But it's called, a Canoe Landing – Tr'ih Zhìt Tàgòhdii – for many, many years."**

The site was used during the Klondike Gold Rush (1897 and 1898); when Gwich'in guides were hired to take miners to Dawson City in the Yukon. They came from the Peel River and passed through this area. The name 'Destruction City' refers to the left-over remains from miners' boats – they would stop at this location to dismantle their large boats and build smaller boats from the pieces, leaving behind what they didn't need (Haszard and Shaw 2000).





Map 4. Generalized traditional Gwich'in trails (from Dene Mapping Project, ~1900- 1970s)

Thick grey lines are major trail corridors; thinner grey lines are trails.

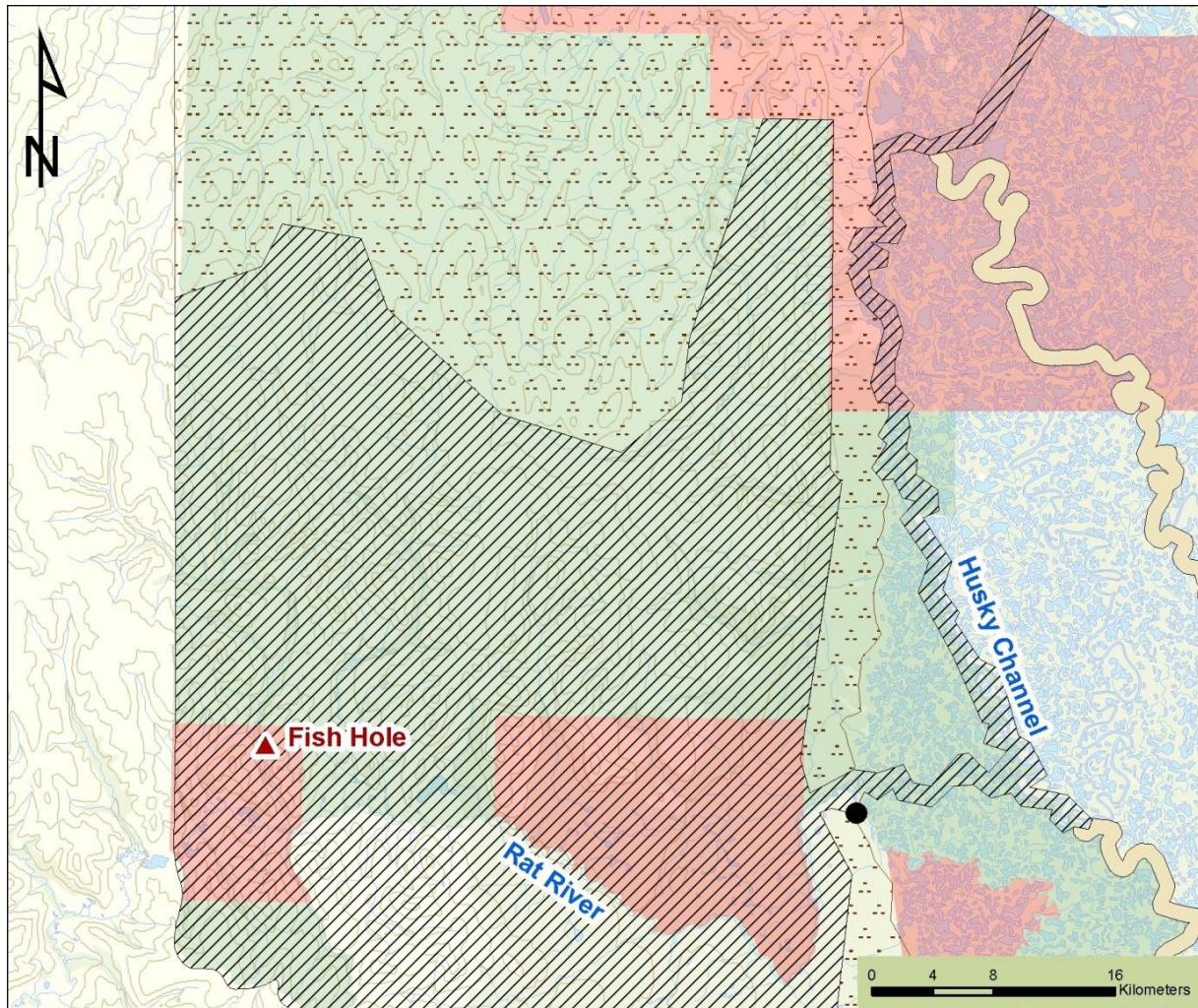
Current protection






There are several types of protection already in place for the Rat River and Husky Channel. Much of the area around the Rat River and in the Delta is owned by the Gwich'in as both Schedule I (Surface rights) and Schedule II (Surface and subsurface, see Map 5, below).

Tr'ih Zhìt Tàgòhdii or Canoe Landing/Destruction City is a Heritage Conservation Zone in *Nanh' Geenjit Gwitr'it Tigwaa'in / Working For The Land, the Gwich'in Land Use Plan* (Gwich'in Land Use Planning Board 2003, see Map 5). Additionally, the length of the Rat River is within the "Rat, Husky, Black Mountain Conservation Zone" (Zone A) in the Gwich'in Land Use Plan based on both biological diversity and heritage values. The river is also within 'WATDOC Site 26 Rat River and Big Fish River' – WATDOC sites were identified as "Sensitive Areas along the Mackenzie River Basin on the basis of physical, hydrological and biological characteristics" (WATDOC 1981, in IMG-Golder 2008: 10). In IMG-Golder's assessment of the Mackenzie Delta, the Rat River was within a larger area designed 'Southern Site'



suggested for evaluation for potential protection; “With the creation of such a protected area, all the important, valuable and unique elements of the southern Mackenzie Delta Ecoregion would be accounted for” (2008:102). Map 5 shows the Rat River and Husky Channel areas, with the privately-owned Gwich’in settlement lands as well as the conservation and management zones described above.



- Destruction City - Heritage Conservation Zone, GLUP
-  Rat River, Husky River, Black Mountain - Gwich'in Conservation Zone, GLUP
-  Peel River and Channel - Special Management Zone, GLUP
-  Porcupine Caribou - Special Management Zone, GLUP
-  Gwich'in Lands: Schedule I, Surface rights
-  Gwich'in Lands: Schedule II, Surface/Subsurface rights

Map 5. Gwich'in Lands and Land Use Plan Zones.



Gwich'in TEK: Dolly Varden Char Health

Recently, the GRRB interviewed six Elders and harvesters about char.²⁴ Several interviewees worked as char monitors or with biologists, three were subsistence fishers, and one has fished char for subsistence or sale and is now a monitor for DFO. The monitors continue to fish, and of the subsistence fishers interviewed, at least one still fishes. The average age of the interviewees was 64.8 years (five out of six reported their age); five were men and one was a woman. The range was 40 years to 93 years. Much of the information contained in this report comes from these interviews and other Gwich'in Renewable Resources Board interviews, Gwich'in Social and Cultural Institute interviews, and other sources (see bibliography and list of primary sources used).

Most Char TK Study interviewees reported that they had not seen any dead or abnormal char. One did say that a small number are pale, **“well I think the early ones I would say, some of them start up a little too early...they are more pale... early August late July.”**²⁵ John Carmichael said he rarely gets a fish with a lump or another abnormality on it.²⁶ Char health is determined by its general appearance, including shape, colour, presence of fat, colour of the meat, firmness, appearance of the liver, and other factors. Health can also be determined by presence of parasites. Char TK Study interviewees agreed that char are healthy fish in general. Caroline Kay said that healthy fish, when made into dryfish, **“they are dripping with grease on the ground...lots of grease from it, rich fish.”**²⁷ Gills may harbour parasites and should appear really red.²⁸

John Carmichael uses the general appearance of the fish to determine health – skinnier fish are less healthy.²⁹ General appearance and feel of the flesh can be used to determine how healthy a char is but it is important to know how the fish should appear at that time of year, **“usually with us it is by the physical appearance. If the char is nice and well, like, with touch too. Like if the char is nice and firm and he is big, and he is the colour he is supposed to be...at that time of the year.”** There are biological factors that indicate health, from sampling the fish, and contaminants can be found in the liver; or in the fat of animals that feed on char as well.³⁰

You can tell when it is nice and healthy when it's nice and round, healthy looking. They are always in good health, every trout that I got.

Abe Peterson

Some Char TK Study interviewees indicated that there are no parasites or worms on char, although one said that he occasionally finds a char with a lot of worms on it. He said that some of the worms are **“long but they are pin-sized.”**

²⁴ These interviews will be referred to collectively as “Char TK Study” interviews.

²⁵ Anonymous, 2008, GRRB Char TK Study, Fort McPherson.

²⁶ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

²⁷ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

²⁸ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.

²⁹ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

³⁰ Anonymous, 2008, GRRB Char TK Study, Fort McPherson.



Billy Wilson indicated that in the last two or three years he has seen more worms in the flesh of char, noticeable when making dryfish.³¹ A monitoring project to determine where the parasites originate would be helpful, since the worms have only been around for a few years.³² Caroline Kay said that there are occasionally white things on char that might be worms or parasites.³³

Abe Peterson said that he occasionally gets young, small char in his net at the mouth of Rat River.³⁴ Young char can most often be found at Rat River during the end of August when they are between six and ten inches in length.³⁵ John Carmichael also catches the occasional young char in his net, but said that with any mesh size you'll catch a small number of juvenile fish. **"You get them, you catch the odd one. [With] any fish you catch the odd one like that, you might even catch them in the five inch mesh because you have fine twine in it, you see a little jackfish this big sometime in the net because it open the mouth and it going through."** He has occasionally caught young ones less than a foot long in August at Big Eddy. Another fisher said that he catches young char in shallower pools.³⁶



*Abe Peterson in Fort McPherson
Photo – GRRB*

Char eat insects as well as other things. They also swallow gravel or sand.³⁷

When the leaves started to get yellow, that is when the char go up the Rat.

Caroline Kay

Gwich'in TEK: Dolly Varden Char Migration

Upstream Migration: Arctic Coast to Rat River in the fall

Char move upstream in July, August, and September (migration routes mapped in Char TK Study are shown in Map 6, below).

They start at the coast in July and end up going up the Rat River in mid-August to September. Old timers say that when the leaves start to turn yellow or drop, it means that char are coming.

"Around Rat Riverwhen the leaves is dropping that is when they are coming that is the old timers saying...they will tell you

³¹ Traditional Knowledge Verification Workshop GRRB Rat River Char TK Report, Inuvik, January 7, 2010.

³² Anonymous, 2008, GRRB Char TK Study, Fort McPherson.

³³ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

³⁴ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

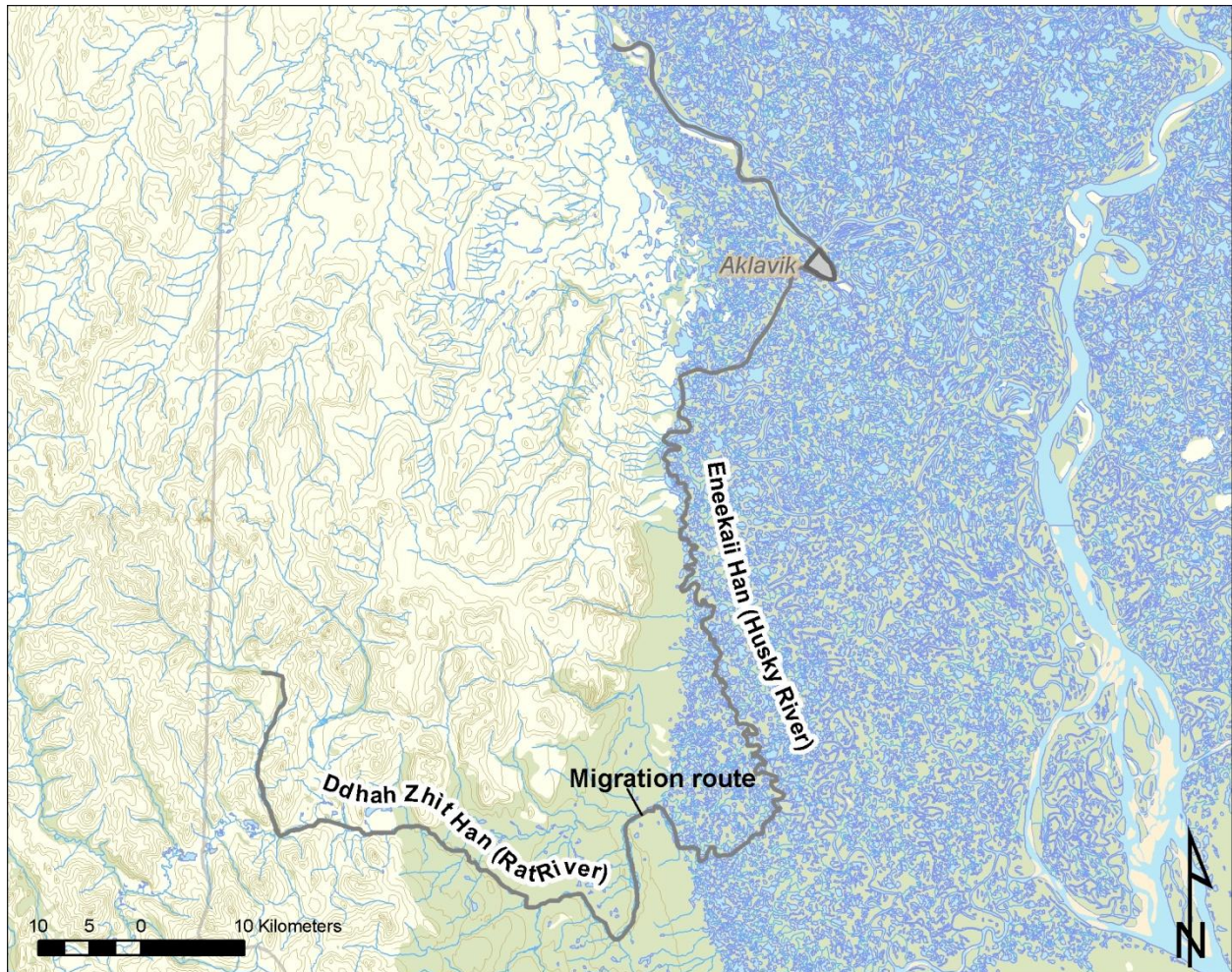
³⁵ Anonymous, 2008, GRRB Char TK Study, Fort McPherson.

³⁶ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

³⁷ Alfred Semple, GEKP interview, May 10, 1996, Aklavik; Alfred Francis, GEKP interview, December 5, 1995, Fort McPherson..



all this, you know, they watch the leaves and then the char is coming.”³⁸ Caroline Kay indicated that they run upstream in “August, middle, close to the end of August, ... always end of August. I know there is this one old man [who] used to say it, when the leaves started to get yellow that is when the char go up the Rat.”³⁹



Map: Gwich'in Social & Cultural Institute

Map 6. Char migration route: Char TK Study

An Aklavik fisher who has fished the char in many locations, said that the char start their upstream migration on the Arctic coast, **“in July, end of July, middle of July and they go right up to September, maybe September 10-11 when the river really start freezing.”**⁴⁰ John Carmichael said that the char arrive around Aklavik in the first week of August, and then the fish make their way further up the Delta after that. He said that, **“it takes quite a while to come up.”**⁴¹ Char are at the mouth of Rat River by mid-

³⁸ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

³⁹ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

⁴⁰ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.

⁴¹ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

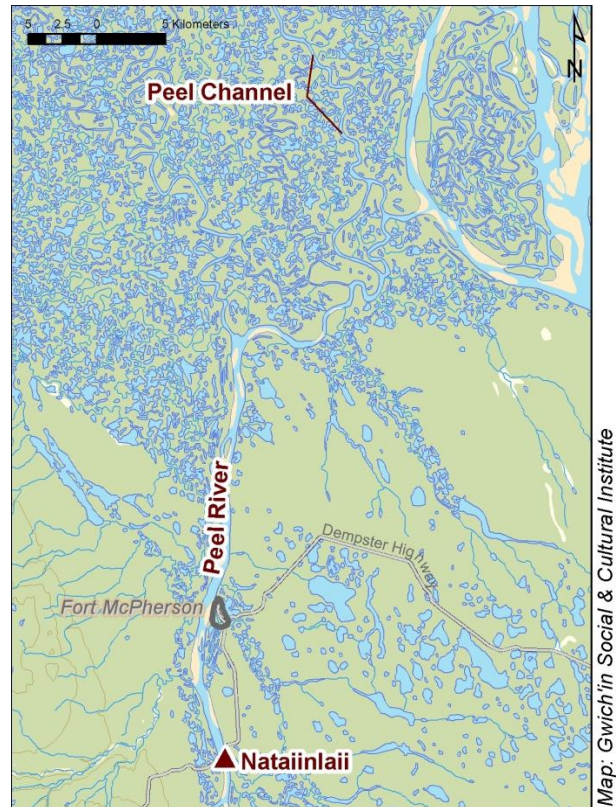


August.⁴² It is hard work for the char to migrate between the pools and over the shallow waters of the Rat River and its tributaries, **“the ripple, ...thousand trout going up, fighting their way up into next hole.”**⁴³

Char TK Study interviewees have caught migrating char as early as July 1st to July 10th, in the 1980s and 1990s. Generally the run is done early to mid-September. Caroline Kay has heard about people catching char at the end of September at Fish Hole, **“it was late that time, some people go up there after, just before freeze-up and they get some travelling up, quite a ways up to travel, [at the] end of September.”**⁴⁴ Recently, the char fisheries may stay open an extra week until September 18th if the **“main run was still running.”**⁴⁵

Some Char TK Study interviewees have caught char as an incidental catch in the fall, either before or after the main run, and some have an incidental char catch in the spring. Places specifically mentioned where the incidental catch happened are probably the Vittrekwa River char (see inset map):

- Eight miles (Nataiinlaih) – fall
- The Peel Channel in the Mackenzie Delta – spring and fall.



Map 7. Inset map: Nataiinlaih and Peel Channel

“Actually there is the odd time that you catch char in the Peel that ... lost their direction or are going into a fish hole that hasn't yet been discovered by the biologists. So we do catch the odd char up the Peel usually in July [and]...you do get the odd one when you set nets under the ice so that would be October.”⁴⁶ It is possible to catch char while fishing for coney, but it's unlikely. It would have to be large char to stay in the net. **“Maybe just a big one... you won't get too many of them, there is not too many big ones left. But you use a 5 ½ inch mesh for your coney and your whitefish so most char will go right through but when they bump the net they can't go through they just hit the net and they go around eh? They are smart fish those char.”**⁴⁷

⁴² Anonymous, 2008, GRRB Char TK Study, Fort McPherson.

⁴³ Alfred Semple, May 10, 1996, GEKP interview, Aklavik.

⁴⁴ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

⁴⁵ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

⁴⁶ Anonymous, 2008, GRRB Char TK Study, Fort McPherson.

⁴⁷ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.



Char fishers often have to go further downriver than in the past. Last year, Johnny Charlie said the undercurrent was filled with debris and they had to find a deeper, cleaner undercurrent to fishing. They had to travel a long ways to fish.⁴⁸

Downstream Migration: Rat River to Arctic Coast in the spring

Rat River char move down to the coast in June, deep in the high waters of spring break-up and flooding. They leave the Rat River in May or June. Abe Peterson said they move very deep in the high spring run-off waters, and head out to Herschel Island.⁴⁹ Char come out of the Rat River in May and June, **“depending on the ice situation or if the ice is moving out of that river- they will be right there with it.”**⁵⁰

Char move **“when the ice comes down... in May and June...If the ice is moving [the char] comes down amongst the ice.”**⁵¹ John Carmichael agreed they’re moving towards the coast, **“June, that is when they are going back down.”** He said they start to move as soon as the water is flowing, even with very swift water. He felt they move out all at once.⁵²

Char that overwinter at Fish Hole come out in the spring when the ice thaws but the high waters make it difficult to see them, **“they do come out in the spring when the snow melt[s].”**⁵³ Char generally are not harvested in the spring because they stay at the bottom of the channels, **“ the water is high, you know they are way down on the bottom going back down.”**⁵⁴

Billy Wilson indicated that Rat River may start to run as early as May 1st, and the char might be migrating then. He said the char spend 40-60 days at the coast before starting to return on around the end of July or early August.⁵⁵

An Aklavik fisher disagreed about the timing, saying, **“in June, no, they are busy feeding.”** He felt they move downstream **“during the spring breakup.”** He went to Ne’eedilee (Rat River Fish Hole) in the spring, as a fisheries monitor around 2002-2003 and saw char there in the underflow.⁵⁶

Abe Peterson said the char move all the way down to Herschel Island, he saw them there when he was sealing one year. **“One summer. [I] was doing some sealing around Herschel Island, and them boys used to have net set and get this trout right there... I think ... they are all over the place in the coast,**

⁴⁸ Traditional Knowledge Verification Workshop GRRB Rat River Char TK Report, Inuvik, January 7, 2010.

⁴⁹ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

⁵⁰ Anonymous, 2008, GRRB Char TK Study, Fort McPherson.

⁵¹ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

⁵² John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik. Richard Ross agreed that they migrate in late June (January 7, 2010)

⁵³ Anonymous, 2008, GRRB Char TK Study, Fort McPherson.

⁵⁴ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

⁵⁵ Traditional Knowledge Verification Workshop GRRB Rat River Char TK Report, Inuvik, January 7, 2010.

⁵⁶ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.



wherever there is good feeding.⁵⁷ The char's summer habitat and behaviour is closely tied to the sea ice conditions, **"if you want to know about char, you watch the ice conditions here on the coast. You got to watch the ice, and you will get some char in it; and no ice they have to go further because I think they feed on ice worms. They like it cold."**⁵⁸ Other Char TK Study interviewees generally agreed. John Carmichael said that the char used to travel to Herschel Island but that he'd heard that the large char from there go up to different spawning areas up the Babbage River on the Yukon North Slope, and that they are two different populations.⁵⁹

Abe Peterson has caught char at Eight Miles in September, but has never seen char in the spring.⁶⁰ Others have caught char in their nets while fishing for other species, **"I usually set net in the spring after the ice goes and catch the odd char at that time too."** These fish are heading down to the coast, **"they come out of the Fish Hole so they are pretty, they are a fair size, ... but they are skinny."**⁶¹

Char TK Study interviewees mapped migration routes (see Map 6). Char follow the same migration routes upstream and downstream.

Timing

Char TK Study interviewees agreed that char decide to migrate based on temperature and possibly water levels. When the water gets colder, the char run, and the timing of the run is more important to a good catch than the clarity of the water.⁶² **"I think it is all temperature...they run when it is cold. I always go by water temperature; when I take water temperature I check the water and if it is too warm I don't worry about it, I'm not catching nothing. So when the temperature gets around 10, get around 13 I think."**⁶³ There is an occasional char caught before the main run.

Some fishers feel that water clarity was important, **"change of water I guess, from summer to fall, the water must change, clear and greener, you could see it, it gets greener. [It's] really clear in September – it's clean, clean water."** You can catch char when the water is murky, however.⁶⁴

The perception of when char run might be based on fishing practises as well. John Carmichael said that char **"go around but you wouldn't be able to put a net in after ice go, because it will get full of moss and stuff, and get so dirty that you would have to pull it out."** He went on to say, **"some years too ... you go up there, and the water is high, and it is real murky and dirty and full of sticks – and [you] can't**

⁵⁷ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

⁵⁸ Anonymous, 2008, GRRB Char TK Study, Fort McPherson.

⁵⁹ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

⁶⁰ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

⁶¹ Anonymous, 2008, GRRB Char TK Study, Fort McPherson.

⁶² Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

⁶³ Anonymous, 2008, GRRB Char TK Study, Fort McPherson.

⁶⁴ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.



have your nets in. And I think some, some years [are] like that when you know quite a few pass a day and nobody have nets in.”⁶⁵

Char come from Herschel Island along the Arctic coast, and migrate up the Mackenzie Delta, through Husky River to the Rat River, and up to their spawning locations.⁶⁶ For example, a landslide into a channel once changed the char’s migration route (see Map 9 below for Char TK Study interviewee’s



Map 8. Vittrekwa River and Road River

information about Rat River char migration and other details). Channels in the Mackenzie Delta do change and the char can respond, but char do not try to move to different watersheds or up different rivers. However, there are other char populations that move to other places to spawn, “I also believe some char come more up and go up the Vittrekwa, and the Road River.”⁶⁷ See inset map for the location of the Vittrekwa and Road rivers.

Multiple Char Runs

Char TK Study interviewees said that there are more than one run of char although they were not sure about the compositions or numbers of the separate runs. “You get the female, male and the rest. Or could be other way. OK, last year it was all the non-spawning, and then females and males [are] always close following each other.”⁶⁸ An Aklavik fisher has fished a separate run of males, which are larger and form a later run. He says there are three runs, “the early ones and then there is another one that happens, it is not too heavy and then you get the heavy run that is at the end, that’s the males and spawners.” The early run is in mid-late July, and the late run is in late August to early September.⁶⁹

John Carmichael has seen differences in the numbers of char during their migration, but called them part of the same run. He agreed that female spawners come first, then males. He also mentioned that the composition of other fish changes through the run, “certain weeks you get lots of whitefish and

⁶⁵ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

⁶⁶ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson, Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

⁶⁷ Anonymous, 2008, GRRB Char TK Study, Fort McPherson, Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

⁶⁸ Anonymous, 2008, GRRB Char TK Study, Fort McPherson.

⁶⁹ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.



certain weeks lots of coneys.”⁷⁰ Alfred Semple agreed, “Well, they’re same thing as whitefish, the female it goes ahead.”⁷¹ There may be two runs that go to two separate spawning grounds up the Rat River – these two areas have a five degree difference in water temperature.⁷² Caroline Kay thought the run was incremental, “little at a time, I think.”⁷³

There are more male spawners than female spawners in the later portion of the char run, “the last bit of char to go through, you know, those are the males that come behind the females, the spawners. So you know definitely [you] get bigger fish when you get into the males. Males are bigger than females.”⁷⁴

There may be different sizes of char that arrive (and leave) the Fish Hole at different times. Herbert Firth suggested that the big char arrive early and then disappear, “there was one, two, three guys that went up there before freeze-up, they went ahead of the char [for the residential school], dog pack or some way. They got up there early and they had big ones, they had the big ones, you just give up after that, because just the small ones, they got the big ones. I think one of them had four to five hundred char. They stage-keep them on there and must have got over 1000, the three of them.” The big char might go further up the creek.⁷⁵ Johnny Charlie explained that this was during the residential school times in the 1960’s and that most of the catch was provided to the school and only some was reserved for personal consumption. He also indicated that no one really goes up to fish at the Rat River since the 1970’s⁷⁶.

Billy Wilson is concerned that changing water temperatures are affecting the char run. Char start moving based on water temperature – they usually run when the water reaches five or six degrees. He noted that in 2009 the temperature did not dip below 12 degrees. Char aren’t running when they normally do, and to compensate for the changing water temperatures, the char are migrating closer to the bottom of the channels. Eddies were flooded, compounding the issue.⁷⁷

Gwich’in TEK: Dolly Varden Spawning

Char TK Study interviewees suggested a range of times when char spawn. Abe Peterson believes that char spawn in September. He has caught them with eggs on their migration up to their spawning locations, around the end of August.⁷⁸ Char spawn once they reach Fish Hole in the fall, where it is possible to see their eggs, “they lay egg up there. Lay eggs, all the eggs are big, round ones... [in]

⁷⁰ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

⁷¹ Alfred Semple, GEKP interview, May 10, 1996, Aklavik.

⁷² Anonymous, 2008, GRRB Char TK Study, Fort McPherson.

⁷³ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

⁷⁴ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

⁷⁵ Herbert Firth, March 2006, Arctic Red River Fish Study, GRRB

⁷⁶ Traditional Knowledge Verification Workshop GRRB Rat River Char TK Report, Inuvik, January 7, 2010.

⁷⁷ Traditional Knowledge Verification Workshop GRRB Rat River Char TK Report, Inuvik, January 7, 2010.

⁷⁸ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.



August. They are big, they are big eggs.⁷⁹ This may be as late as October or November, or as early as the first week to the third week of September.⁸⁰

Spawning habitat

Char need specific conditions to spawn, **“fast current, lots of cover on the shores, lots of vegetation, rich source of oxygen, the water temperature has to be the right temperature ... Overall just a good place for insect larvae to survive, in order to produce food for the younger char.”**⁸¹ Char TK Study interviewees agreed that char spawn at Fish Hole and possibly in other places along the Rat River. Other populations of char spawn up the Vittrekwa and Road rivers.⁸² John Carmichael said that char, **“like they go to deeper holes above. They said the ice get 7-8 feet thick there, and then there is not much water there.”**⁸³ Several fisheries monitors agreed that spawners and silvers are found together at Fish Hole.⁸⁴

There are numerous categories of char based on age, spawning activities, sex, and behaviour. Scientists categorize char with the following names:

- *Juveniles* are young char of both sexes, who stay at Fish Hole until ready to go to the ocean to feed. They may stay at Fish Hole for five to seven years.
- *Residents* are adult char that live year-round in Fish Hole (or Fish Creek). These are mostly male.
- *Spawners* are adult fish of both sexes who migrate from the ocean to Fish Hole to spawn.
- *Non-spawners* or *silvers* (so called because they are silver, whereas *spawners* are red) are adults that migrate from the ocean to Fish Hole but do not spawn.

Char may not spawn every year because they need a certain amount of nutrition, although all Rat River char return to Fish Hole every year for overwintering. This is because the colder temperatures of the ocean would kill them if they did not.⁸⁵ Traditionally, it was not important for the Gwich'in to categorize spawners and non-spawners (“silvers”), residents, and juveniles.⁸⁶ Even today, char fishers use a classification system based on features of the char that are important for subsistence and taste: for example, firmness of the flesh. They also categorize the char into male and female or spawners vs non-spawners for the purposes of management and preserving the population. Some fishers can tell the difference based on size, and colour. It's not easy to tell unless you open the fish up.⁸⁷ Some Gwich'in may only categorize *spawners* as female fish with eggs, although scientists use the word spawners for both males and females about to spawn or that have just spawned. However, with the declining stocks and various rules and regulations, the Gwich'in who fish for char would like to be able to easily tell them apart so they can help the stocks to quickly regenerate. **“When I catch them in the net it would be real**

⁷⁹ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

⁸⁰ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik; Anonymous, 2008, GRRB Char TK Study, Fort McPherson.

⁸¹ Anonymous, 2008, GRRB Char TK Study, Fort McPherson.

⁸² Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson, Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.

⁸³ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

⁸⁴ Anonymous Gwich'in interviewees, 2008, GRRB Char TK Study.

⁸⁵ Nathan Millar, pers. comm., September 22, 2009.

⁸⁶ See Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

⁸⁷ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.



nice to know exactly what they are because I don't like catching fish with eggs in them, or a male. **Spawning males, if anything, it is just a waste.**" This fisher can tell somewhat based on their size, and prefers non-spawners to eat, **"non-spawning is better because non-spawners have a lot more meat on it."**⁸⁸ There seems to be an increasing trend to find more spawners than silvers; **"silvers are better [for eating], they are fatter fish"** – there was agreement about this with Char TK Study interviewees, **"they are more firmer... any spawned fish is softer than the male fish."**⁸⁹

Abe Peterson indicated that an experienced char fisher might be able to easily tell the difference between male and female spawners based on the appearance of the fish, but he can tell if he opens the fish up, **"I see eggs and male is different."**⁹⁰ **"We can't judge how old it is. Like white people they judge how old that fish was, but us we don't know. All we know is there is fish there and we catch them, we don't know how old that fish is."**⁹¹ It is possible to tell based on the shape of the male fish's mouth, **"the way their head is shaped...the hook at the bottom of the mouth."**⁹² There are more female spawners and the number of females has increased in comparison to males.⁹³ Billy Wilson said that spawning char are smaller than they used to be. They may be spawning at a younger age.⁹⁴

"The male char they got little beak, little beak and they look quite different...the male look little darker then the female and the female is slightly colour[ed]."⁹⁵

Gwich'in TEK: Subsistence use of Dolly Varden Char

Seasonal use

Fishing for char most often occurs in fall, August to September, although it does range from July to October depending on location. Char fishing along the coast starts as early as June or July, and near Rat River **"right through until August and September. I used to fish right until it freezes."**⁹⁶ Several Char TK Study interviewees continue fishing under the ice until November. Abe Peterson always fished for char in August. He generally stayed a week at a time, "just to be in the bush." For other fish, he stays out about a month in the fall time. **"I don't really try and clean out the lake you know."**⁹⁷

⁸⁸ Anonymous, 2008, GRRB Char TK Study, Fort McPherson.

⁸⁹ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study; John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

⁹⁰ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

⁹¹ Alfred Semple, May 10, 1996, GEKP interview, Aklavik

⁹² Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.

⁹³ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

⁹⁴ Traditional Knowledge Verification Workshop GRRB Rat River Char TK Report, Inuvik, January 7, 2010.

⁹⁵ Alfred Semple, May 10, 1996, GEKP interview, Aklavik.

⁹⁶ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.

⁹⁷ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.



It is possible to start char fishing earlier, in July, on the Arctic Coast, **“after the ice goes, we go to the coast and we do our fishing for herring⁹⁸ and that is in about June, end of June, July early July and about end of July we start going down towards King Point and we do fishing down there for char [at the] end of July.”⁹⁹** Often char nets are not left in continuously, they are only set every second day. **“You get too much fish if you do that, have net set for too long; otherwise you will have too much fish to work with.”¹⁰⁰** Although John Carmichael fishes for the whole summer, **“well I usually fish all through June until [the] last part of October sometime going into November”** he doesn’t fish for char daily **“I only fish some days.”¹⁰¹**

Caroline Kay fishes from near the end of August to mid-September, staying at her char fishing camp for about a month. She did mention that the August rains can be heavy and prevent a good catch, **“August is the time it rain all the time, and when the river get full of water, the arctic [Dolly Varden] char don’t catch that good they go under...always every August.”** She said that the bad weather in August can cause high, dirty water which prevent people from leaving their nets in.¹⁰² John Carmichael fishes for char in August and until the first week of September at his camp at Big Eddy.¹⁰³

As noted above in the migration section, char are occasionally caught incidentally while fishing for another species. **“Sometimes you hit a late run, sometimes you hit a early one... when they go through early you get them fairly early in the end of July.... they get, I guess, mixed in with the herring so they travel with the herring and get accidently get caught.”¹⁰⁴** John Carmichael has also seen the occasional char when fishing for other species. **“This year I only got one after I moved back on the Peel.”** He doesn’t see them in the spring because in the spring he’s at his main camp, and the char do not migrate past that way, they use other channels. However, he said some people do see them in the spring, **“I know they get the odd one here [in Aklavik] after the ice goes in June but then I think they miss a lot. [Many of the people fishing then are] fishing for their dogs; mostly fishing in the creeks on the side because the water is too dirty. You know soon as the ice goes it’s all muddy and that high water you can’t keep your nets clean in the main channel.”** Although the muddy waters can make fishing harder, the fish are slim in the spring, making it easier for them to travel past the nets, **“there is nothing to them when they are coming back, they are starving, you know. No fat on them, wear it all off.”¹⁰⁵**

Modern use

Even though the population of char has been very low for several years, it is still viewed as an important resource for the Gwich’in of Fort McPherson and Aklavik. One subsistence fisher can easily feed about four families, including grandparents and in-laws. People who fish for char today share with their

⁹⁸ ‘Herring’ locally refers to several types of cisco and herring.

⁹⁹ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

¹⁰⁰ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

¹⁰¹ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

¹⁰² Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹⁰³ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

¹⁰⁴ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

¹⁰⁵ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.



relatives and Elders in town. Interviewees' experiences fishing for char varied greatly. Several Elders have fished for many years, more than a half a century. Younger Gwich'in often indicated they started fishing when they reached adulthood or in the 1990s and continued for ten or twenty years. One monitor has fished for char during two separate years. Caroline Kay, in her 90s, has been fishing since she was a young girl with her parents **"all summer long every year we fish."**¹⁰⁶ John Carmichael started fishing when he was 14 or 15, and has been fishing for six decades.¹⁰⁷

Fishing methods

Today, Gwich'in fishing for char use the regulation net of four or four and a half inches. The mesh size used to range between three to five inches but most people made the switch to the 4½ inch mesh **"when DFO suggested or the char management group suggested."**¹⁰⁸ A 3½ inch mesh was used "to catch those smaller ones, they are better eating anywhere on the river when the char starts running. Use herring net to catch small char; 3½ inch mesh." The small ones were about a foot and a half long, **"really good eating."**¹⁰⁹ Juvenile chars can be caught at the Fish Hole on Fish Creek and elsewhere. One harvester used to set a 3 ½ inch herring net to catch juvenile char, as they taste better.¹¹⁰

John Carmichael also used to use a 3 or 3 ½ inch mesh net, but the smaller net size didn't allow the smaller fish to pass through, **"...but before that we only used to use the 3 inch mesh they got too many small ones. That's why they changed that."** He also noted that the mesh depth is regulated, **"that is why we are using shallower nets too. ... Some of them used to use 60 mesh deep and that is really deep [eight feet]. Some of the nets are deeper here but we are only allowed to use 30 mesh so I use 24 myself."**¹¹¹

Char TK Study interviewees generally place their nets near the bottom of the creeks because char seem to stay closer to the bottom. **"I think they are staying right close to the deeper parts of the water. It is very hard to catch char right now in the Husky Channel."**¹¹² Some fishers have seen char mixed with whitefish.¹¹³ But others say that the two species don't mix too much, **"there is a lot of whitefish in the river; when the char come they all**



*John Carmichael in Aklavik
Photo – GRRB*

¹⁰⁶ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹⁰⁷ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

¹⁰⁸ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.

¹⁰⁹ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.

¹¹⁰ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.

¹¹¹ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

¹¹² Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.

¹¹³ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.



disappear basically. It is just like the char would have right of way.”¹¹⁴

Caroline Kay said that they catch different species ‘all together.’ She agreed that the net has to be **“at the bottom...[the char swim] it’s just all over could be bottom so the fish net is has to be bottom, it has sinker so it is close to bottom and top.”**¹¹⁵ The river conditions will also impact how the net is set, it **“all depends [on] how your eddy is, like if you have a really strong eddy, you would leave it on top because your fish when it hit that eddy, it goes down and they come up.”** Char travel in all parts of a stream, but a fisherman needs experience to put in a net in the right location. **“When you work with nets, you know like when you are fishing for char, ... it’s not just ‘put a net in the water and expect char to run in to it’. You have to clean it, you got to make sure that you know your anchors and your sinkers are put on proper, like I said, because as soon as the char hit the net and don’t go through, he’s going to back up and go around your net. You know they are smart fish, they are not a dumb fish.”**¹¹⁶

Recent net regulations introduced under the Rat River Fishing Plan were familiar to the Char TK Study interviewees. Monitor John Carmichael said, **“[a fisher is] supposed to have two [nets] that’s in all that regulation – and that they [are] 4 and 4 ½, you are supposed to have it on the string, about two feet on your floats, so your nets go down below two feet below the top. Then you have the same on the bottom,... your net that is only about half the depth ... [so there is] enough room for them to go under and over.”**¹¹⁷

In recent memory, the yearly char catch was in the low hundreds, although one Char TK Study interviewee took 2200 char in his best year (around 1990).¹¹⁸ Abe Peterson indicated he never took many, **“say about 6-7 a day.”**¹¹⁹ John Carmichael remembered taking 300-400 but it is unclear if he means after the fishery was regulated. He did mention that he used to catch around 400 as a usual catch at Big Eddy.¹²⁰ However, in the past things were different. Caroline Kay said that **“long ago we used to get lots... Every corner people used to stay getting arctic char setting net, lot of people.”**¹²¹

Gwich’in TEK: Decline in population

Timing

There are fewer people fishing now than in the past, and there are less char. There are two main population events that people discuss:

¹¹⁴ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

¹¹⁵ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹¹⁶ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

¹¹⁷ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

¹¹⁸ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

¹¹⁹ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹²⁰ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

¹²¹ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.



- one is the drop over a period of decades, from times in the past when many families fished for char and it was so abundant it was used as dog feed (**“maybe 21 years ago [late 1980s] they had a big meeting in Fort McPherson about the Rat River char, the decline in char and it was a concern that was brought up from a lot of Elders. And that’s when we started seeing ...no more fish. About 21 years ago.”¹²²**)
- the second is a drop, happening about three to five years ago, when the population ‘crashed’ and management measures were introduced. (**“not that long ago maybe four to five years”¹²³**)

Char numbers in the past far surpass what is caught today. For example, Herbert Firth remembered fishing 20 or 30 years ago at Fish Hole, **“went there with dog team and had to break the ice you know, there was thin ice over the Fish Hole we break it with ice every creek, current took that fish away down the rapids that [were] not too deep. Go in there some way. Anyway we had one net with us and we sweep that net, nobody guarding those fish those days you know, and we sweep that net, two sweeps and you have 700.”¹²⁴**

Even in 1996, Alfred Semple remembered the population being much larger in the past, and the effort to harvest char was correspondingly less.

Them days, 1940, ... this old man [Frank Carmichael, John Carmichael’s father] he hired me to go up to Big Eddy with him and I went up there live with him, and that old man he said, “We set one net.” It’s not very long net either, maybe four inch net and we set that net, and we set a tent, whatever we have to do. And then oh, not too long, we got there in afternoon, about 8 o’clock at night or ten o’clock the net is just moving.

The old man told me go down and look at it, so I look at it and there was so much trout; it’s just loaded already. We put lots in the tub and we got tub full with trout already. I don’t know how many, I never count them but there was a lot of trout and I’ll tell you we stayed there about two weeks with just one net, he keep us busy about three times a day, sometimes four times a day. Now today – that was 1940 – ever since that, they slack down quite a bit. Now people set about maybe ten nets and barely get any trout according to them days, I tell you.¹²⁵

The net was not in the river every day; it would have meant too many char being caught to process as dryfish. In comparison, Alfred set the same sized net in 1995 and caught only 30 char. Sarah Simon also remembered that char was easier to harvest in the past when she fished at the mouth of Rat River and dried the char;

¹²² Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

¹²³ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

¹²⁴ Herbert Firth, March 2006, Arctic Red River Fish Study, GRRB

¹²⁵ Alfred Semple, GEKP interview, May 10, 1996, Aklavik



*Well, when it's really good summer, really plentiful, we used to get 30, 20 or 30, something like that. In the morning they bring it back, and we cut that, and hang them up, and then in the evening again they just set net. They bring it back [again with] that many, we cut them up and hang them up, soon we have all big, fish camp full. We have smoke under them.*¹²⁶

There are not stories about char populations declining in the past like they have recently. Caroline Kay heard from her Elders that char have always been abundant **“it was good all the time.”**¹²⁷ Abe Peterson said that long ago people’s nets were just filled with char. **“Them days they get so many, they feed it to their dogs. That was a crazy thing to do. It’s a good eating fish, trout.”**¹²⁸ In the last few decades the population, and catch, have really declined. Even before the voluntary closure, many people did not harvest char, **“it’s really less now. Hardly anybody go down there [to fish for char]. Even when it is open they hardly come down for it.”**¹²⁹ The population may be recovering slightly in 2007 after the ‘crash.’ In 2007, one fisheries monitor found his net was really filling up so he pulled out of the water. He releases many of the fish from his nets at the mouth of the Rat River. Although he said the larger number wasn’t due to a rebounding fishery but had to do with the net location and eddy, other monitors have seen evidence of a recovering fishery.¹³⁰

Caroline Kay said that they were asked not to fish for char in the summer of 2007, just for monitoring purposes **“because the arctic char is getting less every summer. But last summer was not that bad. It was little bit of char, fish were good last summer.”**¹³¹

The longer range trend is that it is harder to fish for char and fewer char are being caught, but also that fewer people are trying.¹³² **“Further back in time people harvested more and made more of an effort to fish for char than they had in the last maybe 10-20 years. So even before the fisheries were closed people still didn't really make an effort to go fishing for char.”** Additionally, a part of the difficulty may be related to inexperience; as your skill as a fisherman grows, you can set fewer nets and still catch as many fish.¹³³

Char TK Study interviewees had varying opinions about whether there was a change in the size of char – some say the trend is for smaller fish, one indicated that there is an increase of large fish in the nets. Abe Peterson indicated that there are both large and small fish in the nets, but the fish stock is so

¹²⁶ Sarah Simon, GEKP interview, December 12, 1996, Fort McPherson.

¹²⁷ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹²⁸ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹²⁹ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.

¹³⁰ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.

¹³¹ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹³² Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson, Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹³³ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.



depleted that you're **"just glad to see them in the net nowadays"** at all.¹³⁴ But any perceived change in size may be related to net mesh regulations as well. The size of the fish **"it is the same, it never change"** but, **"when you never used to have a ban on fishing... people used to just put 3 ½ [inch mesh net] in, you know like herring nets, and catch all different kinds of char. Small ones to the big ones."**¹³⁵ John Carmichael said that biologists have told him that the fish are bigger, even though they appear to be smaller, the fish are 'more chunky' which is why they are smaller or shorter.¹³⁶

Reasons

There are many contributing factors to the decline in char stocks. A few themes emerged from the Char TK Study interviewees.

Major contributors (listed by most interviewees)

- Overharvest
- Having nets completely or mostly across vital migration waterways

Other contributors

- The rivers are changing, including more sandbars and shallow spots.
- Global climate change changing the composition of the water.
- Predation from seals, bears, and other animals.
- Temperature

Abe Peterson has wondered if **"maybe river is changing or something; those sandbars like at Husky River in the fall time, like in August, boy there's a lot of shallow places in the small river places like that."**¹³⁷ See Map 9 (page 46) for the location of sandbars that Abe recorded near the mouth of Rat River.

Another participant heard that a few years ago, biologists went to the Fish Hole in the winter and augered the ice near an underground stream. The upwelling water through the hole may have damaged the fish stocks with fish coming up through the augered hole. He thinks the population may have been affected by this move because there may be separation of different types of char in the different pools at Fish Hole, so it's possible that one group may have been impacted more than others. **"Like I don't know if all females stick together and all males because they don't die when they spawn. Now whether they are male, female, young... or do they all mix up in three different like altogether, which I don't believe so."**¹³⁸ It may be important to follow up with Elders who have spent time at Fish Hole to determine if there is separation of different types of char into different pools. This participant was referring to a 1996 GRRB project to study the overwintering habitat of char. Biologists present at the time of the upwelling indicate that several char and grayling did come through the hole but that the number was low (less than 10 fish). As the number of fish in the population remained stable for several

¹³⁴ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹³⁵ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.

¹³⁶ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

¹³⁷ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹³⁸ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.



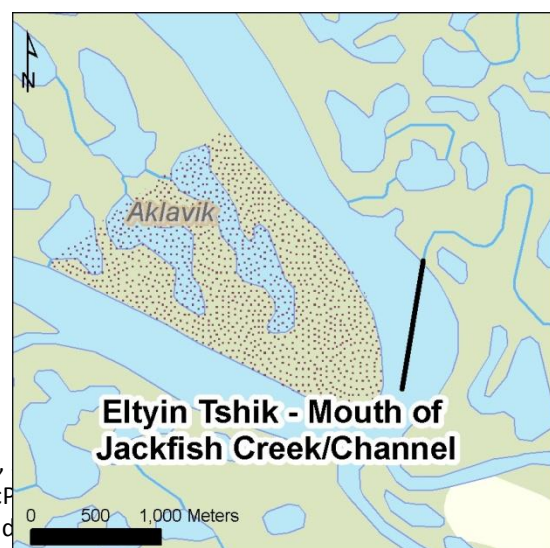
years following and at relatively high abundance, it is unlikely that this particular event (upwelling) was the cause for the large drop in population that occurred between six to eight years later.¹³⁹

Tagging the fish has also been suggested as a reason why the fish population declined in the early 1990s, leading to a period of around seven years with a decreased population. **“There is no more after they tag it, just when it get lots they tag it - next year nothing. For about seven years... I know they bother it, something to do with the tag, that is why it's getting less.”**¹⁴⁰

During the 1990s, you could often see nets for char fishing set almost across channels in the Delta. **“Well they used to do it down there, down in Aklavik... right at the mouth of the Husky River... way back in '90s, I think it was, before our claim.”**¹⁴¹ Caroline Kay agreed that overharvesting was an issue, **“well, they kill them too many, kill them off, I think.”** She also blames the high number of nets that were set.¹⁴²

*It's depleting all those things ... I mean, you got them nets now they're 13 feet deep! So man, they're going to catch everything and, pretty soon there's going to be nothing left... If you don't have some people who think about those things, and you know, realize it, ... there used to be just nets everywhere. [At] West Channel they call it? People set nets there, ...Beaver House, it's right there. They used to set nets around here, and, I mean, all along, all over for char. And so, you know, you catch a few here, and a few there and a few there and a few there and, even, ... in Aklavik. You can't catch them by the hook. You can't catch them in the eddies, they don't go in the eddies! They stay in the main stream. So now, they figured out how to catch them in the stream. ...They set out in the current, but not, not right straight with the current but just on a little angle like this. ... they just find all ways of catching them. And you know if you do, got enough people doing that, well pretty soon, it's going to be nothing left.*¹⁴³

John Carmichael said that overfishing and too many fish nets contributed to the decline, **“Jackfish Channel, [nets would] run right across. You can't do that now, you have to set them down a bit ... I mean you could still do that, you could block it but the thing is you are not supposed to. Those creeks they dry up later on, a lot of them places where the fish come out in the lakes and you can have a net in there maybe for 2-3 weeks when the water drop those fish**



¹³⁹ Steve Sandstrom, personal communication, September 23,

¹⁴⁰ Alfred Francis, GEKP interview, December 5, 1995, Fort McPherson.

¹⁴¹ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.

¹⁴² Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹⁴³ Tommy Wright, April 13, 2007, Aklavik Heritage Zones Project, GSCI



can't get out anymore. No water, it is blocked off." (See inset map for location of Jackfish Channel). He remembered that sometimes, only enough room for a small boat to pass through would be left between nets. **"People have been doing that for years until they change that, stopping them from fishing now so there is no nets in between [Aklavik] and the Big Eddy. But used to be nets all the way."** He specifically identified overharvesting too, **"overharvesting for one thing too, you can't kill millions of fish and expect them to [thrive], something got to go and now with the lower water [levels] of the Rat, that is why it will be real interesting to see what happens this coming year."**¹⁴⁴

There may be or have been a bounty on char in Alaska, where the Kaktovik people **"fish for salmon over there and you know salmon spawn in that area, the char would actually go over there and eat them eggs so the fisheries in Alaska had a bounty out on them. You bring in a char tail or the head and you would actually get a bounty for them."**¹⁴⁵ Char population is also related to rainfall, a fish biologist has told Billy Wilson. After a dry year the char population will be lower. In 2009 the char population was high because the water levels were high and the moss had soaked up a large quantity of rain.¹⁴⁶

Other reasons for the longer-term decline in char stocks were discussed in the original hearings for the Mackenzie Valley pipeline, often called the Berger Inquiry. Lazarus Sittichinli, through an interpreter, said **"about three years ago or less or more, the oil companies went down there and they were blowing up dynamite on the river. He says since that time the fish are not the same, it's not that the fish are less, he says the fish are very poor, sometimes not even fit to eat. We have a run of Arctic char up here, he says all them fish are not the same. He said last summer the fish are getting a little better but on the other hand he say the boys go down here after open season and hunt geese or ducks, he says the ducks are very poor and so are the geese. Also he said there used to be lots of rabbits. There's no rabbits to be seen now, he says."**¹⁴⁷ Seismic activities in the mountains impacted the char.

Gwich'in TEK: Impact of climate change on Dolly Varden Char

Global climate change is of great concern to the Gwich'in. Some of the changes people see in the land have affected the char. The following effects were noted by the interviewees of the Char TK Study:

- Channels and rivers becoming shallower
- Water becoming warmer
- Weather generally changing
- Sandbars are increasing
- Increase in number of willows
- Eddies are disappearing
- Mudslides or landslides are becoming more prevalent
- Smaller creeks are drying out
- More snowfall (some disagreement about this item)

¹⁴⁴ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

¹⁴⁵ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.

¹⁴⁶ Traditional Knowledge Verification Workshop GRRB Rat River Char TK Report, Inuvik, January 7, 2010.

¹⁴⁷ Mackenzie Valley Pipeline Inquiry, Aklavik, N.W.T. February 23, 1976.



However, several interviewees also agreed that rainfall is consistent or not changing drastically. River channels are shallower and warmer, promoting plant growth in them. The water in the Delta and part way up Rat River is shallow but still passable by boat, **“you could pretty well get [there] it is just shallow. It is pretty shallow, you just have know your way around it, that’s all.”**¹⁴⁸ It seems that as though an island may emerge below Destruction City. The shallow water is affecting eddies – possibly making them disappear. **“I mean they used to be deep but now they are getting filled in so they really ineffective in catching fish.”** Willows are more abundant than in the past, and landslides are increasing in the Rat River area over the last two decades, **“especially below Bear Creek ...when I used to go through with skidoo there used to be a canyon ...a big canyon there and when I go up there now there is nothing.”**¹⁴⁹ The area of new landslides on the Rat River is shown on Map 9 (page 46).

Landslides are affecting the channels in the Delta as well. **“Water levels really dropped and banks are really eroded, really falling in.”** It’s especially bad near Aklavik and towards the Husky River.¹⁵⁰ Abe Peterson agreed that the rivers and channels are changing, noticeably the Husky River. In fall 2007 he had taken a boat up the Rat River but was stopped by the shallow water. Some others made it further up by pushing their canoe along with poles, and proceeding very slowly. The river was navigable to this point in the past – the differences are shallowness, mudbars, and sandbars. Abe thought the increase was created possibly during an event where material was washed downstream and settled into sandbars.¹⁵¹

Other changes restrict movement in the Delta even further – some of the smaller channels of the Delta are drying out. John Carmichael said that water levels are lower **“all through the delta”** and that water flow is less. He added that erosion has changed the channels and eddies.¹⁵²

There may also be changes to precipitation, although it might take more time for the new patterns to clearly emerge. Different opinions about changes are held by different fishers. For example, one feels that there is more snowfall but rainfall is consistent.¹⁵³ Another said that snow and rain levels have changed, but not enough to be accurately measured, or possibly it is just a part of cyclical change in weather. He also said that there is a natural process of change in the river channels.¹⁵⁴

Gwich’in TEK: Predation on char

With the declining char stocks, it is important to consider the effects of predation on char.

¹⁴⁸ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

¹⁴⁹ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

¹⁵⁰ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

¹⁵¹ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹⁵² John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

¹⁵³ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

¹⁵⁴ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.



Bears

Black and grizzly bears eat char although it is unclear if the bears are a contributing factor to the decline in the population of char. Abe Peterson said there are a lot of bears around but he hasn't seen them at Fish Hole. He thinks they may eat the fish but aren't as big of a concern as marine mammals.¹⁵⁵

However, Caroline Kay said that the bears are a concern for char, **"bear bother it lots you know, they go in the river, when arctic char come in you could grab them from the water, bear and black bear and grizzly, they all after it."**¹⁵⁶ John Carmichael hasn't been told about bears in the Fish Hole area but is concerned that the shallow water might be increasing the ease with which bears can harvest char.¹⁵⁷

When the population of char is precipitously low, the impact of the bears feeding will probably be greater, in proportion. **"Oh they eat lots too, bad they couldn't somebody couldn't stay there while those fish are passing and chase those bears away, save lots of char."** The bears might feast on the char in the shallow rapids right below Fish Hole.¹⁵⁸ In the mid-1990s, Alfred Semple thought bears may contribute directly to the population decline, **"Before [bears] go back in the den, October, they got to eat to fatten themselves up. They pick up lots of that little trout going up [the Rat River], they eat lots of those. That is why lots of trout gone too, not over-killed by net or anything like that. That is what I believe anyway, not only person; they wasted all that fish, bear and eagle, even fox maybe, anything, we don't know."**¹⁵⁹

Eagles and hawks

Eagles also eat char, but it is unclear if they are a factor in the population decline. **"A lot of fish die on account of bear, that bear or eagle. When they go up in the ripple, the eagle they pick up one fish too."**¹⁶⁰ There are many eagles around the Delta and in the Rat River watershed, **"there is a lot of them in this area this Rat River, eagles every year I go fishing there a lot of eagles, you know they just go in that water and pick up one like that you know, just fast."**¹⁶¹ Eagles have been known to steal fish from nets. Richard Ross indicated that there are more eagles today than in the past, and said that people used to control the eagle population by killing one or two per year.¹⁶² Two fisheries monitors said that there are not large numbers of eagles predating on the char, except at Fish Hole - one noticed eagles in greater numbers around the spawning grounds.¹⁶³

Beavers

Beavers are building dams in smaller back channels up the Rat River and in places where they did not in the past, possibly due to the increasing number of beavers. However, as the dams are not on the main

¹⁵⁵ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹⁵⁶ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹⁵⁷ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

¹⁵⁸ Herbert Firth, March 2006, Arctic Red River Fish Study, GRRB

¹⁵⁹ Alfred Semple, GEKP interview, May 10, 1996, Aklavik.

¹⁶⁰ Alfred Semple, GEKP interview, May 10, 1996, Aklavik.

¹⁶¹ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹⁶² Traditional Knowledge Verification Workshop GRRB Rat River Char TK Report, Inuvik, January 7, 2010.

¹⁶³ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.



channel of Rat River and do not completely cross the rivers they do not prevent char from moving through.¹⁶⁴ Beavers **“are not a concern, their dams ... would never interfere with [char], they are more of a beneficial thing to our environment if there is lots of beavers.”**¹⁶⁵ John Carmichael agreed that beavers aren’t hurting the char, saying they aren’t blocking the river since it’s a deep, swift river that would be difficult for a beaver to dam. He said the beavers go about half way up the Rat River and build their dams and houses on points where the river is wide and bends.¹⁶⁶ Gwich’in used to control beaver populations, but this no longer occurs to the same degree.¹⁶⁷

Abe Peterson said that there are many beavers all over the Delta. He said that beavers have always been around **“they were always there every summer- fall.”** He also said they may be damming some of the smaller creeks along the Rat River.¹⁶⁸ Johnny Charlie supports this statement. He said there are lots of beavers in the back channels of the Rat River but indicated that it’s difficult for them to dam the Rat River Channel. Beavers have dams at the mouth of Fish Creek, but they are not preventing char from migrating, **“because they took photographs and they were on one side. But it is still a concern I mean they shouldn’t be way up there.”**¹⁶⁹ Caroline Kay had also heard that beavers are too numerous in the study area compared to the past.¹⁷⁰

Otters

Otters are a factor in the decline of char stocks; there is a lot of concern about the increase and spread of otters. Although one Aklavik fisher thinks the otter population is not increasing, and hasn’t seen many of them in Husky River; others say that they are a concern.¹⁷¹ Caroline Kay also said that otters eat fish and go in the rivers. She said otters even eat muskrats. **“Otter is worse, I hear people said [they] eat up even rat and we don’t get much rat now. It’s not that good, otter and mink and fox, eagle, they grab anything.”**¹⁷² Abe Peterson said that there are many otters and it is a concern in relation to char stocks, **“they are the ones that could be cleaning them up.”**¹⁷³

I think otters are of concern, there is a lot more otters now than there were in the past. And I think if an otter ever came across a fish hole, it would be very destructive.

Anonymous

Otters may predate on juvenile char in particular.

¹⁶⁴ Traditional Knowledge Verification Workshop GRRB Rat River Char TK Report, Inuvik, January 7, 2010.

¹⁶⁵ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

¹⁶⁶ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

¹⁶⁷ Traditional Knowledge Verification Workshop GRRB Rat River Char TK Report, Inuvik, January 7, 2010.

¹⁶⁸ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹⁶⁹ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

¹⁷⁰ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹⁷¹ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

¹⁷² Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹⁷³ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.



Controlling otter populations has been suggested as beneficial to enable char stocks to return to normal, perhaps with an incentive as they are difficult to trap. Otters are seen in the Big Fish River system as well.¹⁷⁴

Seals

Ring seals eat char on the coast, and have been seen as far up the Delta as the Mouth of Peel when the water is high. Like otters, seals hunt for char and may be partially responsible for the population decline, **“seal could be cleaning them out too them you know, trout.”**¹⁷⁵ There may be too many seals, as part of a complex problem. **“...There is a lot of seals that really plug up, like I travel to the coast and I travel back this way during the fall time you would see some of these little rivers that go out to the ocean from here, they get about five to six seals right inside the main channel and you know, they probably take a lot of fish that comes through. Too many seals I think, that is what is popping off all the fish.”**¹⁷⁶

Other predators

Beluga whales, jackfish, loche, and mink may all predate on char. Jackfish and loche have both been caught with char in their stomachs. Even small jackfish can eat char. Abe Peterson indicated that a beluga was recently seen up the Husky River which was probably predated on char. **“Whale and the seal you don’t know what they are doing out there in the ocean, they could be just coming in the bay there and just eat up all the trout.”** He also saw three or four whales coming into the bay when he was fishing at Herschel Island, he said that they could be eating char there.¹⁷⁷ Caroline Kay indicated that mink also kill fish.¹⁷⁸

Gwich’in TEK: Traditional management practises

In the past, char was generally abundant, so the management of declining populations was not relevant. The stocks stayed high because people fished for what they needed, and what their families needed, and no more. There was a different level of respect for the resource in the past. When char was abundant, fishing practises did not harm the population as people would move to another location if the fishing was poor at one area. **“They will go the fish holes and they would fish there. If they had lack of fish they would go right up to the fish holes back then and take as much char as they want. We used to go up there with dogs.”**¹⁷⁹ John Carmichael said that in the past people would only take what they needed, **“they only take so much.”** There wasn’t the option to fish char commercially and sell it to restaurants or stores in the past, unlike today where char, **“they are pretty easy to sell.”**¹⁸⁰ Alfred Semple remembers seeing sleeping char in Rat River or Fish River after they had already harvested their catch;

¹⁷⁴ Traditional Knowledge Verification Workshop GRRB Rat River Char TK Report, Inuvik, January 7, 2010.

¹⁷⁵ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹⁷⁶ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

¹⁷⁷ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹⁷⁸ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹⁷⁹ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

¹⁸⁰ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.



Well, every creature made in this world they got to have a rest some way, day or night under the water ... Up the Rat River, one time me and one old man, Johnny Kay is his name, and we walk up the creek, we just look around up the creek. We had enough trout already and we see it and under the bank they run maybe ten feet of water, you see all them just in the bottom of the river just like never move ah, just little bit like this. I never ask him, we just seen them laying all up like this under the river floor....They must be sleeping, I don't know.¹⁸¹

He said that an important rule in the past was that you don't catch char 'just to waste it.' People used as much of the fish as possible. Also, a good fish harvest was shared, and Alfred said that he remembers around 1940,

I see that Rat River people, some people, they're poor people, they didn't have decent net, and some good fishermen they got good net and they share. If they get too much trout they give them some, you see. The Gwich'in, whatever they get they share [with] one another, they're doing that ever since way back and they're still today. They're little different today, today what old people does way back and they share whatever, everything what they get, and they help one another. Now today they change quite a bit I'll tell you, the money first now today they're different, old fashioned way is dying now. The money, because everything, they wouldn't give anything away for nothing, you got to have money to buy anything what they...old back old people help one another, never see that again. The money talk.¹⁸²

Although things have changed, many Gwich'in harvesters still share their fish with Elders. Sarah Simon had a freezer full of food, **"I am very happy to say that today still we share. Like me, now I don't go out anywhere, I got my freezer full with fish and meat like that."** She went on to say that in the past, when people fished together, it was common for the work and the fish to be shared, **"if one family, one man get far too many, the women come together and they cut the fish, cut it up. After they finish, they give them what they could give them, so that everybody has the same."**¹⁸³ One difference between the past and now was discipline and respect, **"I am sure that if a guy had enough fish for his family for the year he is not going to continue to fish if he knows it would all spoil in the spring. So I think people just took what they needed, where like now if you and I didn't have a job and we were allowed to go fishing and we said 'OK we need 15 fish each,' well after we get our 15 fish each, we are going to say 'hey let's get more and we will go sell it and make some money...' So all that, it was more disciplined, and [there was more] respect for the resource in the past than there is now."** Newer technology – newer nets, for example – have made a big difference in how many char can be harvested by any one family, **"they didn't even get enough for themselves so they never had to say 'OK, let's quit fishing' because now you can kill as many as you want and then some, back then you struggled for what you**

¹⁸¹ Alfred Semple, GEKP interview, May 10, 1996, Aklavik.

¹⁸² Alfred Semple, GEKP interview, May 10, 1996, Aklavik.

¹⁸³ Sarah Simon, GEKP interview, December 12, 1996, Fort McPherson.



actually got. They were happy for what they got, even though most cases I believe it wasn't enough. ... so I think it has to do with technology and the respect for the resources."¹⁸⁴ Alfred Semple remembered cotton nets coming in to use sometime after 1940.¹⁸⁵

Gwich'in fishers repeat that it is not acceptable to make fun of char (or anything that comes from the land). Food sources are important and respected.

Gwich'in use of and knowledge of Rat River Fish Hole

Ne'eedilee or Fish Hole is a series of spring-fed pools, open year-round, on a tributary of the Rat River called Fish Creek. Gwich'in would travel there in the fall and camp in a group. They fished for char and harvested so much it could be stored for dog feed and trap bait, sometimes as pit fish. The pools were harvested using sweep nets and fish traps.¹⁸⁶ Because the water in Fish Hole is warm – spring-fed, it stays open or doesn't freeze to the ground. Char need warmer water to stay alive.

Caroline Kay went there one time and fished **"long ago when I have three children, I wasn't that old that time, three kids."** She went in late September and harvested many char, **"lots you know we could get thousand in no time, one day. That time, that was long ago when I was this young, we went up there we walk up there me and my husband and my grandpa and grandma and quite a bit of us. James Simon and his wife, and other couples. They sweep nets all day they get lots get about 1000 that time. [It] was lots but that char sneak, the char sneak when it see net it is going around you watch it, the water is so light you watch the fish as soon as he see net he go out and he go around in the middle that is how he save itself."** She said they stayed with numerous other families. People fished with sweep nets, one man would hold the net on one side and another man on the other and the net was walked across. Caroline remembers her son fishing with a small net, and catching juvenile char.¹⁸⁷ Although it hasn't been used for years, one Char TK Study interviewee went with his grandfather when he was only 13 or 14 as well as monitoring fishing **"that year was, would be 2002, catch and release... with fisheries, DFO. Couldn't take any because we were not allowed to."**¹⁸⁸ For fisheries monitoring, interviewees used hook and line, or seine nets. The char can be 'corralled' with the nets - **"you just herd the fish downstream coming behind them with a seine net which is right across the length of the creek and then we get a**



*Caroline Kay in Fort McPherson
Photo – GRRB*

¹⁸⁴ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.

¹⁸⁵ Alfred Semple, GEKP interview, May 10, 1996, Aklavik.

¹⁸⁶ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study; Alfred Semple, GEKP interview, May 10, 1996, Aklavik.

¹⁸⁷ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹⁸⁸ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.



person on the lower side to chase the fish up to one side and then we just sort of surround the fish and pull the lead line underneath them all and contain them in the seine net until we finish tagging them and then we release them unless we tag them.” Gill nets were not used for fisheries monitoring because it’s harmful to fish for tag and release. **“We just use seine nets and barbless hooks on fishing rods.”**¹⁸⁹

*Well, people used to get those long roots and put them in the water. They took the skins off and they made a whole bunch. They gathered and made nets out of it. They tied them together and it was just like nets. They were all white roots, they had them in the water all the time and they never dried up. They were strong, the people made nets out of them then they swept that net into where the trout gathered in that Fish Hole. So by that time, it was about close to the end of August and lots of trout got up there to spawn. People killed lots of trout. Everybody got enough trout by the end of September, and they made dry fish. They made it all kinds of ways. They fixed the fish - dried, split, all kinds of ways they worked with fish so they had good food during the winter time for grub. So every family got enough Arctic Char for grub and after freeze-up in October, middle of October, they started moving away to where they could run into caribou and they killed caribou and made a living that way.*¹⁹⁰

Gwich’in have been using Fish Hole for char for generations. **“As far back as anyone in our culture can remember, there has been people ...using these resources.”**¹⁹¹

There is some confusion about when the Fish Hole was last used. It may have been used as recently as 2000, although several interviewees thought it was used last 20 or 30 years ago. Caroline Kay thought the last use of Fish Hole was a **“few years back.”**¹⁹² However, Alfred Francis may have been using Fish Hole around 1999 or 2000. At that point, char fishermen became concerned that the char stocks were being overharvested. John Carmichael thought the last use was several decades ago. He said people from Fort McPherson used to sweep net fish hole for char and sell them in Inuvik, and his brother, Fred, would fly the fish out.¹⁹³ It is possible that the various answers reflect a trend of declining traditional use of Fish Hole over the last three decades by the Gwich’in. Generally, there is a consensus that the Fish Hole was last used decades ago, in the 1970s.

The Rat River Fish Hole was not salty like the Cache Creek Fish Hole (in the Inuvialuit Settlement Region, about 50 km northwest of Aklavik on Big Fish River) used to be. The water quality is very good and can be used for drinking water, it’s the ‘best water’ – not salty. **“The best water we could get is from the**

¹⁸⁹ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

¹⁹⁰ Roddy Peters, COPE Story, “How people lived in the old days”

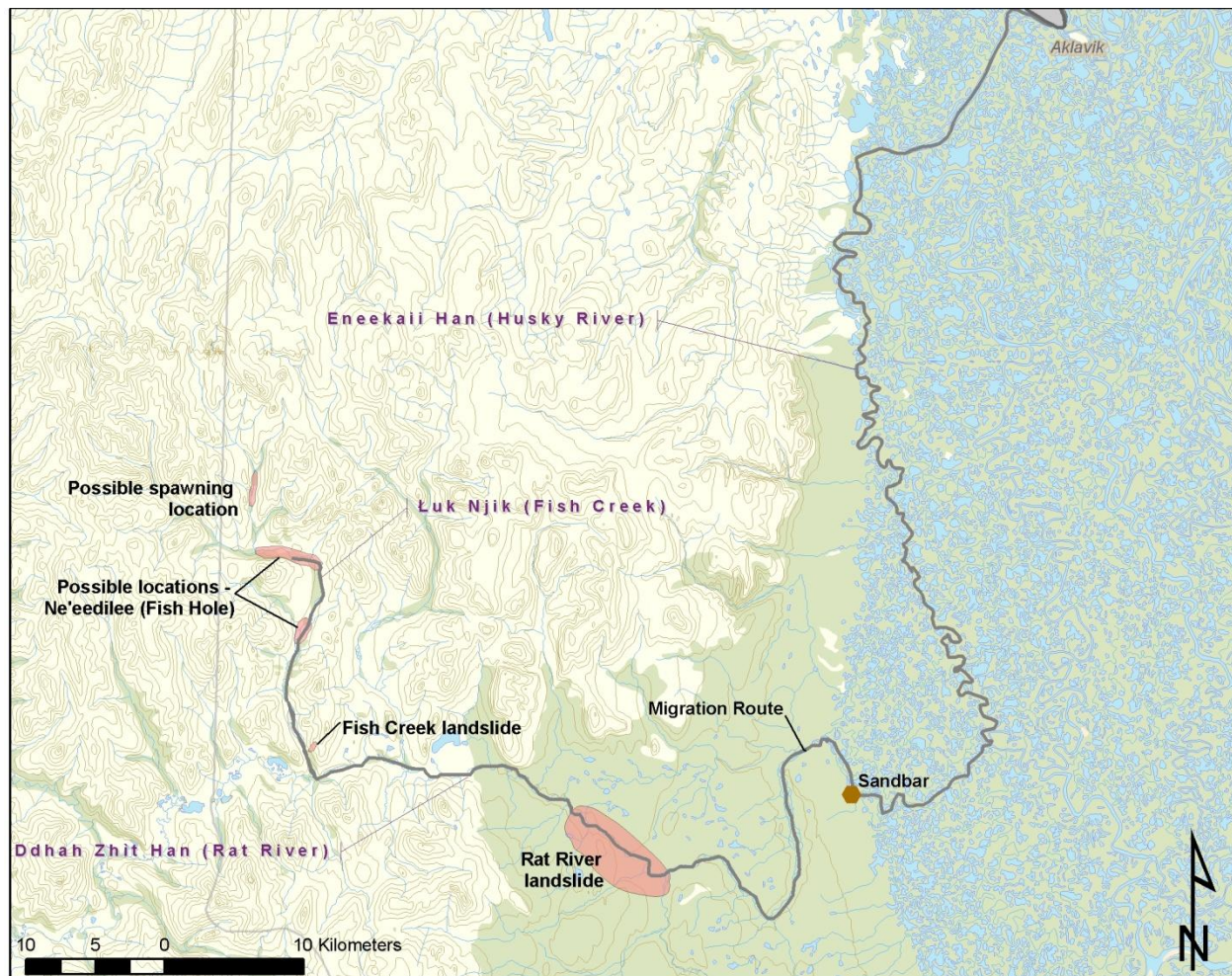
¹⁹¹ Anonymous Gwich’in interviewee, 2008, GRRB Char TK Study.

¹⁹² Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹⁹³ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.



mountain, we drink the water out of the river.”¹⁹⁴ The water in Rat River was always clear mountain water.



Map: Gwich'in Social & Cultural Institute

Map 9. Char TK Study information: Fish Hole, migration routes, landslides, and sandbars

Moving Forward: management of Dolly Varden Char

The current management practises of the Rat River char are supported by the Gwich'in interviewed for the Char TK Study. Many agreed with and all abided by the voluntary closure of the fisheries over the last few years due to the recent population drop. **“Because there is hardly any ... It is good that way because if you just let it go, and peoples go down there and set net, you know, and clean them out more.”**¹⁹⁵ Monitoring of the char is considered important as well.

Population recovery, and a resulting increase in availability of char for Gwich'in use, is the most important goal for the current times – **“I would like to see the trout come back like 1940, when I said**

¹⁹⁴ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹⁹⁵ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.



that time we just set one net.¹⁹⁶ This may mean no fishing, more monitors, and having a solid management strategy – including mesh size. Encouraging char reproduction through research, training, and policy will be key. Information is required to make decisions; and information about the following criteria would help the char fisheries and management to make informed decisions:

1. Ice conditions at Fish Hole
2. Composition of the fall run(s) as determined from a totally closed fishery.
3. Yearly population count from visual count, possibly with the use of helicopter.
4. Predation of char.

John Carmichael agreed that the mesh size requirement is acceptable, and believes that the numbers have been slowly increasing again over the last three years. He indicated that it is important to work with the Inuvialuit, have monitors at key locations, and share information.¹⁹⁷ Caroline Kay says that the voluntary closure is appropriate, **“they want fish to be kept good so we could get more fish later.”**¹⁹⁸

Gwich'in char fishers do not specify numbers when determining a healthy population of char; they view the char population as a functioning whole. The char population will reach a healthy number when the fisheries is open and the nets are full like they were in the past, sustainably.¹⁹⁹ This may take years. John Carmichael said the population needs to be quite a bit higher than it was in 2007.²⁰⁰ However, since the use of char is declining, it might not matter how much the Gwich'in are using it, **“nobody hardly eats char anymore. This day and age everything is bought from the store.”**²⁰¹ John Carmichael thinks the char fisheries will always have to be managed, but hopes that younger monitors will be trained to replace him and the other monitors.²⁰²

*I'll tell you a little story about living out in the bush. Living out in the bush, I really enjoy it. All summer we work with fish. Making dry fish. Then we fish for trout down at Rat River at Destruction City. We got fish house there... My husband set eight nets. Then we start making dry fish. Real lots of trout, looking at eight nets can bring lots of fish. Then we sent two of our boys up to McPherson with loads of trout to put into deep freeze. Then my two boys go hunting for caribou in the mountains too, during that time we pick blueberries and cranberries. For two summers the berry patch wasn't so good. My sons bring back load of caribou when they're lucky. For moose it's not so good. We get rabbits and we get ducks too. So we make a good living.*²⁰³

¹⁹⁶ Alfred Semple, GEKP interview, May 10, 1996, Aklavik.

¹⁹⁷ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

¹⁹⁸ Caroline Kay, March 27 2008, GRRB Char TK Study, Fort McPherson.

¹⁹⁹ Abe Peterson, March 27 2008, GRRB Char TK Study, Fort McPherson.

²⁰⁰ John Carmichael, April 1, 2008, GRRB Char TK Study, Aklavik.

²⁰¹ Anonymous Gwich'in interviewee, 2008, GRRB Char TK Study.

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Appendix One: Char monitors and fall technicians

List from Steve Sandstrom's presentation to the GRRB board meeting in Feb 2009.

Char Monitors

Selwyn Kay (20 years service)

John Carmichael (14)

Billy Wilson (7)

Ben Mitchell (5)

Dale Semple (3)

Victor Firth (1)

late Joe Vittrekwa (3)

Lazarus Francis (1)

Fall Technicians

Ben Mitchell (1)

Leslie Snowshoe (1)

Woody Elias (1)

Dale Semple (1)

Doug Wilson (1)

Stephen Tetlich (3)

Ryan McLeod (3)

Ian McLeod (1)

Joe Illasiak (2)

