



Fisheries  
and Oceans

Pêches  
et Océans

Fish Habitat Management  
Suite 101, 5204-50<sup>th</sup> Avenue  
Yellowknife, Northwest  
Territories  
X1A 1E2

Your file *Votre référence*

Our file *Notre référence*

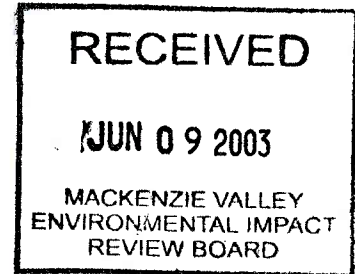
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June 9, 2003

MVEIRB  
Box 938, 5102-50<sup>th</sup> Ave  
Yellowknife, NWT

Hand Delivered

Attention: Alan Ehrlich



**RE: Western Geco, Mackenzie/ Liard Rivers 2D Seismic Program- DFO Technical Report**

Dear Alan,

The Department of Fisheries and Oceans, Fish Habitat Management – Western Arctic Area (DFO) has reviewed the environmental assessment submitted by WesternGeco for the above mentioned program as well as all relevant information requests and responses. Based upon this information, I am submitting the following technical report on behalf of DFO. As per the department's mandate, DFO's assessment takes into consideration primarily fish and fish habitat related concerns.

DFO is acting as an expert advisor and responsible minister for the purpose of this environmental assessment.

**Specific Comment**

**Behavioural effects on fish as a result of the seismic program**

Reference: ToR Section 4.9 Aquatic Resources, EA Report Section 9.2.2.2 (page 116 & 118)

**Developer's Conclusion:**

Based on test results, WesternGeco has predicted that the Project will have a minimal effect on the behaviour of fish populations within the Project area, and that "herding" of fish will not occur in the Mackenzie and Liard rivers as a result of the Project.

**DFO's conclusion:**

Due to study design limitations, DFO does not believe that the conclusions on fish behaviour are conclusive enough to make these predictions. Based on the fact that sound of greater than 160 dB (levels that cause changes in fish behaviour according to existing literature) is travelling much further in the water than originally anticipated by Western Geco prior to the test program, DFO believes a precautionary approach should be taken. One approach would be to reduce the size of the airgun array. However, testing with

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1500, 1200, and 1000 cubic inch airgun arrays demonstrated that only the 1500 cubic inch airgun array could obtain the quality of data required by WesternGeco. Therefore, DFO accepts the use of the 1500 cubic inch airgun array. The approach that DFO would like to see implemented is the use of shutdown areas at sensitive locations in order to give these areas an added buffer from any potential effects as well as providing an area for fish to move to if there is any herding activity taking place. DFO has compiled a list of shutdown areas (attached) based on consultation with DFO biologists, traditional harvesters, Renewable Resource Boards, Renewable Resource Councils, available literature, and other regulators.

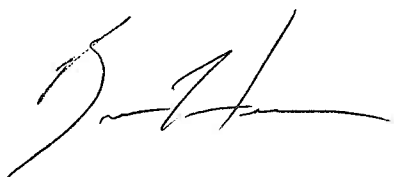
### **Recommended Mitigation Measures**

The following are general mitigation measures for the Project, many of which are in WesternGeco's EA report.

1. Ramp-up procedures should be conducted every time seismic operations are to resume. This is to allow fish in the area to leave prior to firing airguns at full volume.
2. Airguns should be shut down for at least one hour out of every six, to avoid the potential of "herding" fish for prolonged periods of time. **In Western Geco's information request response (1.2.21) dated May 11<sup>th</sup>, 2003 Western Geco states that this precautionary measure has been added. Shutdowns due to maintenance etc. are expected, therefore shutdowns will likely occur more frequently than every 6 hours.**
3. Fish monitoring (looking for dead or stunned fish) should be conducted by monitors on board the seismic vessel as well as in small boats in front of and behind the seismic vessel. Shoreline monitoring should also be conducted where possible (around communities).
4. If any injured (stunned) or dead fish are observed, airgun operation should cease. Any injured or dead fish should be collected, appropriately labelled and frozen. **The fish should be preserved in such a way that they can be examined using electron microscopy if deemed necessary.** DFO should be contacted immediately ((867)777-7500 or (867)669-4900)).
5. Areas of known sensitivity should be avoided (i.e. no shooting of airguns in prescribed area) in order to offer maximum protection to fish and fisheries resources (see attached).
6. All activities including maintenance procedures and refuelling of the seismic vessel should be controlled to prevent the entry of petroleum products, debris, or other deleterious substances into the water.
7. Any fuel storage on the seismic vessel should have secondary containment (such as doubled walled tanks) that is sufficient to ensure that fuel will not be able to enter the water.
8. All waste should be disposed of in an appropriate manner that ensures no negative impacts to fish and fish habitat
9. A spill contingency plan should be made available to all persons required to work on the seismic vessel and followed in the event of a spill.

10. All spills of oil, fuel, or other deleterious material should be reported immediately to the 24-Hour Spill Line at (867) 920-8130.

If you have any questions, please contact me at (867) 669-4931 or Pete Cott at (867) 777-7520.

A handwritten signature in black ink, appearing to read 'Bruce Hanna', written in a cursive style.

Bruce Hanna  
Habitat Biologist  
Fish Habitat Management  
Department of Fisheries and Oceans- Western Arctic Area

Cc: Pete Cott, Area Habitat Biologist, DFO

Region	Sensitive Area	Shut Down Zone/ Avoidance Area	Rationale	Source
<i>Gwich'in Settlement Area</i>				
	Point Separation		<ul style="list-style-type: none"> <li>- Used extensively for fishing</li> <li>- Suspected and known important congregating and spawning areas.</li> </ul>	<ul style="list-style-type: none"> <li>- Western Geco, February 2003</li> <li>- Jennifer Walker-Larsen, Fisheries Biologist- GRRB (pers comm.)</li> </ul>
	Arctic Red River	1 km downstream of river mouth to 1 km upstream of river mouth	<ul style="list-style-type: none"> <li>- Used extensively for fishing</li> <li>- Suspected and known important congregating and spawning areas.</li> <li>- Traditional fishing; for Inconnu peak July 15 to August 15, for broad whitefish peak August 15 – September 1, for lake whitefish peak September 1- 15.</li> </ul>	<ul style="list-style-type: none"> <li>- Western Geco, February 2003</li> <li>- Jennifer Walker-Larsen, Fisheries Biologist- GRRB (pers comm.)</li> <li>Dan Andre, Traditional Gwich'in Harvester (pers comm.)</li> </ul>
	Tree River	1 km downstream of river mouth to 1 km upstream of river mouth	<ul style="list-style-type: none"> <li>- "Area located between Tree River and Thunder River has been identified as an important fishing area"</li> <li>- Suspected spawning area for grayling and burbot just upstream of the mouth.</li> <li>- Traditional fishing</li> <li>- Traditional fishing; for Inconnu peak July 25 to August 10, for broad whitefish peak August 25 – September 10, for lake whitefish peak August 25 – September 25.</li> </ul>	<ul style="list-style-type: none"> <li>Western Geco, February 2003</li> <li>McCart et al, April 1974</li> <li>Jennifer Walker-Larsen, Fisheries Biologist- GRRB (pers comm.)</li> <li>Dan Andre, Traditional Gwich'in Harvester (pers comm.)</li> </ul>
	Thunder River	1 km downstream of river mouth to 1 km upstream of river mouth	<ul style="list-style-type: none"> <li>- Serves as a spawning and nursery area for grayling, lake trout, round and broad whitefish. Pond smelts, pike, and longnose sucker caught at the mouth.</li> <li>- Sensitive from May-November</li> </ul>	<ul style="list-style-type: none"> <li>McCart et al, April 1974</li> </ul>
	Travaillant River	1 km downstream of river mouth to 1 km upstream of river mouth	<ul style="list-style-type: none"> <li>- Resident population of broad whitefish as well as a migratory population</li> <li>- Traditional fishing; for Inconnu peak August 1 - 15, for broad whitefish peak September 1 - September 20, for lake whitefish peak September 1 – 30.</li> </ul>	<ul style="list-style-type: none"> <li>Jennifer Walker-Larsen, Fisheries Biologist- GRRB (pers comm.)</li> <li>Jennifer Walker-Larsen, Fisheries Biologist- GRRB (pers comm.)</li> <li>Ken Chang-kue, Biologist-DFO (pers comm.)</li> <li>Dan Andre, Traditional Gwich'in Harvester (pers comm.)</li> </ul>
<i>Sahlu Settlement Area</i>				
	Redstone River	1 km downstream of river mouth to 1 km upstream of river mouth	<ul style="list-style-type: none"> <li>- Possible congregation of bull trout</li> </ul>	<ul style="list-style-type: none"> <li>George Low, Fisheries Biologist-DFO (pers comm)</li> <li>Ken Chang-kue, Biologist-DFO (pers comm.)</li> <li>Sahlu Renewable Resource Board- (pers. Comm.)</li> </ul>
	Keele River	1 km downstream of river mouth to 1 km upstream of river mouth	<ul style="list-style-type: none"> <li>- Possible congregation of bull trout</li> </ul>	<ul style="list-style-type: none"> <li>George Low, Fisheries Biologist-DFO (pers comm)</li> <li>Ken Chang-kue, Biologist-DFO (pers comm.)</li> <li>Sahlu Renewable Resource Board- (pers. Comm.)</li> </ul>

Region	Sensitive Area	Shut Down Zone/ Avoidance Area	Rationale	Source
<i>Sahtu Settlement Area</i>				
	Great Bear River	1 km downstream of river mouth to 1 km upstream of river mouth	Probable migratory route for grayling, pike, Arctic cisco, round whitefish, and possibly inconnu. Resident population of grayling throughout the year. Domestically fished near Fort Norman (Tulita)	McCart et al, April 1974
	Hume River to Ramparts and Upper Part of Ramparts		Local fishing eddies, fish congregation	George Low, Fisheries Biologist-DFO (pers comm) Ken Chang-kue, Biologist-DFO (pers comm.) Sahtu Renewable Resource Board- (pers. Comm.)
	Loon River	1 km downstream of river mouth to 1 km upstream of river mouth	Important area for spawning and congregation of broad whitefish, burbot, bull trout, inconnu and other species. Fishing eddies for community of Fort Good Hope. Being considered as a protected area.	George Low, Fisheries Biologist-DFO (pers comm) Neil Mochmacz, Fish Habitat Biologist-DFO (pers comm.) Roger Boniface, Fort Good Hope RRC - (pers comm.) Sahtu Renewable Resource Board- (pers. Comm.) Western Geco, February 2003
	Carcajou River	1 km downstream of river mouth to 1 km upstream of river mouth	Camp that is used for fishing year round Spawning and nursery area for longnose sucker, longnose dace, pike, and grayling.	Roger Boniface, Fort Good Hope RRC - (pers comm.)
	Mountain River	1 km downstream of river mouth to 1 km upstream of river mouth	Possible spawning area for whitefish spp, cisco spp, nine spine sticklebacks and lake chub	McCart et al, April 1974
	Ontaratic River	1 km downstream of river mouth to 1 km upstream of river mouth	Fish congregation area	George Low, Fisheries Biologist-DFO (pers comm) Sahtu Renewable Resource Board- (pers. Comm.)
	Oscar Creek	1 km downstream of creek mouth to 1 km upstream of creek mouth	Fish congregation area Population of Arctic cisco, large back eddies- important holding area-migrate up river in early fall	George Low, Fisheries Biologist-DFO (pers comm) Ken Chang-kue, Biologist-DFO (pers comm.) Northern Land Use Information Series Maps Sahtu Renewable Resource Board- (pers. Comm.) Richard Popko- RWED Norman Wells (pers. Comm.)
			Fish congregation area	Jennifer Walker-Larsen, Fisheries Biologist- GRRB (pers comm.) Sam Stephenson, Environmental Science Biologist-DFO (pers comm) Northern Land Use Information Series Maps Sahtu Renewable Resource Board- (pers. Comm.)
			-Northern pike, walleye, grayling, whitefish common- suitable habitat for spawning -Provides spawning habitat for walleye in the middle reach of the Mackenzie River where this species is not common -Walleye spawning run in early summer- June/ July	Northern Land Use Information Series Maps Ken Chang-kue, Biologist-DFO (pers comm.) Richard Popko- RWED Norman Wells (pers. Comm.) Sahtu Renewable Resource Board- (pers. Comm.)

Region	Sensitive Area	Shut Down Zone/ Avoidance Area	Rationale	Source
<i>Sahtu Settlement Area</i>				
	Rengleng River	1 km downstream of river mouth to 1 km upstream of river mouth	-Fish congregation area. Migratory run of broad whitefish, lake whitefish, and inconnu, and supports a noteworthy pike population -River utilized by grayling and pike as a spawning and nursery area. Burbot and inconnu fry caught at the mouth. Sensitive from May-November Domestic fishing	Ken Chang-kue, Biologist-DFO (pers comm.)  McCart et al, April 1974
	12 Mile Point			Wilfred Lennie- Tulita Renewable Resource Board (pers.comm)
	Sucker Creek	1 km downstream of creek mouth to 1 km upstream of creek mouth	Arctic Grayling run June/early summer, feeding area for burbot prior to spawning under new ice in the fall. 3 camps located here.	Richard Popko- RWED Norman Wells (pers. Comm.)
	Blue Fish Creek	1 km downstream of creek mouth to 1 km upstream of creek mouth	-Domestic fishing, grayling and whitefish -Grayling feeding/ staging area of grayling from Sucker Creek stock	Wilfred Lennie- Tulita Renewable Resource Board (pers.comm) Richard Popko- RWED Norman Wells (pers. Comm.) Sahtu Renewable Resource Board- (pers. Comm.)
<i>Deh Cho Region</i>				
	Birch River	1 km downstream of river mouth to 1 km upstream of river mouth	-Bull trout congregation area -Spawning and nursery habitat for Arctic grayling, longnose sucker, and other species	Neil Mochmacz, Fish Habitat Biologist-DFO (pers comm.) Stewart & Low, 2000
	Netla River	1 km downstream of river mouth to 1 km upstream of river mouth	-Bull trout congregation area -Fish movements, possible spawning mid May-beginning of July, important to Nahanni Butte	Neil Mochmacz, Fish Habitat Biologist-DFO (pers comm.) Northern Land Use Information Series Maps
	Katanelee River	1 km downstream of river mouth to 1 km upstream of river mouth	Possible congregation of bull trout and other species	George Low, Fisheries Biologist-DFO (pers comm)
	Petitot River	1 km downstream of river mouth to 1 km upstream of river mouth	-Local fishing and congregation area -"The mouth of the Petitot River at the confluence with the Liard River is likely an important feeding habitat for fish during high sediment load events in the Liard River"	George Low, Fisheries Biologist-DFO (pers comm) Western Geco, February 2003
	Blackstone River	1 km downstream of river mouth to 1 km upstream of river mouth to 1 km upstream of river mouth	River mouth habitat	George Low, Fisheries Biologist-DFO (pers comm)

## REFERENCES

Land Use Information Series Maps. 1978. Indian and Northern Affairs Canada

McCart, P, Griffiths, W, Gossen, C Aquatic Environments Ltd. And Bain, H, Tripp, D Northern Engineering Services Company Ltd.. 1974. Arctic Gas Biological Report Series Volume 16 Catalogue of Lakes and Streams in Canada Along Routes of the Proposed Arctic Gas Pipeline From the Alaskan/ Canadian Border to the 60<sup>th</sup> Parallel

Stewart, D.B & G.Low. 2000. A Review of Information on Fish Stocks and Harvests in the Deh Cho Area, NWT. Canadian Manuscript Report of Fisheries and Aquatic Sciences 2549

Western Geco. February 2003. Environmental Assessment for the WesternGeco Mackenzie and Liard Rivers 2D Seismic Program 2003

## PERSONAL COMMUNICATIONS

Boniface, Roger. Fort Good Hope Renewable Resource Council, Fort Good Hope, NT

Chang-Kue, K.T.J. Department of Fisheries and Oceans, 501 Towerhill Rd, Peterborough, ON, K9H 7S3

Larson, J Walker. Gwich'in Renewable Resource Board, Inuvik, NT, X0E 0T0

Lennie, Wilfred. Tulita Renewable Resource Council. Tulita, NT

Low, George. Department of Fisheries and Oceans, 42043 MacKenzie Hwy, Hay River, NT

Mochnacz, Neil. Department of Fisheries and Oceans. 501 University Cr Winnipeg, MB, R3T 2N6

Popko, Richard. RWED-GNWT. Norman Wells, NT

Sahtu Renewable Resources Board, PO Box 134, Tulita, NT

Stephenson, Sam. Department of Fisheries and Oceans. Box 1871 Inuvik, NT. X0E 0T0