

FISHERIES PROTECTION SELF-ASSESSMENT SERIOUS HARM IMPACTS DETERMINATION RECORD

February 2016 - V 2.0 – GNWT DOT

Tłıchq All Season Road

Project Name: Tłıchq All Season Road

Water body Types(s): Freshwater, large rivers, small creeks, permanent intermittent and ephemeral, and braided water courses.

Course of Action:

1] Risk management decision is low risk

→ Proceed without review by DFO

2] Risk management decision is NOT low risk

→ Further review options to try and achieve low risk

→ Request for review to be submitted to DFO

Next Steps:

The following mitigation measures must be a component of the works to mitigate liability under the *Fisheries Act*:

- Any in-water works must be done between July 16th and September 14th of any given year or when frozen solid or dry.
- Ensure fish passage by using the DFO guidance on culvert velocities and invert. Bridge major crossings with full spans and bank abutments above the ordinary high water mark.
- Using best management practices and through the implementation of the GNWT Department of Transportation - Erosion and Sediment Control Manual, ensure the following:
 - o Install appropriate and effective sediment control measures before beginning the work. Ensure sediment control measures are inspected regularly during the course of the work and all necessary repairs are made if damage is discovered (i.e. you see silt or sediment entering the water outside of the work area).
 - o Stabilize any waste materials removed from the work site to prevent them from entering any waterbody.
 - o All disturbed areas should be stabilized and/or re-vegetated upon completion of work and restored to a pre-disturbed state or better.
 - o Maintain effective sediment and erosion control measures until the site has stabilized.
 - o Materials installed for stabilization (e.g. rock) should be clean and free of fine particulates, and are not to be taken from below the high water mark or shoreline of any waterbody.

Assessor: Stu Niven – DOT Environmental Affairs - GNWT

Date: February 17th, 2016

FISHERIES PROTECTION SELF-ASSESSMENT SERIOUS HARM IMPACTS DETERMINATION RECORD

February 2016 - V 2.0 – GNWT DOT

Tłıchq All Season Road

Project Location: The location of the 94 km all-season road begins at KM 196 along Highway 3 and continues in a northwesterly direction to the municipal boundary of Whatı. The alignment is situated within the geographic coordinates 62°28'54" to 63°10'37" N latitude and 116°29'07" to 117°00'05" W longitude.

The proposed corridor is entirely contained within the Wek'èezhıı area and begins approximately 40 km southwest of Behchokò off Highway 3. Approximately 17 km of the road is located on Tłıchq private lands.

There are 16 tributaries along the alignment, which include four major water crossings. The names and locations of the main water crossings are listed in Table 1 while Table 2 provides a comprehensive listing of the crossings (includes culverts).

Table 1 Main Water Crossings

Name/Location	River Width	Total Bridge Length (m)	Approx. KM Location (Station)
Duport River 62°43'48" N 116°50'21" W (Crossing 8)	1.2 m + 8.3 m offline floodplain pond + 50-75 m floodplain	48 (24m + 24m; 2 span pre-cast concrete girder)	40.40
Unnamed Tributary 62°46'13" N 116°48'51" W (Crossing 9)	8.3 m +	24 (1 span, pre-cast concrete girder)	45.18
James River 62°58'26" N 116°54'43" W (Crossing 14)	12.2 m +	80 (20m +40m +20m; 3 span steel girder type)	68.37
La Martre River 63°06'34" N 116°58'33" W (Crossing 15)	26.6 m +	100 (30m+40m +30m; 3 spans steel girder type)	85.40

FISHERIES PROTECTION SELF-ASSESSMENT SERIOUS HARM IMPACTS DETERMINATION RECORD

February 2016 - V 2.0 – GNWT DOT

Tłıchq All Season Road

Table 2 All Water Crossings (values may change slightly during detailed design phase)

Crossing No.	Station	Crossing Description	Specifications
1	2+032 2+377	1x1200 CSP at 2+032 1x1200 CSP at 2+377	1200 CSP; 1200 CSP
2	3+206 3+216	2x1400 CSP	CSP
3	7+839 7+859	2x1400 CSP	CSP
4	13+228 13+233 13+238	3x1400 CSP	CSP
5	16+532	1x2430 SPCSP, 10% embedment	SPCSP
6	19+427 19+432.5	2x2430 SPCSP, 10% embedment	SPCSP
7	23+584.4 23+594.4	2x1400 CSP	CSP
8 - Duport River	40+400	24 + 24 = 48 meter 40+374.1 to 40+422.1	2 spans, precast concrete girder
9	45+175	24 meter clear span 45+163.7 to 45+187.7	1 span, precast concrete girder
10a	48+208.8	3660x1910 Arch culvert	Arch Culvert; corrugation profile and thickness to be determined
10	48+275.5	1x1200 CSP	CSP
11	54+480.6 54+522.6	2x1400 CSP	CSP
12	56+556.4	1x1000 CSP	CSP
13	62+692.3 62+702.3 62+712.3	3x1400 CSP	CSP
14 - James River	69+666	20 + 40 + 20 = 80 meter 69+626.5 to 69+706.5	3 spans, steel girder type
15 - La Martre	85+397	30 + 40 + 30 = 100 meter 85+347.1 to 85+447.1	3 spans, steel girder type

All Corrugate Steep Pipe culverts are embedded 10%

FISHERIES PROTECTION SELF-ASSESSMENT SERIOUS HARM IMPACTS DETERMINATION RECORD

February 2016 - V 2.0 – GNWT DOT

Tłı̨chq All Season Road

Summary of the relevant information considered and documentation of DOT’s analysis when making a risk based determination of “serious harm to fish” as per the legislative obligations under the *Fisheries Act*.

Project Description – provide a brief description of the Project and the component works, undertakings or activities (w/u/a) that **have the potential to impact fish and fish habitat**.

Project: New Build - 16 water crossings, four having bridges, one arched culvert, the rest with SPCSP/CSP culverts no more than 25 meters in length.

Component W/U/A:

Pathways of Effects identified: Vegetation clearing, excavation, industrial equipment use, grading, explosives, water extraction, water flow, structure removal, placement of material, dredging, debris management, fish passage.

1. Erosion and sediment controls
2. Temporary access over watercourses
3. New crossings built.

CRA Fishery – Identify if the fish potentially impacted by the proposed w/u/a are part of or support a fishery.

Commercial Recreational Aboriginal Fish that support

Of the four major crossings, one watercourse is un-named and the other three watercourses are the Duport, James and La Martre Rivers. These watercourses would support a fishery. It is assumed Arctic Grayling, Northern Pike, and Burbot may utilize the watercourses.

Habitat Description – Provide a brief description of the existing fish habitat in the Project area for the fish species identified above, potentially impacted by the w/u/a (include type and quantity).

The habitat on some rivers are permanent flowing cold water and will have spanning bridges, although some will have piers in the floodplain. The smaller crossings will have culverts sized as per the DFO guidance on 10% embedded invert and velocities to allow for fish passage that may be needed. This is the first permanent road in this area following an existing recently un-used seasonal transportation corridor. This means that up until recently, the watercourses were snow-filled and vehicles crossed them. The habitat type is common except for the three named rivers, which will have bridges. The habitat types for all culvert crossings are not rare or sensitive to disturbance. This assessment assumes full access from any and all fish typical in this area. The watersheds involved are pristine to near pristine.

FISHERIES PROTECTION SELF-ASSESSMENT SERIOUS HARM IMPACTS DETERMINATION RECORD

February 2016 - V 2.0 – GNWT DOT

Tłıchq All Season Road

QUESTIONS	DESCRIBE YOUR ASSESSMENT
<p>1. Measures to avoid and mitigate impacts</p>	<p>Identify measures used to avoid and mitigate impacts on fish or habitat for specific project component w/u/a</p>
<p>Has DOT designed and located the project, and included standard or site-specific measures to avoid and mitigate impacts to fish and fish habitat?</p>	<p>Yes</p> <ul style="list-style-type: none"> • The four major water crossings will have bridges, some piers within the floodplain, but with the abutments a distance back from the shoreline edge. To mitigate any potential fish passage issues, DFO guidance will be incorporated into the design so that the culverts will be embedded 10% below the invert so as to negate any perching of the culverts, and will be sized as follows: <ul style="list-style-type: none"> ○ Culverts less than 25 m long, velocities should not exceed 1.0 m/s at 3DQ10 ○ Culverts greater than 25 m long, velocities should not exceed 0.8 m/s at the 3DQ10 ○ Culverts greater than 40 m long, velocities may be limited to 0.6 m/s at the 3DQ10 • The work areas will be isolated from the active channels. Standard northern mitigations such as working when the watercourse is dry or frozen solid, or using silt curtains and erosion fencing so as to provide erosion and sediment controls until the site has stabilized. Clean local fill will be used and the slopes will be stabilized to prevent erosion into the water body. • Road alignment has been altered to allow for right angle crossings, along a straight section of watercourse, and at a narrow section of the watercourse. Road alignment has been adjusted to minimize the number of crossings. • Use temporary crossing structures or other practices to cross streams or waterbodies with steep and highly erodible (e.g., dominated by organic materials and silts) banks and beds. For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (e.g., swamp mats, pads) if minor rutting is likely to occur during fording. Cross when frozen solid. • Be ever mindful of permafrost, eliminating or fully mitigating and permafrost disturbance.
<p>Are there additional design/location or site-specific mitigation measures that can be applied to avoid and mitigate impacts to fish and fish habitat?</p>	<p>Yes</p> <ul style="list-style-type: none"> • In-water works to be restricted between July 16th to September 14th of any given year or when the crossing location is frozen solid or dry to protect all potential fish that may use this stream during their sensitive periods of their life cycle.

FISHERIES PROTECTION SELF-ASSESSMENT SERIOUS HARM IMPACTS DETERMINATION RECORD

February 2016 - V 2.0 – GNWT DOT

Tłıchq All Season Road

2. Residual Project Impacts	Describe the residual impacts anticipated for each w/u/a
<p>a) Following avoidance and mitigation, will there be residual impacts to CRA fish or their habitat?</p> <p><input type="checkbox"/> death of fish?</p> <p><input checked="" type="checkbox"/> permanent alteration to fish habitat?</p> <p><input type="checkbox"/> destruction of fish habitat?</p>	<p>Yes</p> <ul style="list-style-type: none"> • No death of fish. • No fish passage issues. • No infilling of the watercourse other than fill around the new culverts. • No channel realignments. • No destruction of fish habitat as spanning bridges and culverts embedded enabling native substrate continuity. • Permanent alteration of habitat at the culvert locations, but not harmful as fish passage will be maintained where required (2007 DFO Water Crossing Position Statement; DFO fish passage velocity criteria) • Permanent infill at the bridge pier locations. None are located in any watercourse, but some will be in the floodplain. • Stream dynamics are not destabilized due to the crossing infrastructure. Culverts are sized to accommodate fish passage and are embedded to allow native substrate to fill the culvert bottom. Bridges will span the ordinary high water mark. • Alterations at these locations are not harmful in terms of serious harm to an Aboriginal, Commercial, or Recreational fishery.
3. Considerations for Serious Harm	Summary – analysis used to consider whether a project is likely to cause serious harm to fish requiring an authorization.
<p>Is the unavoidable residual serious harm to fish likely to result in “a localized effect to fish populations or fish habitat in the vicinity of the project”?</p>	<p>No</p> <ul style="list-style-type: none"> • There is no residual serious harm to fish. • This type of habitat is abundant throughout that entire area and fish are likely to be minimally impacted. All watersheds involved are pristine to near pristine and habitat is not limiting in any way. • Major water course crossings will utilize bridges.

FISHERIES PROTECTION SELF-ASSESSMENT SERIOUS HARM IMPACTS DETERMINATION RECORD

February 2016 - V 2.0 – GNWT DOT

Tłı̨chq All Season Road

Assessment of Sensitivity of Fish and Fish Habitat			
Attribute	Sensitivity	Examples/Measure	Rationale for Scale Ranking
Species Sensitivity Sensitivity of species to short term change (alteration or disruption) in environmental conditions, such as suspended sediments, bottom substrate, aquatic or riparian vegetation, or water temperature.	Low <input type="checkbox"/>	No use by fish or species present are resilient to change and perturbation (e.g. most cyprinid species);	Northern Pike and cyprinids are expected to be in many of the crossings. Arctic Grayling are expected in any of the major crossings. Arctic Grayling have high sensitivity. All others moderate.
	Moderate <input checked="" type="checkbox"/>	Species present are moderately resilient to change and perturbation (e.g. bass, pike, walleye and some cyprinids)	
	High <input checked="" type="checkbox"/>	Species present are highly sensitive to perturbations, temperature, etc. (e.g. many salmonidae, COSEWIC species, END / THR ESA species)	
Species' Dependence on Habitat Use of habitat by fish species. Some species may be able to spawn in a wide range of habitats, while others may have very specific habitat requirements (e.g. over-wintering habitat, nursery, rearing habitat).	Low <input type="checkbox"/>	No direct use by fish; habitat has the potential to support only single-use life-cycle function (e.g. marginal spawning, migration, rearing, feeding, or over-wintering) non-specialized habitat; or Indirect / contributing habitat	Areas could be spawning or nursery habitat for Northern Pike and migratory fish such as Arctic Grayling, Northern Pike, and Burbot may require continued fish passage as it relates to existing conditions.
	Moderate <input checked="" type="checkbox"/>	Habitat has the potential to support multiple life-cycle functions (e.g. spawning, migration, rearing, feeding, and over-wintering)	
	High <input type="checkbox"/>	Important (e.g., site specific spawning such as upwellings) or specialized habitat (e.g., over-wintering) that is essential to the survival of species or populations. Critical Habitat for END/ THR Schedule 1 SAR. Habitat for Schedule 1 Special Concern Species	
Rarity The relative strength of a fish species or population, or prevalence of a particular type of habitat. Consideration should be given to cumulative effects of all existing developments in a water body. * Where the scale for species or habitat is different select the most appropriate scale	Low <input checked="" type="checkbox"/>	Habitat/species is/are prevalent and are widely distributed in the province/territory or water body where the work is being undertaken (e.g. rock bass, white sucker)	Cumulative effects are not an issue as there is very little development in this otherwise pristine area. Apart from the major crossings, with this habitat type being very prevalent in the region, the fish and habitat is not considered rare.
	Moderate <input type="checkbox"/>	Habitat/species has/have moderate distribution confined to small areas in the province/territory or water body where the work is being undertaken	
	High <input type="checkbox"/>	Species/habitat is rare/limiting (e.g., SC, THR and END SARA Schedule 1 species, and critical habitat under SARA COSEWIC listed species, END/THR ESA, other fish/habitat identified in Fish Management Plans);	
Habitat Resiliency Habitat resiliency refers to the ability of an aquatic ecosystem to recover from changes in environmental conditions. Consideration of the physical characteristics of the stabilization design is important in predicting the resiliency of the affected freshwater ecosystem (i.e. preserving its function). Consider residual impacts such as the stability of the immediate and adjacent fish habitats as a result of the stabilization design.	Low <input type="checkbox"/>	Thermal regime, physical characteristics, unsuitable for fish species or warmwater baitfish systems that are stable and resilient to change – typically ephemeral and some intermittent systems where habitat is non-specialized	The watercourses range from permanently flowing to intermittent to ephemeral or braided. Most of these crossing sites would be suitable for fish. The Le Martre, Duport and James Rivers can be considered cold water but the habitat type at all the crossing locations are not specialized.
	Moderate <input checked="" type="checkbox"/>	Warmwater (more sensitive fish species) and coolwater systems; system is unstable, but resilient to change and perturbation. Intermittent systems with habitat that is specialized, permanent flowing warmwater systems and coldwater systems without specialized habitat	
	High <input type="checkbox"/>	Coldwater systems that cannot buffer temperature changes with specialized habitat (e.g., spawning and nursery).	

FISHERIES PROTECTION SELF-ASSESSMENT SERIOUS HARM IMPACTS DETERMINATION RECORD

February 2016 - V 2.0 – GNWT DOT

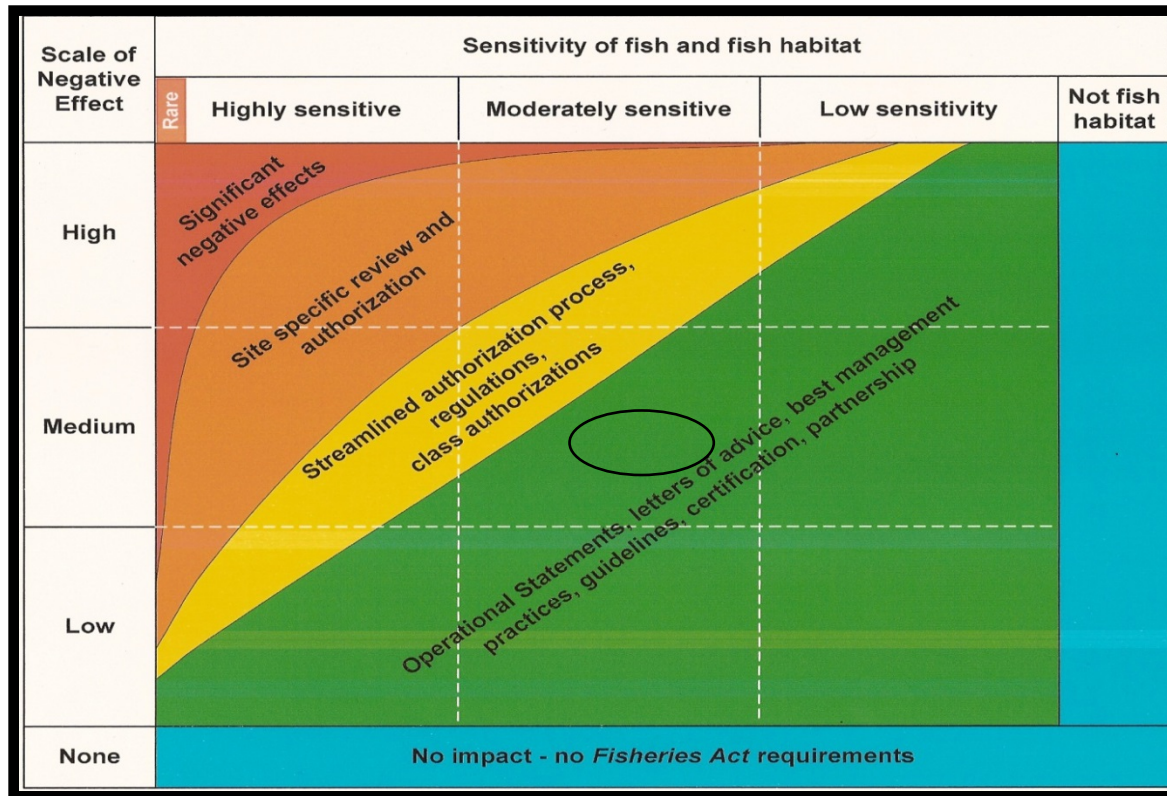
Tłı̨chq All Season Road

Assessment of Scale of Negative Effects			
Attribute	Scale	Examples/Measure	Rationale for Scale Ranking
<p>Extent (size) Refers to the direct "footprint" of the proposal in fish habitat, including riparian areas, as well as adjacent areas that may be indirectly affected.</p> <p>The ecological unit where the work is being completed should be considered when assessing the extent of the project and determining the footprint size.</p>	<p>Low <input checked="" type="checkbox"/></p>	Site or segment, localized effect (e.g. no greater than one meander wavelength); or small portion of ecological unit.	For the culvert installations, within the pristine ecological unit or eco-reach, the area in question being affected is relatively small. For the bridges at the major crossings, the extent is even smaller as they are full span or with piers in the floodplain only.
	<p>Medium <input type="checkbox"/></p>	Ecological unit moderately reduced in size, length of watercourse impacted – greater than one meander wavelength (e.g. channel reach or lake region)	
	<p>High <input type="checkbox"/></p>	Majority of ecological unit impacted,(e.g. stream channel length reduced more than one meander wavelength) would include impacts to an entire watershed or lake	
<p>Duration The amount of time that a residual effect will persist. Includes construction, re-stabilization and long term impacts (use of natural stabilization approaches will often reduce duration).</p>	<p>Low <input type="checkbox"/></p>	Short term (days – a few weeks).	The road works are expected to be permanent.
	<p>Medium <input type="checkbox"/></p>	Medium term (months - year).	
	<p>High <input checked="" type="checkbox"/></p>	Long term (multiple years – permanent).	
<p>Intensity The expected amount of change from the baseline condition. Intensity is a way of describing the degree of change, such as changes in shoreline processes, groundwater flow, suspended sediment, bottom substrate, aquatic and riparian vegetation, etc.</p>	<p>Low <input checked="" type="checkbox"/></p>	Altered habitat still suitable but not as productive; or Changes to habitat productivity are acceptable as per FMP	Relative to the ecological unit or eco-reach, the intensity of change is low, as the habitat in the location of the crossings will not be affected on the major crossings, but may be marginally reduced at the smaller crossings.
	<p>Medium <input type="checkbox"/></p>	Habitat quality significantly reduced; or Changes to habitat productivity are acceptable as per FMP	
	<p>High <input type="checkbox"/></p>	Altered habitat not suitable; significant change to habitat productivity that may compromise FMP; no value compared to existing, or has been permanently removed (e.g. infilled)	

FISHERIES PROTECTION SELF-ASSESSMENT SERIOUS HARM IMPACTS DETERMINATION RECORD

February 2016 - V 2.0 – GNWT DOT

Tłı̨chq All Season Road



Categorize risk by plotting a uncertainty oval on the Risk Assessment Matrix.

Use a Point, circle or oval depending on uncertainty.

A red box labeled "Rare" is located at the most highly sensitive end of the axis and is meant to represent fish and fish habitats that are particularly rare and/or afford special protection under the Species at Risk Act

Risk Management Decision	Risk	Rationale for Risk Decision
Provide rationale for <i>Scale of Negative Effect, Sensitivity of Fish and Fish Habitat</i> Rankings as well as Risk Decision factoring in the answer to Question 3.	Low Risk ☒	The major crossings will have bridges so at these crossings even with some piers in the floodplain, it is very low risk. The spans are designed to the ordinary high water mark and beyond. For the other crossings, it is low risk as the culverts are sized to address hydrological, fish passage and ice management concerns. Although any impact is permanent, this habitat type is abundant in the nearby area and regionally. Any physical impacts to fish and fish habitat due to the new highway is not likely to result in "a localized effect to fish populations or fish habitat in the vicinity of the project".
	Medium Risk ☐	
	High Risk ☐	
	Significant Effects ☐	

FISHERIES PROTECTION SELF-ASSESSMENT SERIOUS HARM IMPACTS DETERMINATION RECORD

February 2016 - V 2.0 – GNWT DOT

Tłjchq All Season Road

References:

- 1] Tłjchq All-season Road Project Description Report
- 2] DFO Fisheries Protection Program website www.dfo-mpo.gc.ca/pnw-ppe/fpp-ppp/index-eng.html
- 3] DFO Water Crossing Position Statement dated April 10, 2007
- 4] DFO Risk Management Framework Worksheet, version January 2012
- 5] DFO Fisheries Protection Program Serious Harm/SAR Impacts Determination Record, November 2014, version 1.0
- 6] Peake, S.J. 2008. Swimming performance and behaviour of fish species endemic to Newfoundland and Labrador: A literature review for the purpose of establishing design and water velocity criteria for fishways and culverts. Can. Manuscr. Rep. Fish. Aquat. Sci. 2843: v + 52p.
- 7] Fish Passage Rules e-mail from Tara Schweitzer, DFO Transportation C&A office (Regina), January 29, 2015.