

# Big Fish River Fishing Plan: *Community Harvest of Char at Shingle Point, the Mouth of the River and the Fish Hole*

---

## **Aklavik Hunters and Trappers Committee, 2014**



*A proposal submitted by the Aklavik Hunters and Trappers Committee for consideration by the Dolly Varden Integrated Fisheries Management Plan Steering Committee:*

- Amy Amos, Gwich'in Renewable Resources Board*
- Larry Dow, Fisheries and Oceans Canada*
- Vic Gillman, Fisheries Joint Management Committee*
- Diane Wilson, Parks Canada*

## Table of Contents

<b>Purpose of the Big Fish River Fishing Plan .....</b>	<b>3</b>
<b>Background.....</b>	<b>3</b>
<b>Scope of Big Fish River Fishing Plan .....</b>	<b>7</b>
<b>Current Monitoring, Management and Research Programs, Harvest Levels and Communications .....</b>	<b>7</b>
<b>Big Fish River Fishing Plan .....</b>	<b>9</b>
Shingle Point.....	9
Mouth of the Big Fish River .....	10
Big Fish River Fish Hole and Nearby Pools.....	10
<i>Program Coordinator and Sampling Crew .....</i>	<i>11</i>
<i>Training – Animal Care Protocols for Fish Research.....</i>	<i>12</i>
<i>Timing .....</i>	<i>12</i>
<i>Location.....</i>	<i>12</i>
<i>Collection Methods.....</i>	<i>13</i>
<i>Sampling Methods.....</i>	<i>14</i>
<i>Harvested Dolly Varden Char – Distribution to Community.....</i>	<i>15</i>
<i>Educational Opportunities.....</i>	<i>15</i>
<b>Conclusion .....</b>	<b>16</b>
<b>References.....</b>	<b>17</b>

## Purpose of the Big Fish River Fishing Plan

The purpose of the Big Fish River Fishing Plan is to present a community harvest plan for Big Fish River char. Fishers from Aklavik and members of the Aklavik Hunters & Trappers Committee have outlined existing details of the char harvest at Shingle Point and the mouth of the Big Fish River, as well as proposed methods for a harvest at the Big Fish River Fish Hole area. The proposed char harvest at the Fish Hole would be a coordinated harvest effort by a handful of community fishers, who would then return and distribute the harvested char to community members. The harvest would include sampling of char to learn more about the stock, and the methods that are proposed aim to address concerns and conditions listed by the Minister of Fisheries and Oceans Canada in a letter sent to the Aklavik Hunters & Trappers Committee in February 2014.

## Background

Canadian populations of the northern form of Dolly Varden char (*Salvelinus malma malma*; referred to as char by community members from Aklavik as well as throughout this document) are found west of the Mackenzie River along the Beaufort Sea coast and within Northwest Territories and Yukon rivers. Within this “West Side” area, anadromous char spawn and overwinter within the Big Fish, Rat, Firth, Babbage and Vittrekwa rivers (see Figure 1 for map of the West Side and important char rivers in the area), and migrate to the sea coast to feed in summer after they have reached approximately 3-4 years in age (Gallagher et al. 2011, Gallagher et al. 2013). After feeding along the coast, char generally return to their natal river as they display strong site fidelity (e.g., Sandstrom and Harwood 2002). The Inuvialuit and Gwich’in have fished char from this area for decades, with the use of some sites, such as the Big Fish River Fish Hole, for generations (Byers 1993). Through their subsistence use of West Side rivers and their observations while on the land, the Inuvialuit observed the decline in char numbers in the Big Fish River in the 1980s, as well as large habitat changes (e.g., reduced salinity and water depth at the Fish Hole and other pools) over the years. The decline in the stock led to a DFO closure of the Big Fish River to all fishing in 1987. Twenty-seven years later the Big Fish River remains closed to subsistence fishing of char, and it appears that the habitat changes that have occurred along the river have created a new, lower carrying capacity (i.e., reduced fishing pressure has not resulted in stock recovery, but the stock appears stable at a new reduced level).

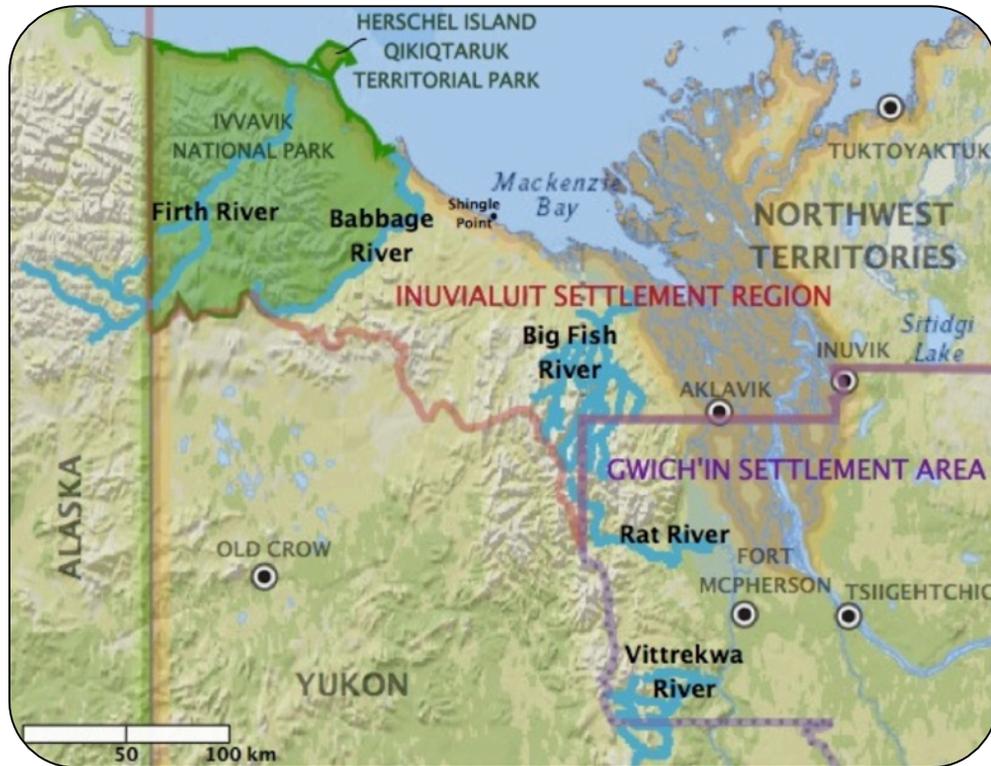


Figure 1. “West Side” area and important Dolly Varden char rivers (highlighted in blue).

Since the closure of the Big Fish River in 1987, the Aklavik Hunters and Trappers Committee (AHTC) has worked with Fisheries and Oceans Canada (DFO), the Fisheries Joint Management Committee (FJMC), Parks Canada (PCA), Yukon Territorial Parks, the Gwich'in Renewable Resources Board (GRRB), and Gwich'in Renewable Resource Committees to improve knowledge of char stocks as well as the co-management process for char on the West Side. The progress that has been achieved over the past 27 years (see Table 1 for a general timeline of Big Fish River char management events) has required trust and cooperation among working partners and has culminated in the creation of the Integrated Fisheries Management Plan (IFMP) for Dolly Varden of the Gwich'in Settlement Area and Inuvialuit Settlement Region (DFO 2010), which outlines general “rules” aimed at ensuring char can be fished and managed sustainably in the area. The West Side Working Group (WSWG) was also established with efforts focused on the co-management of char in the West Side area within the Inuvialuit Settlement Region (ISR). The WSWG reviews harvest, monitoring and research on an annual basis and makes recommendations on the allowable harvest levels for the Big Fish River based on indicators of stock health. The WSWG has also established 4 objectives to guide efforts around the co-management of char. These objectives, along with how these are addressed (in italics) are listed below:

1. To ensure the long-term sustainability of northern Dolly Varden, with a target population abundance that is not less than 1 standard deviation below the mean of the most recent population estimates (3-5 years) in the Big Fish River.

- *The Big Fish River has had an approved recommended harvest level of 150 char since 2012. This harvest level for the Big Fish River, along with the expected harvest of 25-35 Big Fish River char at coastal sites such as Shingle Point is less than 5% of the current estimated population size of 3,844.*
2. To ensure at least an allowable harvest of 150 adult Dolly Varden in the Big Fish River for cultural and traditional purposes.
    - *The recommended harvest level of 150 Big Fish River char has been approved for 2014.*
  3. Future changes in Recommended Allowable Harvests for the Big Fish River (up or down) will be based on changes in the population size in the Big Fish River as determined by an agreed upon “traffic light process”. This process will include scientific and traditional knowledge indicators from the mixed stock coastal fishery and the Big Fish River in an adaptive co-management regime. Thresholds for change will be transparent and agreed to by all parties in the development of the process.
    - *Indicators were reviewed at the March 2014 WSWG meeting in Aklavik and indicated that the population appears stable under the current harvest level; thus, the recommended harvest level for the Big Fish River was maintained at 150 char.*
  4. Fishing in the fish holes in the Big Fish River will be permitted following approval from the Minister of Fisheries and Oceans and following agreement on harvest method.
    - *Conditions outlined by the Minister of Fisheries and Oceans in February 2014 (see Table 1) have been addressed in the proposed harvest plan for the Fish Hole area within this document.*

These collaborative efforts in the West Side have resulted in improved working relationships among various stakeholders and improved understanding of the char stocks in the area.

In January 2014, the AHTC made a formal request to the Minister of Fisheries and Oceans, Gail Shea, to lift the DFO fishing closure on the Big Fish River. This request was based on the stability of the Big Fish River char population (at a smaller population size), the importance to the community to return to this traditional fishing site, the knowledge that the recommended annual harvest level of 150 char could be fished from the Fish Hole and nearby pools with minimal damage to char habitat, and that the first 3 objectives of the WSWG had already been met. This proposed plan aims to address the conditions outlined by the Minister of DFO in February 2014 (see Table 1), in response to the AHTC’s request to lift the Big Fish River fishing closure, as well as build upon the successful co-management of West Side char.

Table 1. Major events timeline for Big Fish River char management.

Year	Event
1986	<ul style="list-style-type: none"> <li>Community concerns on reduced numbers of Big Fish River char. After consultations with DFO, the community requests formal closure of the fishery in hopes that this would allow the population to recover.</li> </ul>
1987	<ul style="list-style-type: none"> <li>DFO closure of all char fishing in the Big Fish River.</li> </ul>
1999	<ul style="list-style-type: none"> <li>Aklavik HTC request to harvest 300 char from the Big Fish River.</li> <li>FJMC discussions with representatives from the Aklavik HTC and DFO highlighting the need for a working group and a fishing plan for West Side char.</li> <li>Approval for AHTC harvest of 200 silver char from the Big Fish River Fish Hole from FJMC and DFO (granted under a DFO scientific license).</li> </ul>
2001	<ul style="list-style-type: none"> <li>Letter from the Minister of DFO telling the FJMC and DFO to develop a management plan for char.</li> <li>FJMC establishes the West Side Working Group (WSWG) to begin working on a comprehensive fishing and management plan for rivers west of the Mackenzie River.</li> </ul>
2001-2010	<ul style="list-style-type: none"> <li>Development of the WSWG: meetings with co-management partners and to inform the public, compiling data, establishing broad objectives, performing a local knowledge study on fish, reviewing harvest numbers along with research and monitoring results. The work on the integrated fisheries management plan for char became more focused over time.</li> </ul>
2010	<ul style="list-style-type: none"> <li>Northern form of Dolly Varden char listed as a species of Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC)</li> <li>Integrated Fisheries Management Plan (IFMP) for Dolly Varden of the Gwich'in Settlement Area and Inuvialuit Settlement Region, Northwest Territories and Yukon North Slope, 2011-2015 finalized.</li> </ul>
2011	<ul style="list-style-type: none"> <li>Dolly Varden IFMP Steering Committee formed by senior officials from DFO, FJMC, Parks Canada and the GRRB, who are tasked with overseeing the work and recommendations made by the WSWG and the Rat River Working Group.</li> </ul>
2012	<ul style="list-style-type: none"> <li>Introduction of an indicators monitoring approach to the WSWG.</li> <li>The Dolly Varden IFMP Steering Committee approves the WSWG request to harvest 150 char from the mouth of the Big Fish River. A harvest monitor was hired to sample harvested char.</li> </ul>
2013	<ul style="list-style-type: none"> <li>Inuvialuit from Aklavik began developing potential indicators for the new monitoring program, with a focus on their local knowledge.</li> <li>The Dolly Varden IFMP Steering Committee approves the WSWG request to harvest 150 char from the mouth of the Big Fish River for the second year. A harvest monitor was hired to sample harvested char.</li> </ul>
2014	<ul style="list-style-type: none"> <li>January: AHTC letter sent to the Minister of DFO requesting that the DFO closure on the Big Fish River be lifted</li> <li>February: Letter of response to the AHTC from the Minister of DFO stating "<i>As Minister of Fisheries and Oceans, I agree to consider allowing harvesting at the Big Fish River "fish holes" in the future under the following conditions:</i> <ul style="list-style-type: none"> <li><i>The WSWG and the AHTC must describe how the harvesting at the Big Fish River "fish holes" could take place in a manner that minimizes impacts to this critical habitat and the sustainability of this Dolly Varden population;</i></li> <li><i>The regular harvest of Dolly Varden at the mouth of the Big Fish River must already have been completed;</i></li> <li><i>The total harvest must not exceed the recommended level for that year; and</i></li> <li><i>The DFO Director of Northern Operations, IFMP Steering Committee and the FJMC must be in agreement with the proposed harvest plan."</i></li> </ul> </li> </ul>

## **Scope of Big Fish River Fishing Plan**

This fishing plan provides a brief overview of current monitoring, management and research programs, harvest levels and communications, as well as a description of existing and proposed Big Fish River char harvest and monitoring at Shingle Point, the mouth of the Big Fish River, and the Big Fish River Fish Hole. This plan does not provide detail on DFO licensing procedures around the Big Fish River closure or describe DFO research and monitoring programs, with the exception of how these may relate to fish harvest. While this plan does not go into detail on how the potential future listing of the northern form of Dolly Varden char under the Species At Risk Act (SARA) may affect future char management plans in the area, it is believed that the proposed plan could work effectively within a broader char management plan developed by DFO and local stakeholders. This fishing plan is proposed for 2014; in future years, plans will be reviewed and modified as needed by co-management partners following the principles of adaptive co-management.

## **Current Monitoring, Management and Research Programs, Harvest Levels and Communications**

West Side char are cooperatively managed by a number of stakeholders dedicated to the long-term health and sustainability of char stocks. To facilitate the effective co-management of char resources in the West Side, two working groups (West Side Working Group - WSWG, Rat River Working Group - RRWG) have been established to bring together co-management partners to discuss research and monitoring results and make recommendations on harvest levels on an annual basis. The WSWG and RRWG focus on the Big Fish and Rat River stocks, respectively; however, both working groups discuss concerns as well as research and monitoring results from other char stocks in the area (e.g., Babbage, Firth, and Vittrekwa). These working groups provide a forum for concerns to be raised, for new initiatives to be developed, and for improved communication between working partners. Both working groups provide their recommendations to the Dolly Varden Integrated Fisheries Management Plan Steering Committee (formed by senior representatives from DFO, FJMC, GRRB and PCA) that review and approve proposed changes to fishing plans (DFO 2010). A summary of the research and monitoring programs and harvest levels supported by the WSWG in 2014 is presented in Table 2.

Table 2. Char research, monitoring and harvest levels supported by the WSWG for 2014.

<b>WSWG (AHTC, FJMC, DFO, PCA, Yukon Territorial Parks) - 2014</b>	
Support for research and monitoring	<ul style="list-style-type: none"> <li>- Population assessment of North Slope Dolly Varden: Howland &amp; Gallagher, DFO               <ul style="list-style-type: none"> <li>• Harvest monitoring at Shingle Point, Ptarmigan Bay and Herschel Island</li> <li>• Mark-recapture population assessments in the Big Fish and Babbage Rivers</li> </ul> </li> <li>- ACES / Shingle Point CBM Program: Loseto, DFO               <ul style="list-style-type: none"> <li>• Collection of near shore fish species and environmental / oceanographic variables for analyses at Shingle Point</li> <li>• Supports the Tarium Niryutait Marine Protected Area Monitoring Program</li> </ul> </li> <li>- Big Fish River Dolly Varden Harvest Monitoring: Lea, DFO               <ul style="list-style-type: none"> <li>• Harvest monitoring at the mouth of the Big Fish River (Note: work supported; however, the AHTC has decided to focus on the proposed harvest at the Fish Hole area in 2014 instead of this program run at the mouth of the river).</li> </ul> </li> <li>- Ecological thresholds of Dolly Varden in the Canadian Western Arctic: Mochnacz, DFO               <ul style="list-style-type: none"> <li>• Habitat research in West Side char rivers</li> <li>• Focus on water temperature and level monitoring and potential effects on spawning habitat availability</li> </ul> </li> <li>- Nearshore marine habitat use of Arctic Salmonidae (Dolly Varden, Arctic Cisco, Pacific Salmon): Dunmall, DFO, University of Manitoba               <ul style="list-style-type: none"> <li>• Habitat research in West Side char rivers</li> <li>• Habitat use by Salmonidae and potential interactions between species</li> </ul> </li> </ul>
Annual harvest level	AHTC: 150 char from the Big Fish River

For the Big Fish River, there has been an approved annual harvest level of 150 char since 2012, and Big Fish River char are currently harvested at Shingle Point and the mouth of the Big Fish River. Recommended annual harvest levels are conservative to ensure sustainability of the stock; the 150 char for the Big Fish River is less than 5% of the most recent population estimate of 3,844 (5% of 3,844 = 192), as recommended by the IFMP. The 150 char from the Big Fish River was allocated to the mouth of the Big Fish River in 2012 and 2013 where a harvest monitor was stationed. It is assumed that 25-35 Big Fish River char may also be harvested at coastal fishing sites such as Shingle Point each summer, as this has been assessed through harvest monitoring and genetic analyses (see Table 3 for a breakdown of the char harvest at Shingle Point by river stock); however, the coastal harvest does not come out of the Big Fish River harvest level. With the addition of up to 42 coastal Big Fish River char to the allocation of char for fishing at the river, the total harvest will remain below 5% of the estimated population size.

Table 3. Char harvested at Shingle Point from 2011 to 2013, and the number (#) and per cent (%) by char stock (Firth, Babbage, Big Fish, Rat, Vittrekwa), as determined by genetic analysis (data presented by Colin Gallagher (DFO) to the WSWG in March 2014).

Year	2011		2012		2013	
# of char harvested	189		236		115	
Stock	%	#	%	#	%	#
Firth / Alaska	7	13	4	9	6	6
Babbage	69	130	89	210	38	43
Big Fish	13	25	2	5	31	36
Rat	10	19	5	12	25	29
Vittrekwa	1	2	0	0	1	1

The success of monitoring and management programs is in large part due to good community participation in reporting their char harvest and the development of an effective communication plan. Communication strategies are discussed in working group meetings and advertised within communities prior to each fishing season. Char monitors at Shingle Point and the Rat River are responsible for weekly reporting of their char harvest throughout the duration of their contracts. The AHTC and Ehdiitat and Tetlit Renewable Resource Committees (RRCs) are responsible for keeping their community harvesters up to date on programs and harvest levels, and reporting community and monitor harvest numbers to DFO and GRRB staff. The GRRB Fisheries Biologist summarizes all harvest numbers into a report that is provided to co-management partners on a weekly basis. This reporting strategy has worked well to ensure fishers are informed when recommended annual harvest levels have been reached (or nearly reached) so that they can stop harvesting char.

## Big Fish River Fishing Plan

The proposed fishing plan for Big Fish River char outlines the current and proposed harvest, harvest reporting and sampling plans for Shingle Point, the mouth of the Big Fish River, and the Big Fish River Fish Hole and Nearby Pools.

### Shingle Point

A harvest-monitoring program run by DFO and the AHTC aims to record total char harvest at Shingle Point as well as sample as many harvested char as possible to improve our knowledge of the stocks. Char monitors record char harvest through good communication with local fishers, and local fishers often use fishing diaries (DFO “Green Books”) to record their catch throughout the fishing season. The char sampling methods used at Shingle Point include the collection of a char fin clip that will be used in genetic analyses to determine which river each char is from (e.g., Big Fish River, Babbage River, Rat River, etc.). This allows DFO researchers to determine with good accuracy the number

of Big Fish River char that are harvested annually from this popular fishing site. Char monitors report char harvest numbers for Shingle Point on a weekly basis to the AHTC office and the DFO Fisheries Management Biologist in Inuvik. The Shingle Point harvest monitoring program and results are reviewed annually by the WSWG to ensure it continues to be run effectively.

### Mouth of the Big Fish River

Following the principles of the IFMP, a Big Fish River char harvest level of 150 was approved from 2012-2014. In 2012 and 2013, this harvest level was used for a fishery at the mouth of the Big Fish River where a harvest monitor was stationed. From 2012-2013 the char monitor harvested the majority of char that were caught at the mouth of the Big Fish River (see Table 4 for the number of char harvested at the mouth of the river in 2012-2013). While not fished by a large number of community members, the DFO variation order to allow gillnet fishing at the mouth of the river in August should be continued to allow more subsistence harvesting options for the community. For 2014, the AHTC will allow up to 30 char to be harvested at the mouth of the Big Fish River. Fishers will be responsible for reporting their catch to the AHTC, who will then share this information with other co-management partners (no harvest monitor is planned for 2014). Any char harvested from the mouth of the Big Fish River will be counted and removed from the allocation of 150, prior to the proposed harvest at the Fish Hole area.

Table 4. Monitoring dates and number of char harvested at the mouth of the Big Fish River in 2012 and 2013.

Monitoring dates	# of char harvested	Notes
August 7-19, 2012	29	Program likely started late → assumed that the majority of the char run was missed
August 6-11, 2013	61	Lot of rain in July → high water levels and debris in water. Generally poor fishing conditions.

### Big Fish River Fish Hole and Nearby Pools

The proposed community harvest plan for the Fish Hole and nearby pools on the Big Fish River would allow the community of Aklavik to harvest an important subsistence fish in a traditional fishing area, and is not expected to negatively affect the char stock or habitat. The proposed methods and locations follow those used by DFO during their fall mark-recapture program in the Big Fish River Fish Hole area, and were selected to minimize damage to fish and their habitat. This program will be run with DFO staff present who will be working cooperatively with and providing training to the community sampling team. The program will be run after the DFO mark-recapture program and after the char have spawned, and the harvest level of 150 char for the Big Fish River will not be exceeded. The allocation amount that remains after the community harvest at the mouth of the river will be subtracted from the total harvest level; the remaining amount is

proposed for harvest at the Big Fish River Fish Hole area. The main objectives of this program are to:

- Allow the community to harvest char at one of their traditional sites after a nearly 30-year closure
- Build community capacity through research and monitoring training (e.g., DFO collection and sampling methods), and the development of leadership skills
- Build on existing scientific knowledge of Big Fish River char with more thorough sampling of harvested fish (i.e., there is little to no dead-sampling of char in the existing mark-recapture program)
- Involve youth and Elders to allow sharing of traditional knowledge about this important site, as well as allow community members to learn more about scientific sampling and research methods
- Provide an important traditional subsistence food to the community of Aklavik

The following methods describe the AHTC's proposed harvest plan for the Big Fish River and adjacent pools. These methods were developed by AHTC members as well as fishers and Elders from the community of Aklavik who are familiar with this area as well as management concerns. DFO and FJMC staff provided feedback and support in the development of these plans.

#### *Program Coordinator and Sampling Crew*

The AHTC will select 5 community members who are well suited for this work (e.g., previous harvest experience at Big Fish River Fish Hole and other pools, experience working on DFO monitoring and research programs, good knowledge of existing management programs for char) to ensure the successful delivery of this program. Of these 5 community members, one will be assigned as the Program Coordinator and the other 4 will be responsible for the collection and sampling of char. An outline of general responsibilities of each position are listed below:

- 1) Program Coordinator: Facilitate coordination with co-management partners (e.g., DFO, FJMC) and field crew; and assist with logistical planning of program.
- 2) Field Crew Leader: Coordinate and work with DFO staff to ensure collection and sampling methods are well understood by sampling crew prior to harvest; providing leadership and assigning tasks to sampling crew; ensure that the outlined plan is followed while in the field; working with DFO and field crew to solve problems, should any arise during harvest.
- 3) Field Crew Members (3): Review collection and sampling methods with DFO staff and Field Crew Leader; work with Field Crew Leader to collect and sample char; record data; assist with the return of harvested char to the AHTC.

### *Training – Animal Care Protocols for Fish Research*

Prior to the harvest at the Big Fish River, the field crew and other interested residents of Aklavik will be given the opportunity to increase their knowledge of Canadian animal care protocols by taking the online Experimental Fish course that is provided by the University of Prince Edward Island (University of Prince Edward Island, 2014). Community members already show great respect for the animals they harvest by minimizing disturbance and handling time; however, this course will be aimed at increasing the field crew's knowledge of Canadian fish handling protocols used by agencies such as DFO. The AHTC will work with the FJMC to coordinate this training session in August or September of 2014. Some of the main components of this course include:

- Experimental animal care and use
- Ethical issues of experimental animal use
- Fish as a research animal
- Aquatic animal care and husbandry
- The role and structure of the Canadian Council on Animal Care
- Recognizing pain, stress and distress in aquatic animals
- Aquatic animal identification and monitoring

### *Timing*

It is anticipated that this harvest program will require approximately 2-3 days for travel to and from the Fish Hole area by snowmobile and to complete the collection and sampling of char. This program will be run at the time of year that this area was traditionally used by community members, prior to the closure of the fishery, and will be completed between October 10<sup>th</sup> and 30<sup>th</sup>, 2014. Big Fish River char generally spawn in the river between late July and September (Gallagher et al. 2013) so the timing of the proposed harvest should not impact char spawning success. The specific dates of the work will depend on local conditions (i.e., 3-4 inches of snow will be required for travel to the Fish Hole area by snowmobile); the Program Coordinator will work with the field crew and DFO to finalize the dates for this work in fall pending DFO approval.

### *Location*

The proposed harvest locations for this program include the Fish Hole and other pools along upper reaches the Big Fish River (highlighted in yellow in Figure 2). This area is a traditional fishing site for the community of Aklavik and has been seined by DFO biologists for char tagging programs (e.g., Gallagher et al. 2013, Sandstrom and Harwood 2002). Specific pools to be sampled within this outlined section of river will be determined on site by the Field Crew Leader in coordination with DFO staff.

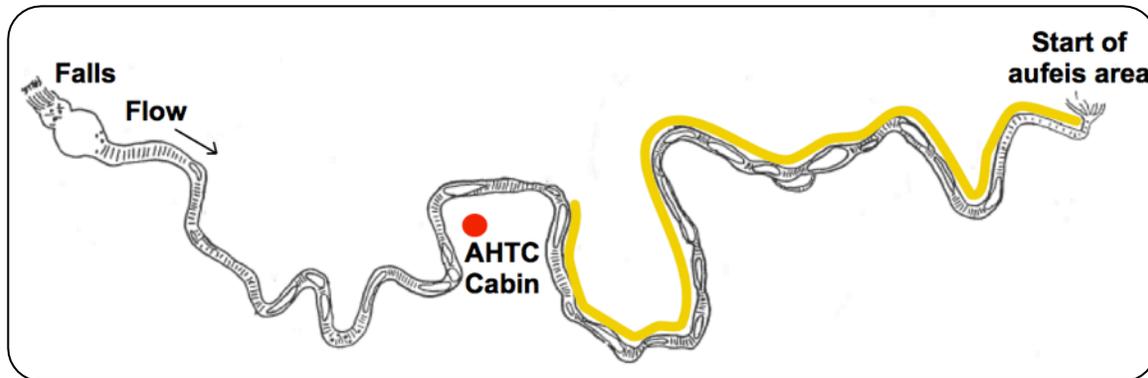


Figure 2. Big Fish River (Little Fish River) Fish Hole area with falls, AHTC cabin (red circle; located at 68°17'48"N, 136°21'48"W) and start of aufeis area marked for reference. The section of the river proposed for seining is highlighted in yellow, with specific pools to be sampled to be determined on site.

### Collection Methods

The field crew will be following the collection methods that have been used in local DFO mark-recapture programs in the Big Fish River (Gallagher et al. 2013) and Fish Creek (Sandstrom et al. 2009). A summary of these methods follows:

- One modified 16 m long seine net with small mesh size (to minimize fish injury and mortality) will be used to capture fish (see Sandstrom et al. (2009) for further details on net specifications). Note: this net can be borrowed from DFO under the condition that DFO staff is present to ensure proper use and maintenance.
- Three members of the field crew will use the seine net to capture fish – one person on each end of the net, and the third person in the middle of the net to provide assistance as needed (i.e., to un snag the net if it gets caught on rocks or debris in the river) and help deter fish from swimming upstream while seining.
- At each pool to be sampled, the field crew will extend the seine net to cross the width of the stream at the upstream limit of the pool. The net will then be swept at an angle slowly downstream across the length of the pool. When nearing the end of the pool, the person holding the seine net on the far side of the river will quickly sweep their end of the seine net at an angle towards the opposite shoreline, while the fourth crew member splashes a branch in the water while moving in an upstream direction towards the seine net. This splashing will assist with herding fish into the seine net. Once both ends of the seine net have reached one side of the shore, the ends of the net will be lifted out of the water, with the center of the net left in the water functioning as a pen for the captured fish.
- Throughout the seining process, the number of people walking in the river and the number of seines passes per pool will be minimized to limit the amount of disturbance to fish and fish habitat.
- The field crew will track the number of fish harvested while seining, and will not exceed the harvest level for the Big Fish River. The upper limit of char harvested in this program will be dependent on the number of char

harvested at the mouth of the Big Fish River during the summer (i.e., the number of char harvest at the mouth of the river will be subtracted from the harvest level of 150 char for the Big Fish River).

### *Sampling Methods*

After sweeping each pool, captured fish will be sampled on site by the field crew. The field crew will record the basic set of information that follows, on all captured fish:

- Species
- Reproductive status for anadromous species (i.e., non-spawner / silver or spawner)
- Sex, if distinguishable (i.e., anadromous fish with sex-specific spawning characteristics)
- Fork length
- Tag number and colour, if present on dorsal fin

Fish that are not desired for harvest will be immediately released in the water after basic information has been recorded for each fish. The field crew will work in an efficient and organized manner to minimize the handling of fish throughout this process. Non-target fish that will be released alive include:

- Char that were tagged in the September 2014, DFO mark-recapture program
- Char – male spawners (not consumed by community members because of taste preferences)
- Fish that are less than 6 inches in length
- Fish species that are not consumed by community members

Additional sampling will be performed on harvested fish to improve our knowledge of the Big Fish River char stock. Increased knowledge of the stock is expected through more thorough sampling of char and an anticipated larger sample size, in comparison with the fall mark-recapture program (fish generally released alive), and the harvest-monitoring program run at the mouth of the Big Fish River in 2012 and 2013, respectively. The proposed dead-sampling methods for harvested fish are variable because taste can be affected by whether or not the fish is cut or sampled before freezing for some traditional ways of eating char (e.g., raw and frozen). The proposed dead-sampling methods were selected as a compromise between the valuable information collected through the thorough sampling of char and the traditional consumption practices of Elders and other community members:

- Char, tagged in the mark-recapture program in 2013 or earlier years
  - Weight, sex, maturity, gonad weight (when possible), otoliths, small tissue sample (contaminants testing), fin clip (genetics), kidney (viruses)
- Char, approximately 6-10 inches in length (silvers): up to 20 char of this size to be harvested for Elders

- Weight, fin clip (genetics)
- Char, greater than 10 inches in length
  - All: weight, fin clip (genetics)
  - Up to 100 char: otoliths
- Char, silvers
  - All: weight, fin clip (genetics)
  - Up to 35 char: sex, maturity, gonad weight (when possible), otoliths, small tissue sample (contaminants testing), kidney (viruses)
- Char, female spawners
  - All: weight, fin clip (genetics)
  - Up to 10 char: sex, maturity, gonad weight (when possible), otoliths, small tissue sample (contaminants testing), kidney (viruses)
- Species other than char
  - Grayling will be harvested for the community
  - Other species will be decided by field crew and DFO on site

It is anticipated that the relative proportions of char silvers (non-spawners) and female spawners harvested in this program would be approximately 40% and 60%, respectively (Colin Gallagher, personal communication).

Note: all sampled char will be vacuum-sealed in the field to ensure they are kept fresh for the community.

#### *Harvested Dolly Varden Char – Distribution to Community*

The field crew will return all harvester char to the Aklavik HTC who will be responsible for distributing these fish to community members.

#### *Educational Opportunities*

This proposed program would benefit the community through the harvest of a traditional food source; however, it is likely that the largest benefit to the community from this work will be meaningful educational opportunities. The field crew will be trained by DFO staff on seining and sampling methods and will have the opportunity to complete a course on protocols for experimental work with fish. This valuable training will increase their research and monitoring skills, providing them the expertise to increase their role in the local management of char in the future. The importance of the Fish Hole to residents of Aklavik and the reduced travel to this area since the closure of the fishery provides another educational opportunity around the sharing of traditional knowledge (TK). A separate Big Fish River program will be developed by the WSWG TK Indicators Group (includes members from the AHTC and fishers from Aklavik, with FJMC and ISR Community-Based Monitoring Program staff support) that focuses on the collection of TK and selecting TK indicators that may be used to assist the WSWG with management decisions (in conjunction with scientific knowledge).

Details of this TK program require further development; however, initial feedback from the community indicate that Elders should be involved to share their knowledge, youth should be involved to learn and document the program through the creation of a report, and this program should be run alongside the harvest program (pending approval) so that more community members can learn about the seining and sampling methods used by DFO for fish research. The TK program will likely incorporate water quality sampling, recording habitat and environmental observations, and documenting any signs of predation around the Fish Hole or other pools. Participants in the TK program will stay out of the river to prevent any additional disturbance to fish and fish habitat.

## Conclusion

This proposed program has the potential to benefit residents of Aklavik and the AHTC, as well as co-management partners such as DFO and FJMC. For the community, community-capacity towards monitoring and management will be increased, knowledge of the char stock will increase, TK knowledge will be shared, a traditional food source will be provided, and the community will have the opportunity to return as a group to one of their culturally important areas. For DFO and FJMC, this is an opportunity to learn more about the char stock, learn more about the TK of char, as well as an opportunity to support the community of Aklavik working towards the management of their own resources. Significant progress has been made in the co-management of char in the West Side over the years and the proposed harvest program will be a significant achievement in this process. As with all work related to the management of char on the West Side, this plan will be evaluated by the WSWG to determine if and how it should be modified in future years.

## References

Byers, T. 1993. Aklavik Traditional Knowledge – Big Fish River: a study of indigenous wisdom in fishery science. Report produced for the Aklavik Hunters and Trappers Committee, Aklavik, NT.

DFO. 2010. Integrated Fisheries Management Plan for Dolly Varden (*Salvelinus malma malma*) of the Gwich'in Settlement Area and Inuvialuit Settlement Region Northwest Territories and Yukon North Slope 2011-2015. Volume 1: the plan. 25 p.

Gallagher, C.P., Howland, K.L., Harris, L.N., Bajno, R., Sandstrom, S., Loewen, T., and Reist, J. 2013. Dolly Varden (*Salvelinus malma malma*) from the Big Fish River: abundance estimates, effective population size, biological characteristics, and contribution to the coastal mixed-stock fishery. DFO Can. Sci. Advis. Sec. Res. Doc. 2013/059. v + 46 p.

Gallagher, C.P., Roux, M.-J., Howland, K.L., and Tallman, R.F. 2011. Synthesis of biological and harvest information used to assess populations of northern form Dolly Varden (*Salvelinus malma malma*) in Canada. Part II: Big Fish River. DFO Can. Sci. Advis. Sec. Res. Doc. 2010/115. 45 p.

Sandstrom, S., Harwood, L., and Howland, K. 2009. Status of anadromous Dolly Varden char (*Salvelinus malma*) of the Rat River, Northwest Territories, as assessed through mark-recapture and live-sampling at the spawning and overwintering site (1995-2007). Can. Tech. Rep. Fish. Aquat. Sci. 2842: vi + 68 p.

Sandstrom, S., and Harwood, L.A. 2002. Studies of anadromous Dolly Varden (*Salvelinus malma*) (W.) of the Big Fish River, NT, Canada, 1972-1994. Can. Manuscr. Rep. Fish. Aquat. Sci. 2603. 39 p.

University of Prince Edward Island, 2014. 2014-2015 Course Schedule: Experimental Fish, <http://stage.upei.ca/lifelonglearning/course/experimental-fish-0> (June 25, 2014)